SECONDARY MATHEMATICS
Curriculum

Scranton School District
Scranton, PA

Acknowledgements

The Scranton School District Secondary Mathematics Committee was charged with updating the Scranton School District's secondary mathematics curriculum. The committee revised the Mathematics Curriculum Pathways, selected new mathematics textbooks for grades seven, eight, Algebra I, Geometry, and Algebra II/Trigonometry (including Algebra II), and developed the Scranton School District Curriculum Guides in Mathematics for the state tested content areas (both currently tested and proposed).

The following are members of this committee:

John Marichak, Supervisor of Secondary Education
Susan Burns
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All remaining mathematics subject area curriculum guides (non-state tested) were developed during the second wave of the curriculum writing process. In addition to the original committee, the following teachers developed guides in their areas of expertise to complete the process.

Tony Battaglia
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David Failing
PJ Hughes
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Tammy McClure

Common Core 8P Concepts of Algebra

Curriculum Guide

Scranton School District

Scranton, PA

Common Core 8P Concepts of Algebra

Prerequisites:

- Successful completion of Common Core Math 7P

In addition, the students must meet 2 out of 3 criteria:

- A grade of 80 or higher in a Common Core Math 7P
- Teacher recommendation from the 7th grade math teacher
- Students must perform proficient on the seventh grade PSSA

Course Description

Students will demonstrate an understanding of the connections between the various branches of mathematics by applying computational skills, mathematical reasoning, and introductory algebraic and geometric principles to model and solve real life problems. Students will demonstrate a proficient understanding of rational and irrational numbers, exponents and scientific notation, proportional relationships, linear equations, functions, systems of equations, geometry, angle relationships, volume, statistics and probability.

After successfully completing this course, students will be allowed to enroll in
Honors Algebra I K/CC or Algebra I K/CC.

Year-at-a-glance

Scranton School District
Curriculum Guide

Subject: Common Core 8P Concepts of Algebra	**Grade Level: 8th**	**Date Completed: 10/22/14**

1st Quarter

Topic	Resources	CCSS
Linear Equations: One Variable	Big Ideas Math Blue, Ch. 1 Lesson 1-4	8.EE 7a,b
Geometry	Big Ideas Math Blue, Ch. 2, Lessons 1-7	8.G 1 a,b,c, 2,3,4
Angle Relationship	Big Ideas Math Blue, Ch.3, Lessons 1-4	8.G 5

2nd Quarter

Topic	Resources	CCSS
Graphing linear Equations	Big Ideas Math Blue, Ch. 4 Lessons 1-2	8. EE 7a
Proportional Relationships	Big Ideas Math Blue, Ch. 4 Lessons 3	8.EE 5
Slope/ linear Equations	Big Ideas Math Blue, Ch. 4 Lessons 4-7	8.EE.6 8.EE.7b 8.F.3

3rd Quarter

Topic	Resources	CCSS
Systems of Equations	Big Ideas Math Blue Ch. 5 lessons 1-4	8.EE 8a,b,c
Functions	Big Ideas Math Blue Ch. 6 lessons 1-2	8.F 1,2
Functions & Linear Relationships	Big Ideas Math Blue Ch. 6 lessons 3-5	8.F 4,5

4th Quarter

Topic	Resources	CCSS
Rational & Irrational Numbers, Pythagorean Theorem	Big Ideas Math Blue Ch. 7 Lessons 1-5	8.NS 1,2 8.G 6,7,8
Volume	Big Ideas Math Blue Ch. 8 Lessons 1-4	8.G 9
Statistics & Probability	Big Ideas Math Blue Ch. 9 Lessons 1-4	8.SP 1,2,3,4
Exponents & Scientific Notation	Big Ideas Math Blue Ch. 10 Lessons 1-7	8.EE 1,2,3,4
Linear Equations/Slope (Review)	Big Ideas Math Blue Ch. 4 Lessons 4-7	8.EE.6,7b 8.F.3
Systems of Equations (Review)	Big Ideas Math Blue Ch. 5 Lessons 1-4	8.EE.8 a,b,c
Final Exam Review	Big Ideas Math Blue	All

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* When Common Core becomes fully implemented, the suggested timeline should be adjusted accordingly.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time *
Solving Linear Equations	**8.EE 7a,b**	**One-Step, Multi-Step, Variables on Both Sides Solutions** • **One Solution** • **Infinite Solutions** • **No Solutions**	• **Big Ideas Math Blue, 1.1-1.4** • **Bigideasmath.com** • **Triumph Learning CC Coach**	**Teacher prepared tests, quizzes, etc.** **Bigideasmath.com, Series available assessments online. (optional)**	**15 days**
Geometry	**8.G 1 a,b,c 2,3,4**	**Translations, , Reflections, Rotations, Dilations** • **Properties** • **Congruence** • **Effects** • **Similarity**	• **Big Ideas Math Blue,2.1-2.7** • **Bigideasmath.com** • **Triumphlearning CC Support Coach Lesson 10-14** • **Triumphlearning CC Coach Lesson 18-23** • **Promethean Board etc.**		**15 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Angle Relationships	**8.G 5**	**Parallel Lines** **Angles** **Angle Sums and Triangles** • **Interior Angles** • **Exterior Angles** • **Similarity** **Parallel Lines cut by a Transversal** **Applications to Coordinate System**	• **Big Ideas Math Blue, 3.1-3.4** • **Triumphlearning CC Support Coach Lesson 15-16** • **Triumphlearning CC Coach Lesson 24-27** • **Promethean Board etc.**		**10 days**
Graphing **&** **Proportional Relationships**	**8.EE 7a** **8.EE 5.**	• **Graphing Linear Equations: One and Two Variables** • **Proportional Relationships** • **Graphing proportional relationships** • **Comparing proportional relationships in different ways** • **Unit Rate** • **Interpreting unit rate as the slope of a graph**	• **Big Ideas Math Blue, 4.1-4.3** • **Triumphlearning CC Support Coach Lesson 4,6** • **Crosswalk Coach Lesson 9-10,12-14, 23** • **Triumphlearning CC Coach Lesson 7,9** • **Promethean Board etc**		**22 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Slope/Linear Equations	**8.EE 6** **8.EE 7b** **8. F 3**	**Determine slope:** • **Visually** • **Formula: given two points** • **Use to derive** $y = mx + b$	• **Big Ideas Math Blue, 4.4-4.7** **Triumphlearning CC Support Coach Lesson 5-6** • **Triumphlearning CC Coach Lesson 8-9,15** • **Promethean Board etc.**		**22 days**
Systems of Equations	**8.EE 8 a,b,c**	**Types of Solutions** **Solve by** • **Graphing,** • **Substitution** • **Elimination** **Real Life Applications**	• **Big Ideas Math Blue, 5.1-5.4** • **Triumphlearning CC Support Coach Lesson 7** • **Triumphlearning CC Coach Lesson 10-12**		**20 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Functions & Linear Relationships	**8.F 1,2** **8.F 4,5**	**Definition and Graph** **Determine function rule** • **from table of values** • **from a graph** **Rate of Change and Initial Value** **Linear and Non-Linear Functions** • **Increasing/decreasing** • **Linear/nonlinear**	• **Big Ideas Math Blue, 6.1-6.5** • **Triumphlearning CC Support Coach Lesson8, 9** • **Triumphlearning CC Coach Lesson 13-17** • **Promethean Board etc.**		**18 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Rational & Irrational Numbers	**8.NS 1,2** **8.G 6,7,8** **8 EE 6**	**Classify real numbers** **Irrational Numbers** • **Estimate the value** • **Comparing and ordering all real numbers** **Square roots & Cube roots** **Pythagorean Theorem** • **Proof and Converse** • **Applications in Two and Three Dimensions** • **Explain slope using similar triangles**	• **Big Ideas Math Blue, 7.1-7.4** • **Triumphlearning CC Support Coach Lesson 1** • **Crosswalk Coach Lesson 1-4** • **Triumphlearning CC Coach Lesson 1-2** • **Promethean Board etc**		**5 days**
Volume	**8.G 9**	**Volumes of Cones, Cylinders, Spheres** • **Formulas** • **Applications**	• **Big Ideas Math Blue, 8.1-8.4** • **Triumphlearning CC Support Coach Lesson 17** • **Triumphlearning CC Coach Lesson 28** • **Promethean Board etc.**		**4 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Statistics & Probability	**8.SP 1,2,3,4**	**Scatter Plots** • **Construct** • **Interpret** • **Lines of best fit (Slope and Intercept)** **Stem and Leaf Plots** **Two Way Tables** • **Construct** • **Interpret**	• **Big Ideas Math Blue, 9.1-9.3** • **Triumphlearning CC Support Coach Lesson 18-20** • **Triumphlearning CC Coach Lesson 29-32** • **Promethean Board etc.**		**12 days**
Exponents & Scientific Notation	**8 EE 1,2,3,4**	**Operations involving exponents** • **Integer (positive/negative)** • **Radical** **Scientific Notation** • **Operations involving scientific notation** • **Applications**	• **Big Ideas Math Blue, 10.1-10.7** • **Triumphlearning CC Support Coach Lesson 2-3** • **Triumphlearning CC Coach Lesson 3-6** • **Promethean Board etc**		**10 days**
Review of Linear Equations/Slope	**8.EE.6,7b 8.F.3**	**Review of these topics in preparation for Algebra 1**	• **Big Ideas Math Blue, 4.4-4.7**		**12 days**
Systems of Equations	**8.EE.8a,b,c**	**Review of topic in preparation for Algebra 1**	• **Big Ideas Math Blue, 5.1-5.4**		**9 days**
Final Exam Review	**All**	**Review of all topics for final exam**	• **Big Ideas Math Blue**		**6 days**

Algebra I Part 10B

Curriculum Guide

Scranton School District

Scranton, PA

Algebra I 10B

Prerequisite :

- Successful completion of Algebra I Part 9A

Intended Audience: This course is designed for the student who has successfully completed Algebra I Part 9A by the end of the 9th grade.

Algebra I Part 9A 3010 and Algebra I Part 10B/K 3020

Algebra I Part 9A and Algebra I Part 10B/K together create an Algebra I course taken over two years. The students who select Algebra I Part 9A in ninth grade will complete their studies of Algebra I when they complete the Algebra I Part 10B/K course in tenth grade. These Algebra courses are designed for students who may experience difficulty with a one year Algebra I course Topics covered focus on the Pennsylvania Common Core Standards and are parallel to the Algebra I course, presenting all the same major topics but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts.

At the culmination of the Algebra I Part 10B/K, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. After successfully completing the course, students will be allowed to enroll in Geometry 11 or Applied Geometry 11.

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Year-at-a-glance

Subject: Algebra I Part 10B	**Grade Level: 10**	**Date Completed: 10-22-14**

1st Quarter

Topic	Resources	CCSS
Review: simplifying/evaluating expressions, solving equations, solving inequalities in 1 variable, graphing linear equations in 2 variables	Big Ideas Math Algebra I Supplemental Material	
Graphing systems of linear equations	Big Ideas Math Algebra I Chapter 5	A1.1.2.2.1, A1.1.2.2.2

2nd Quarter

Topic	Resources	CCSS
Graph Systems of linear inequalities in 2 variables	Big Ideas Math Algebra I Chapter 5	A1.1.3.2.1, A1.1.3.2.2
Rules for exponents and square roots	Big Ideas Math Algebra I Chapter 6	A1.1.1.3.1
Add and subtract polynomial expressions	Big Ideas Math Algebra I Chapter 7	A1.1.1.5.1

3rd Quarter

Topic	Resources	CCSS
Multiplying polynomials	Big Ideas Math Algebra I Chapter 7	A1.1.1.5.1
Factoring Polynomials	Big Ideas Math Algebra I Chapter 7	A1.1.1.2.1, A1.1.1.52
Simplifying Square Roots	Big Ideas Math Algebra I Chapter 6 and 10	A1.1.1.3.1
Data Analysis and Probability	Big Ideas Math Algebra I Chapter 7	A1.2.3.2.2, A1.2.3.2.1, A1.2.3.1.1, A1.2.3.3.1,

4th Quarter

Topic	Resources	CCSS
Solving Quadratic Equations using the quadratic formula	Big Ideas Math Algebra I Chapter 7.4	HSA-APR.B.3 HSA-REI.4b
Graphing Quadratic Equations	Big Ideas Math Algebra I Chapter 8.1-8.3	HSF-IF.C.7a
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Review		**Simplifying/evaluating expressions, solving equations, solving inequalities in 1 variable, graphing linear equations in 2 variables**			**25 days**
Systems of Linear Equations	**A1.1.2.2.1**	**Write and/or solve a system of linear equations, including problem, using graphing , substitution, and/or elimination.**	**Big Ideas Math Algebra I** **Chapter 5.1-5.4** **Engage NY** **Module 4 Topic D Lesson 24-30** **https://www.engageny.org/resource/grade-8-mathematics**		**20 days**
Interpret solutions to Linear Systems.	**A1.1.2.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear equations**	**Big Ideas Math Algebra I** **Chapter 5.1-5.4** **Keystone Unit 3 Lesson 3**		**10 days**
Systems of Linear Inequalities	**A1.1.3.2.1**	**Write and/or solve a system of Linear Inequalities using graphing. Limit to two linear inequalities.**	**Big Ideas Math Algebra I** **Chapter 5.6-5.7**		**15 days**

Interpret solutions to Linear Inequalities	**A1.1.3.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear inequalties**	**Big Ideas Math Algebra I** **Chapter 5.6-5.7** **Keystone Unit 4 Lesson 3**		**5 days**
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Big Ideas Math Algebra I** **Chapter 6.1** **Keystone WB** **Unit 1 Lesson 4** **Engage NY Module 1 Topic A Lessons 1-6** **https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-1**		**10 days**
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Keystone WB** **Unit 1 Lesson 2** ***Supplement resources will be needed**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.5.1**	**Add, subtract, and/or multiply polynomial expressions (express answer in simplest form) Nothing larger than a binomial multiplied by a trinomial.**	**Big Ideas Math Algebra I** **Chapter 7.1-7.3** **Keystone Unit 2 Lesson 2**		**5 days**

GCF and LCM for monomials	**A1.1.1.2.1**	**Find the Greatest Common Factor and/or Least Common Multiple for sets of monomials**	**Keystone WB** **Unit 1 Lesson 3** ***Supplement resources will be needed**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials. Trinomials limited to the form $ax^2 + bx + c$, where *a* is equal to 1 after factoring out all monomials factors.**	**Big Ideas Math Algebra I** **Chap 7.4-7.7** ***7.8 See Standard**		**15 days**
Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials. *including factoring ax^2+bx+c and factoring by grouping**	**Big ideas Math Algebra I Chapter 7**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.5.3**	**Simplify/reduce a rational algebraic expression.**	**Keystone WB** **Unit 2 Lesson 5** ****Login to site – Common Core 2014 – Purple infinity Big Ideas Math Algebra I BK Sect 11.3**		**10 days**
Simplify expressions involving polynomials	**A1.1.1.1.2**	**Simplify Square Roots (e.g., $\sqrt{24} = 2\sqrt{6}$)**	**Keystone WB** **Unit 1 Lesson 2** ***Supplement resources will be needed**		**5 days**

Solving Quadratic Equations	**HSA-APR.B.3 HSA-REI.4b**	**Identify the zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.** **Solve quadratic equations by factoring as appropriate to the initial form of the equation.**	**Big Ideas Math Algebra I Chapter 7.4, 7.5, 7.6, 9.2, 9.3, 9.4, 9.5**		**10 days**
Graphing Quadratic Functions	**HSF-IF.C.7a**	**Graph quadratic functions and show intercepts, maxima, and minima**	**Big Ideas Math Algebra I Section 8.1-8.3**		**5 days**
Apply Probability to practical situations	**A1.2.3.3.1**	**Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.**	**Big Ideas Math Algebra I Chapter 11**		**5 days**
Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Big Ideas Math Algebra I Chapter 11**		**5 days**

Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Big Ideas Math Algebra I Chapter 11**		**5 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.2**	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Big Ideas Math Algebra I Chapter 11**		**5 days**
Final Exams/ Review					**10 Days**

Algebra I Part 11B

Curriculum Guide

Scranton School District

Scranton, PA

Algebra I 11B

Prerequisite :

- Successful completion of Algebra I Part 10A

Intended Audience: This course is designed for the student who has successfully completed Algebra I Part 10A by the end of the 10th grade.

Algebra I Part 9A 3010 and Algebra I Part 10B/K 3020

Algebra I Part 9A and Algebra I Part 10B/K together create an Algebra I course taken over two years. The students who select Algebra I Part 9A in ninth grade will complete their studies of Algebra I when they complete the Algebra I Part 10B/K course in tenth grade. These Algebra courses are designed for students who may experience difficulty with a one year Algebra I course Topics covered focus on the Pennsylvania Common Core Standards and are parallel to the Algebra I course, presenting all the same major topics but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts.

At the culmination of the Algebra I Part 10B/K, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. After successfully completing the course, students will be allowed to enroll in Geometry 11 or Applied Geometry 11.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra I Part 10B	**Grade Level: 10**	**Date Completed: 10-22-14**

1st Quarter

Topic	**Resources**	**CCSS**
Review: simplifying/evaluating expressions, solving equations, solving inequalities in 1 variable, graphing linear equations in 2 variables	Big Ideas Math Algebra I Supplemental Material	
Graphing systems of linear equations	Big Ideas Math Algebra I Chapter 5	A1.1.2.2.1, A1.1.2.2.2

2nd Quarter

Topic	Resources	CCSS
Graph Systems of linear inequalities in 2 variables	Big Ideas Math Algebra I Chapter 5	A1.1.3.2.1, A1.1.3.2.2
Rules for exponents and square roots	Big Ideas Math Algebra I Chapter 6	A1.1.1.3.1
Add and subtract polynomial expressions	Big Ideas Math Algebra I Chapter 7	A1.1.1.5.1

3rd Quarter

Topic	Resources	CCSS
Multiplying polynomials	Big Ideas Math Algebra I Chapter 7	A1.1.1.5.1
Factoring Polynomials	Big Ideas Math Algebra I Chapter 7	A1.1.1.2.1, A1.1.1.52
Simplifying Square Roots	Big Ideas Math Algebra I Chapter 6 and 10	A1.1.1.3.1
Data Analysis and Probability	Big Ideas Math Algebra I Chapter 7	A1.2.3.2.2, A1.2.3.2.1, A1.2.3.1.1, A1.2.3.3.1,

4th Quarter

Topic	Resources	CCSS
Solving Quadratic Equations using the quadratic formula	Big Ideas Math Algebra I Chapter 7.4	HSA-APR.B.3 HSA-REI.4b
Graphing Quadratic Equations	Big Ideas Math Algebra I Chapter 8.1-8.3	HSF-IF.C.7a
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Review		**Simplifying/evaluating expressions, solving equations, solving inequalities in 1 variable, graphing linear equations in 2 variables**			**25 days**
Systems of Linear Equations	**A1.1.2.2.1**	**Write and/or solve a system of linear equations, including problem, using graphing , substitution, and/or elimination.**	**Big Ideas Math Algebra I** **Chapter 5.1-5.4** **Engage NY** **Module 4 Topic D Lesson 24-30** **https://www.engageny.org/resource/grade-8-mathematics**		**20 days**
Interpret solutions to Linear Systems.	**A1.1.2.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear equations**	**Big Ideas Math Algebra I** **Chapter 5.1-5.4** **Keystone Unit 3 Lesson 3**		**10 days**
Systems of Linear Inequalities	**A1.1.3.2.1**	**Write and/or solve a system of Linear Inequalities using graphing. Limit to two linear inequalities.**	**Big Ideas Math Algebra I** **Chapter 5.6-5.7**		**15 days**

Interpret solutions to Linear Inequalities	**A1.1.3.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear inequalties**	**Big Ideas Math Algebra I** **Chapter 5.6-5.7** **Keystone Unit 4 Lesson 3**		**5 days**
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Big Ideas Math Algebra I** **Chapter 6.1** **Keystone WB** **Unit 1 Lesson 4** **Engage NY Module 1 Topic A Lessons 1-6** **https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-1**		**10 days**
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Keystone WB** **Unit 1 Lesson 2** ***Supplement resources will be needed**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.5.1**	**Add, subtract, and/or multiply polynomial expressions (express answer in simplest form) Nothing larger than a binomial multiplied by a trinomial.**	**Big Ideas Math Algebra I** **Chapter 7.1-7.3** **Keystone Unit 2 Lesson 2**		**5 days**

GCF and LCM for monomials	**A1.1.1.2.1**	**Find the Greatest Common Factor and/or Least Common Multiple for sets of monomials**	**Keystone WB** **Unit 1 Lesson 3** ***Supplement resources will be needed**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials. Trinomials limited to the form $ax^2 + bx + c$, where a is equal to 1 after factoring out all monomials factors.**	**Big Ideas Math Algebra I** **Chap 7.4-7.7** ***7.8 See Standard**		**15 days**
Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials.** ***including factoring ax^2+bx+c and factoring by grouping**	**Big ideas Math Algebra I Chapter 7**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.5.3**	**Simplify/reduce a rational algebraic expression.**	**Keystone WB** **Unit 2 Lesson 5** ****Login to site – Common Core 2014 – Purple infinity Big Ideas Math Algebra I BK Sect 11.3**		**10 days**
Simplify expressions involving polynomials	**A1.1.1.1.2**	**Simplify Square Roots (e.g., $\sqrt{24} = 2\sqrt{6}$)**	**Keystone WB** **Unit 1 Lesson 2** ***Supplement resources will be needed**		**5 days**

Solving Quadratic Equations	**HSA-APR.B.3 HSA-REI.4b**	**Identify the zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.** **Solve quadratic equations by factoring as appropriate to the initial form of the equation.**	**Big Ideas Math Algebra I Chapter 7.4, 7.5, 7.6, 9.2, 9.3, 9.4, 9.5**		**10 days**
Graphing Quadratic Functions	**HSF-IF.C.7a**	**Graph quadratic functions and show intercepts, maxima, and minima**	**Big Ideas Math Algebra I Section 8.1-8.3**		**5 days**
Apply Probability to practical situations	**A1.2.3.3.1**	**Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.**	**Big Ideas Math Algebra I Chapter 11**		**5 days**
Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Big Ideas Math Algebra I Chapter 11**		**5 days**

Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Big Ideas Math Algebra I Chapter 11**		**5 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.2**	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Big Ideas Math Algebra I Chapter 11**		**5 days**
Final Exam Review					**10 Days**

Algebra I Accelerated K/CC

Curriculum Guide

Scranton School District

Scranton, PA

Scranton School District
Curriculum Guide

Algebra I Accelerated K/CC

Prerequisites:

- A grade of 90 or higher in Common Core 7th Grade Accelerated
- Teacher recommendation from seventh grade Common Core 7th Grade Accelerated
- Students must perform in the top 1/3 of the proficient or advance scores on the PSSA.
- Students must maintain an average of 90 or above by the end of the 1st quarter to remain in the class
- Parent's consent

*Students entering from other schools or districts, who did not take a placement test in sixth grade, must pass the Algebra Placement Test for eighth grade with a score of 90 or better.

The 8th grade Algebra I Accelerated K/CC establishes strong algebraic thinking and problem solving skills necessary for further work in mathematics. This course involves working with abstract expressions, using mathematical models to represent real-world problems, and solving open sentences. Topics presented in this course include but are not necessarily limited to:

- structure and properties of the real number system
- algebraic notation including radicals, exponents, absolute value
- varied means for analyzing and expressing patterns, relations and functions including words, tables, graphs, sequences,
- linear equations
- quadratic equations
- systems of equations and inequalities
- polynomials and operations with polynomials including factoring
- data analysis
- probability
- problem solving strategies

At the culmination of this course, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. Successfully completing Algebra I Accelerated K/CC in eighth grade affords the students the opportunity to study Calculus in their senior year of high school. After successfully completing this course, students who meet the proper prerequisites will be enrolled in Honors Geometry or Geometry 9 in ninth grade.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra I Accelerated K/CC	Grade Level: 8th	Date Completed: 10/28/14

1st Quarter

Topic	Resources	CCSS
Represent and/or use numbers in equivalent forms	Keystone Finish Line WB - Unit 1 Lesson 1	A1.1.1.1.1
Use Estimation strategies in problem-solving situations	Keystone Finish Line WB - Unit 2 Lesson 1	A1.1.1.4.1
Linear Equations	Big Ideas Algebra I - Chapter 1 Keystone Unit 3 Lesson 1	A1.1.2.1.2
Linear Inequalities	Big Ideas Algebra I - Chapter 2 Keystone Unit 4 Lesson 1	A1.1.3.1.3, A1.1.3.1.2, A1.1.3.1.1
Functions	Big Ideas Algebra I - Chapter 3.1- 3.5 Keystone WB - Unit 5 Lesson 2	A1.2.1.1.3,A1.2.1.1.2, A1.2.2.1.1
Rate of Change	Big Ideas Algebra I - Chapter 3.2-3.5	A1.2.2.1.1, A1.2.2.1.2

2nd Quarter

Topic	Resources	CCSS
Linear Equations with two variables	**Big Ideas Algebra I - Chapter 4.1-4.4**	**A1.2.2.1.3, A1.2.2.1.4, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2 A1.2.2.2.1,**
Systems of Linear Equations	**Big Ideas Algebra I - Chapter 5.1-5.4**	**A1.1.2.2.1**
Interpret solutions to Linear Systems.	**Big Ideas Algebra I - Chapter 5.1-5.4** **Keystone Finish Line WB - Unit 3 Lesson 3**	**A1.1.2.2.2**
Systems of Linear Inequalities	**Big Ideas Algebra I - Chapter 5.6-5.7**	**A1.1.3.2.1**
Interpret solutions to Linear Inequalities	**Big Ideas Algebra I - Chapter 5.6-5.7** **Keystone Finish Line WB - Unit 4 Lesson 3**	**A1.1.3.2.2**
Transformations Angles and Triangles	**Big Ideas Blue (8th grade) - Chapters 2 and 3**	**8.A.2**
Volume and Similar Solids	**Big Ideas Blue (8th grade) – Chapter 8.1 – 8.3**	**8.A.1**
Pythagorean Theorem	**Big Ideas Blue (8th grade) - Chapter 7**	**8.A.3**

3rd Quarter

Topic	Resources	CCSS
Exponents, Roots and Absolute Value	**Big Ideas Algebra I - Chapter 6.1** **Keystone Finish Line WB - Unit 1 Lesson 4**	**A1.1.1.3.1, A1.1.1.1.2**
Simplify expressions involving polynomials	**Big Ideas Algebra I - Chapter 7.1-7.3** **Keystone Finish Line WB - Unit 2 Lesson 2**	**A1.1.1.5.1**
GCF and LCM for monomials	**Keystone Finish Line WB - Unit 1 Lesson 3**	**A1.1.1.2.1**
Simplify expressions involving polynomials	**Big Ideas Algebra I - Chapter 7.4-7.8** **Keystone Finish Line WB - Unit 2 Lesson 3 &4** **Keystone Finish Line WB - Unit 2 Lesson 5** ****Login to site – bigideasmath.com -Common Core 2014 – Purple Infinity Algebra Book Chapter 11, Section 3**	**A1.1.1.5.2, A1.1.1.5.3**

4th Quarter

Topic	Resources	CCSS
Use measures of dispersion to describe a set of data	**Keystone Finish Line WB – Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11** **See standards**	**A1.2.3.1.1**
Use data displays in the problem-solving settings and/or to make predictions	**Keystone Finish Line WB – Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11** **See standards**	**A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3**
Apply Probability to practical situations	**Keystone Finish Line WB – Unit 7 Lesson 5**	**A1.2.3.3.1**
Final Review		

***The suggested timeline and curriculum content should be adjusted and revised as needed in correlation with the PA State Standards.**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents).	A1.1.1.1.1	Compare and/or order any real numbers. Rational and irrational may be mixed.	Keystone Finish Line WB - Unit 1 Lesson1	Teacher prepared tests, quizzes, etc. Series available assessments online. (Optional)	1 day
Use Estimation strategies in problem-solving situations	A1.1.1.4.1	Use estimation to solve problems	Keystone Finish Line WB - Unit 2 Lesson 1 *Use throughout when appropriate		1 day

Linear equations	**A1.1.2.1.2**	**Use and/or identify an algebraic property to justify any step in an equation-solving process.** **Note: Linear equations only** **Vocabulary:** • **Additive inverse** • **Multiplicative Inverse** • **Commutative property** • **Associative Property** • **Identity Property** • **Distributive Property** • **Multiplicative Property of Zero** • **Additive Property of Equality** • **Multiplicative Property of Equality**	**Big Ideas Algebra I – Chapter 1** **Keystone Finish Line WB - Unit 3 Lesson 1** **Engage NY Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics**		**12 days**
	A1.1.2.1.1	**Write, solve, and/or apply a linear equation (including problem situations).**	**Occurs in every chapter** ***Used throughout**		

Linear Inequalities	**A1.1.3.1.2**	**Identify or graph the solution set to a linear inequality on a number line.**	**Big Ideas Algebra I – Chapter 2** **Keystone Finish Line WB - Unit 4 Lesson 1**		**10 days**
	A1.1.3.1.3	**Interpret solutions to the problems in the context of the problem situations. Note: Linear inequalities only.**	**Big Ideas Algebra I – Chapter 2** **Keystone Finish Line WB - Unit 4 Lesson 1**		
	A1.1.3.1.1	**Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value Inequalities).**	**Big Ideas Algebra I – Chapter 2** **Keystone Finish Line WB - Unit 4 Lesson 2**		
Functions	**A1.2.1.1.3**	**Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Vocabulary:** • **Range** • **Domain**	**Big Ideas Algebra I – Chapter 3.1** **Keystone Finish Line WB - Unit 5 Lesson 2** **Engage NY** Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics		**21 days**

	A1.2.1.1.2	**Determine whether a relation is a function, given a set of points or a graph.**	**Big Ideas Algebra I – Chapter 3.1** **Keystone Finish Line WB - Unit 5 Lesson 2** **Engage NY** Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics		
	A1.2.1.1.1	**Analyze a set of data for the existence of a pattern and represent the pattern Algebraically and/or graphically.**	**Big Ideas Algebra I – Chapter 3.2-3.5** **Engage NY** **Module 4 Topic B 10-14** https://www.engageny.org/resource/grade-8-mathematics		
Rate of Change	**A1.2.2.1.1**	**Identify, describe, and/or use constant rates of change.**	**Big Ideas Algebra I – Chapter 3.2-3.5** **Engage NY** **https://www.engageny.org/resource/grade-8-mathematics-module-4-topic-b-lesson-11**		

	A1.2.2.1.2	**Apply the concept of linear rate of change (slope) to solve problems.**	**Big Ideas Algebra I – Chapter 3.3-3.5** **Engage NY Module 4 Topic C Lesson 15-17** https://www.engageny.org/resource/grade-8-mathematics		
Linear Equations with two variables	**A1.2.2.1.3**	**Write or identify a linear equation when given** • **The graph of the line,** • **Two points on the line, or** • **The slope and a point on the line.** • **Parallel and Perpendicular Lines** **Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.**	**Big Ideas Algebra I – Chapter 4.1-4.3** **Engage NY Module 4 Topic C Lesson 18-23** https://www.engageny.org/resource/grade-8-mathematics		**19 days**
	A1.2.2.1.4	**Determine the slope and/or y-intercept represented by a linear equation or graph.**	**Big Ideas Algebra I – Chapter 4.1**		
	A1.1.2.1.3	**Interpret solutions to problems in the context of the problem situation.** **Note: Linear equations only.**	**Big Ideas Algebra I – Chapter 4.1-4.3** ***Used throughout**		

	A1.2.1.2.1	**Create, interpret, and/or use the equation, graph, or table of al linear function.**	**Big Ideas Algebra I – Chapter 4.1-4.3** ***Used throughout**		
	A1.2.1.2.2	**Translate from one representation of a linear function to another (i.e., graph, table, and equation).**	**Big Ideas Algebra I – Chapter 4.1-4.3** ***Used throughout** **Engage NY** **Module 6 Topic A Lesson 1-5** https://www.engageny.org/resource/grade-8-mathematics		
	A1.2.2.2.1	**Draw, identify, find, and/or write and an equation for a line of best fit for a scatter plot**	**Big Ideas Algebra I – Chapter 4.4** **Engage NY** **Module 6 Topic B & C Lesson 6-9** https://www.engageny.org/resource/grade-8-mathematics		

Systems of Linear Equations	**A1.1.2.2.1**	**Write and/or solve a system of linear equations, including problem, using graphing, substitution, and/or elimination.**	**Big Ideas Algebra I – Chapter 5.1-5.4** **Engage NY Module 4 Topic D Lesson 24-30** https://www.engageny.org/resource/grade-8-mathematics		**19 days**
Interpret solutions to Linear Systems.	**A1.1.2.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear equations**	**Big Ideas Algebra I – Chapter 5.1-5.4** **Keystone Finish Line WB - Unit 3 Lesson 3**		
Systems of Linear Inequalities	**A1.1.3.2.1**	**Write and/or solve a system of Linear Inequalities using graphing. Limit to two linear inequalities.**	**Big Ideas Algebra I – Chapter 5.6-5.7**		
Interpret solutions to Linear Inequalities	**A1.1.3.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear inequalities**	**Big Ideas Algebra I – Chapter 5.6-5.7** **Keystone Finish Line WB - Unit 4 Lesson 3**		
Transformations **Angles and Triangles**	**CC.2.3.8.A.2**	**Understand and apply congruence, similarity, and geometric transformations using various tools.**	**Big Ideas Blue (8th grade) - Chapters 2 and 3**		**3 days**

Volume and Similar Solids	**CC.2.3.A.1**	**Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.**	**Big Ideas Blue (8th grade) - Chapter 8.1 – 8.3**		**2 days**
Pythagorean Theorem	**CC.2.3.8.A.3**	**Understand and apply the Pythagorean Theorem to solve problems.**	**Big Ideas Blue (8th grade) - Chapter 7** **Engage NY Module 2 Topic D Lessons 15 &16 https://www.engageny.org/resource/grade-8-mathematics**		**2 days**
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Big Ideas Algebra I – Chapter 6.1** **Keystone Finish Line WB - Unit 1 Lesson 4** **Engage NY Module 1 Topic A Lessons 1-6 https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-1**		**10 days**
	A1.1.1.1.2	**Simplify Square Roots (e.g., $\sqrt{24} = 2\sqrt{6}$)**	**Keystone Finish Line WB - Unit 1 Lesson 2** ***Supplement resources will be needed**		**10 days**

Simplify expressions involving polynomials	**A1.1.1.5.1**	**Add, subtract, and/or multiply polynomial expressions (express answer in simplest form) Nothing larger than a binomial multiplied by a trinomial.**	**Big Ideas Algebra I – Chapter 7.1-7.3** **Keystone Finish Line WB - Unit 2 Lesson 2**		**10 days**
GCF and LCM for monomials	**A1.1.1.2.1**	**Find the Greatest Common Factor and/or Least Common Multiple for sets of monomials**	**Keystone Finish Line WB - Unit 1 Lesson 3** ***Supplement resources will be needed**		**5 days**
Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials. Trinomials limited to the form $ax^2 + bx + c$, where a is equal to 1 after factoring out all monomials factors.**	**Big Ideas Algebra I – Chapter 7.4-7.8** **Keystone Finish Line WB - Unit 2 Lesson 3 &4**		**15 days**
	A1.1.1.5.3	**Simplify/reduce a rational algebraic expression.**	**Keystone Finish Line WB - Unit 2 Lesson 5** ****Login to site – Common Core 2014 – Purple infinity Algebra Book Chapter 11, Section 3**		

Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Keystone Finish Line WB - Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11**		**10 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Keystone Finish Line WB - Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11 See standards**		
	A1.2.3.2.2	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Keystone Finish Line WB - Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11 See standards**		
	A1.2.3.2.3	**Make predictions using the equations or graphs of best-fit lines of scatter plots**	**Keystone Finish Line WB - Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11 See standards**		
Apply Probability to practical situations	**A1.2.3.3.1**	**Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.**	**Keystone Finish Line WB - Unit 7 Lesson 5**		

Keystone Review and Exam					**10 days**
Selected Topics		• **Solving quadratic equations** • **Completing the square** • **Solving the quadratic formula** • **Graphing quadratics with tables of values** • **Solving radical equations**	**Big Ideas Algebra I – Chapters 9 and 10**		**10 days**
Final Review/Final Exam					**10 days**

Algebra I K/CC

Curriculum Guide

Scranton School District

Scranton, PA

Algebra I K/CC 3210

Prerequisite :

- Successful completion of Common Core 8P Concepts of Algebra

Algebra I establishes strong algebraic thinking and problem solving skills necessary for further work in mathematics. This course involves working with abstract expressions, using mathematical models to represent real-world problems, and solving open sentences. Topics presented in this course include but are not necessarily limited to structure and properties of the real number system, algebraic notation including radicals, exponents, absolute value, varied means for analyzing and expressing patterns, relations and functions including words, tables, graphs, sequences, solving and graphing linear equations, quadratic equations, systems of equations and inequalities, polynomials and operations with polynomials including factoring, data analysis, probability and problem solving strategies.

At the culmination of this course, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. After successfully completing this course, students will be allowed to enroll in Geometry 10.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra I K/CC 3210	Grade Level: 9th	Date Completed: 10-14-14

1st Quarter

Topic	Resources	CCSS
Represent and/or use numbers in equivalent forms	Keystone Finish Line WB Unit 1 Lesson 1	A1.1.1.1.1
Use Estimation strategies in problem-solving situations	Keystone Finish Line WB Unit 2 Lesson 1	A1.1.1.4.1
Linear equations	Big Ideas Algebra I Chapter 1 Keystone Finish Line WB Unit 3 Lesson 1	A1.1.2.1.2
Linear Inequalities	Big Ideas Algebra I Chapter 2 Keystone Finish Line WB Unit 4 Lesson 1	A1.1.3.1.3, A1.1.3.1.2, A1.1.3.1.1

2nd Quarter

Topic	Resources	CCSS
Functions	**Big Ideas Algebra I** **Chapter 3.1- 3.5** **Keystone Finish Line WB** **Unit 5 Lesson 2**	**A1.2.1.1.3,A1.2.1.1.2, A1.2.2.1.1**
Rate of Change	**Big Ideas Algebra I** **Chapter 3.2-3.5**	**A1.2.2.1.1, A1.2.2.1.2**
Linear Equations with two variables	**Big Ideas Algebra I** **Chapter 4.1-4.4**	**A1.2.2.1.3, A1.2.2.1.4, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2 A1.2.2.2.1,**

3rd Quarter

Topic	Resources	CCSS
Systems of Linear Equations	Big Ideas Chapter 5.1-5.4	A1.1.2.2.1
Interpret solutions to Linear Systems.	Big Ideas Chapter 5.1-5.4 Keystone Finish Line WB Unit 3 Lesson 3	A1.1.2.2.2
Systems of Linear Inequalities	Big Ideas Chapter 5.6-5.7	A1.1.3.2.1
Interpret solutions to Linear Inequalities	Big Ideas Chapter 5.6-5.7 Keystone Finish Line WB Unit 4 Lesson 3	A1.1.3.2.2
Exponents, Roots and Absolute Value	Big Ideas Algebra I Chapter 6.1 Keystone Finish Line WB Unit 1 Lesson 4	A1.1.1.3.1, A1.1.1.1.2
Simplify expressions involving polynomials	Big Ideas Algebra I Chapter 7.1-7.3 Keystone Finish Line WB Unit 2 Lesson 2	A1.1.1.5.1

4th Quarter

Topic	Resources	CCSS
GCF and LCM for monomials	**Keystone Finish Line WB** **Unit 1 Lesson 3**	**A1.1.1.2.1**
Simplify expressions involving polynomials	**Big Ideas Algebra I** **Chap 7.4, 7.5, 7.7, 7.8** **Keystone Finish Line WB Unit 2 Lesson 3 &4, Unit 2 Lesson 5** ****Login to site – bigideasmath.com - Common Core 2014 – Purple Infinity Algebra Book Chapter 11, Section 3**	**A1.1.1.5.2, A1.1.1.5.3**
Use measures of dispersion to describe a set of data	**Keystone Finish Line WB** **Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11** **See standards**	**A1.2.3.1.1**
Use data displays in the problem-solving settings and/or to make predictions	**Keystone** **Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11** **See standards**	**A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3**
Apply Probability to practical situations	**Keystone Finish Line WB** **Unit 7 Lesson 5**	**A1.2.3.3.1**
Final Review		

***The suggested timeline and curriculum content should be adjusted and revised as needed in correlation with the PA State Standards.**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents).	A1.1.1.1.1	Compare and/or order any real numbers. Rational and irrational may be mixed.	Keystone Finish Line WB Unit 1 Lesson1	Teacher prepared tests, quizzes, etc. Series available assessments	3 days
Use Estimation strategies in problem-solving situations	A1.1.1.4.1	Use estimation to solve problems	Keystone Finish Line WB Unit 2 Lesson 1 Use throughout when appropriate		2 days

Linear equations	**A1.1.2.1.2**	**Use and/or identify an algebraic property to justify any step in an equation-solving process.** **Note: Linear equations only** **Vocabulary:** • **Additive inverse** • **Multiplicative Inverse** • **Commutative property** • **Associative Property** • **Identity Property** • **Distributive Property** • **Multiplicative Property of Zero** • **Additive Property of Equality** • **Multiplicative Property of Equality**	**Big Ideas Algebra I** **Chapter 1** **Keystone Finish Line WB** **Unit 3 Lesson 1** **Engage NY** **Module 4 Topic A Lessons 1-9** **https://www.engageny.org/resource/grade-8-mathematics**		**20 days**
	A1.1.2.1.1	**Write, solve, and/or apply a linear equation (including problem situations).**	**Occurs in every chapter** ***Use throughout. Number of days not given**		

Linear Inequalities	**A1.1.3.1.2**	**Identify or graph the solution set to a linear inequality on a number line.**	**Big Ideas Algebra I** **Chapter 2** **Keystone Finish Line WB** **Unit 4 Lesson 1**		**20 days**
	A1.1.3.1.3	**Interpret solutions to the problems in the context of the problem situations. Note: Linear inequalities only.**	**Big Ideas Algebra I** **Chapter 2** **Keystone Finish Line WB** **Unit 4 Lesson 1**		
	A1.1.3.1.1	**Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value Inequalities).**	**Big Ideas Algebra I** **Chapter 2** **Keystone Finish Line WB** **Unit 4 Lesson 2**		
Functions	**A1.2.1.1.3**	**Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table).** **Vocabulary:** • **Range** • **Domain**	**Big Ideas Algebra I** **Chapter 3.1** **Keystone Finish Line WB** **Unit 5 Lesson 2** **Engage NY** Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics		**20 days**

	A1.2.1.1.2	**Determine whether a relation is a function, given a set of points or a graph.**	**Big Ideas Algebra I** **Chapter 3.1** **Keystone Finish Line WB** **Unit 5 Lesson 2** **Engage NY** Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics		
	A1.2.1.1.1	**Analyze a set of data for the existence of a pattern and represent the pattern Algebraically and/or graphically.**	**Big Ideas Algebra I** **Chapter 3.2-3.5** **Engage NY** **Module 4 Topic B 10-14** https://www.engageny.org/resource/grade-8-mathematics		
Rate of Change	**A1.2.2.1.1**	**Identify, describe, and/or use constant rates of change.**	**Big Ideas Algebra I** **Chapter 3.2-3.5** **Engage NY** https://www.engageny.org/resource/grade-8-mathematics-module-4-topic-b-lesson-11		

	A1.2.2.1.2	**Apply the concept of linear rate of change (slope) to solve problems.**	**Big Ideas Algebra I** **Chapter 3.3-3.5** **Engage NY** **Module 4 Topic C Lesson 15-17** https://www.engageny.org/resource/grade-8-mathematics		
Linear Equations with two variables	**A1.2.2.1.3**	**Write or identify a linear equation when given** • **The graph of the line,** • **Two points on the line, or** • **The slope and a point on the line.** • **Parallel and Perpendicular Lines** **Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.**	**Big Ideas Algebra I** **Chapter 4.1-4.3** **Engage NY** **Module 4 Topic C Lesson 18-23** https://www.engageny.org/resource/grade-8-mathematics		**25 days**
	A1.2.2.1.4	**Determine the slope and/or y-intercept represented by a linear equation or graph.**	**Big Ideas Algebra I** **Chapter 4.1**		
	A1.1.2.1.3	**Interpret solutions to problems in the context of the problem situation.** **Note: Linear equations only.**	**Big Ideas** **Chapter 4.1-4.3** **Used throughout**		

	A1.2.1.2.1	**Create, interpret, and/or use the equation, graph, or table of al linear function.**	**Big Ideas Algebra I** **Chapter 4.1-4.3** **Used throughout**		
	A1.2.1.2.2	**Translate from one representation of a linear function to another (i.e., graph, table, and equation).**	**Big Ideas Algebra I** **Chapter 4.1-4.3** **Used throughout** **Engage NY** **Module 6 Topic A Lesson 1-5** https://www.engageny.org/resource/grade-8-mathematics		
	A1.2.2.2.1	**Draw, identify, find, and/or write and an equation for a line of best fit for a scatter plot**	**Big Ideas Algebra I** **Chapter 4.4** **Engage NY** **Module 6 Topic B & C Lesson 6-9** https://www.engageny.org/resource/grade-8-mathematics		
Systems of Linear Equations	**A1.1.2.2.1**	**Write and/or solve a system of linear equations, including problem, using graphing , substitution, and/or elimination.**	**Big Ideas** **Chapter 5.1-5.4** **Engage NY** **Module 4 Topic D Lesson 24-30** https://www.engageny.org/resource/grade-8-mathematics		**25 days**

Interpret solutions to Linear Systems.	**A1.1.2.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear equations**	**Big Ideas Chapter 5.1-5.4 Keystone Finish Line WB Unit 3 Lesson 3**		
Systems of Linear Inequalities	**A1.1.3.2.1**	**Write and/or solve a system of Linear Inequalities using graphing. Limit to two linear inequalities.**	**Big Ideas Chapter 5.6-5.7**		
Interpret solutions to Linear Inequalities	**A1.1.3.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear inequalities**	**Big Ideas Chapter 5.6-5.7 Keystone Finish Line WB Unit 4 Lesson 3**		
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Big Ideas Chapter 6.1 Keystone Finish Line WB Unit 1 Lesson 4 Engage NY Module 1 Topic A Lessons 1-6 https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-1**		**10 days**

	A1.1.1.1.2	**Simplify Square Roots (e.g., $\sqrt{24}$ = $2\sqrt{6}$)**	**Keystone Finish Line WB Unit 1 Lesson 2 *Supplemental resources will be needed**		
Simplify expressions involving polynomials	**A1.1.1.5.1**	**Add, subtract, and/or multiply polynomial expressions (express answer in simplest form.) Nothing larger than a binomial multiplied by a trinomial.**	**Big Ideas Algebra I Chapter 7.1-7.3 Keystone Finish Line WB Unit 2 Lesson 2**		**10 days**
GCF and LCM for monomials	**A1.1.1.2.1**	**Find the Greatest Common Factor and/or Least Common Multiple for sets of monomials**	**Keystone Finish Line WB Unit 1 Lesson 3 *Supplemental resources will be needed**		**7 days**
Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials. Trinomials limited to the form ax^2 + bx + c, where a is equal to 1 after factoring out all monomials factors.**	**Big Ideas Algebra I Chap 7.4, 7.5, 7.7, 7.8** **Keystone Finish Line WB Unit 2 Lesson 3 & 4**		**10 days**

	A1.1.1.5.3	**Simplify/reduce a rational algebraic expression.**	**Keystone Finish Line WB Unit 2 Lesson 5 **Login to site – bigideasmath.com - Common Core 2014 – Purple Infinity Algebra Book Chapter 11, Section 3**		
Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Keystone Finish Line WB Unit 7 Sections 1-4 *Big Ideas Algebra I Chap 11.1 – 11.2**		**8 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Keystone Finish Line WB Unit 7 Sections 1-4 *Big Ideas Algebra I Chap 11.1 – 11.3**		
	A1.2.3.2.2	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Keystone Finish Line WB Unit 7 Sections 1-4 *Big Ideas Algebra I Chap 11.1 – 11.3**		

	A1.2.3.2.3	Make predictions using the equations or graphs of best-fit lines of scatter plots	Keystone Finish Line WB Unit 7 Sections 1-4		
Apply Probability to practical situations	A1.2.3.3.1	Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.	Keystone Finish Line WB Unit 7 Lesson 5		
Keystone Review and Exam					5 days
Selected Topics		-Solving quadratic equations -Completing the square -Solving the quadratic formula -Graphing quadratics with a table of values -Solving radical equations	Big Ideas Algebra I Chapters 9 & 10		5 days
Final Review/Exam					10 days

Algebra I Part 10A

Curriculum Guide

Scranton School District

Scranton, PA

Algebra I Part 10A

Prerequisite :

- Successful completion of Pre Algebra in 9th grade.

Intended Audience: This course is designed for the student who has successfully completed Pre-Algebra by the end of the 9th grade.

Algebra I Part 9A and Algebra I Part 10B/K together create an Algebra I course taken over two years. The students who select Algebra I Part 9A in ninth grade will complete their studies of Algebra I when they complete the Algebra I Part 10B/K course in tenth grade. These Algebra courses are designed for students who may experience difficulty with a one year Algebra I course Topics covered focus on the Pennsylvania Common Core Standards and are parallel to the Algebra I course, presenting all the same major topics but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts.

At the culmination of the Algebra I Part 10B/K, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. After successfully completing the course, students will be allowed to enroll in Geometry 11 or Applied Geometry 11.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra I 10A	**Grade Level: 10**	**Date Completed: 10-22-14**

1st Quarter

Topic	Resources	CCSS
Review Pre-Algebra Skills: Evaluating and simplifying expressions, order of operations, integer operations, exponential and standard notation, simplifying basic square roots, review properties of real numbers	**Big Ideas Math Algebra 1** online teacher resources	
Represent and use numbers in equivalent forms	Keystone Finish Line workbook	A1.1.1.1.1

2nd Quarter

Topic	Resources	CCSS
Solving Linear Equations: 1-step, 2-step, combining like terms, with the distributive property, with variables on both sides.	**Big Ideas Math Algebra 1** Chapter 1	A1.1.2.1.2, A1.1.2.1.1
Solving and graphing linear inequalities: including identifying the solution set of an inequality. Solving compound inequalities	**Big Ideas Math Algebra 1** Chapter 2	A1.1.3.1.2, A1.1.3.1.3, A1.1.3.1.1

3rd Quarter

Topic	Resources	CCSS
Concepts of functions: domain/range, determining whether a function is a relation, function notation, evaluating functions	**Big Ideas Math Algebra 1** Chapter 3	A1.2.1.1.3, A1.2.1.1.2, A1.2.1.1.1
Rate of change problems	**Big Ideas Math Algebra 1** hapter 3	A1.2.2.1.1, A1.2.2.1.2
Graph linear equations using t-table, intercepts, and slope and the y intercept	**Big Ideas Math Algebra 1** Chapter 3	A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.1
Scatter plots: writing line of best fit and making predictions	**Big Ideas Math Algebra 1** Chapter 4	A1.2.2.2.1,

4th Quarter

Topic	Resources	CCSS
Writing linear equations	**Big Ideas Math Algebra 1** Chapter 4	A1.2.2.1.3, A1.2.3.2.3
Identifying slope	**Big Ideas Math Algebra 1** Chapter 4	A1.2.2.1.2
Probability and statistics	**Big Ideas Math Algebra 1** Chapter 4	A1.2.3.3.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents).	**A1.1.1.1.1**	**Compare and/or order any real numbers. Rational and irrational may be mixed.**	**Keystone Algebra I Workbook: Chapter 1 Section 1**		**20 days**
Use Estimation strategies in problem-solving situations	**A1.1.1.4.1**	**Use estimation to solve problems**	**Use throughout the year**		**5 days**

Linear Equations	**A1.1.2.1.2**	**Use and/or identify an algebraic property to justify any step in an equation-solving process.** **Note: Linear equations only** **Vocabulary:** • **Additive inverse** • **Multiplicative Inverse** • **Commutative property** • **Associative Property** • **Identity Property** • **Distributive Property** • **Multiplicative Property of Zero** • **Additive Property of Equality** • **Multiplicative Property of Equality**	**Big Ideas Math Algebra 1 Chapter 1**		**25 days**
Linear Equations		**Solve linear equations by clearing fractions and decimals from the equation by:** **a. Using the appropriate power of 10.** **b. Using the least common multiple of the denominator**	**Supplemental Materials**		**5 days**

Linear Equations		**Solve linear equations involving absolute value**	**Big Ideas Math Algebra 1 Chapter 1**		**5 days**
Linear Equations		**Write and/or solve proportions**	**Supplemental Materials**		**5 days**
Linear Equations		**Solve percent problems including percent change, percent increase, percent decrease, and percent error.**	**Supplemental Materials**		**5 days**
Linear Equations	**A1.1.2.1.1**	**Write, solve, and/or apply a linear equation (including problem situations).**	**Big Ideas Math Algebra 1 Chapter 1**		**10 days**
Linear Inequalities	**A1.1.3.1.2**	**Identify or graph the solution set to a linear inequality on a number line.**	**Big Ideas Math Algebra 1 Chapter 2**		**5 days**
Linear Inequalities	**A1.1.3.1.3**	**Interpret solutions to the problems in the context of the problem situations. Note: Linear in equalities only.**	**Big Ideas Math Algebra 1 Chapter 2**		**5 days**
Linear Inequalities	**A1.1.3.1.1**	**Write or solve compound in equalities and/or graph their solution sets on a number line (may include absolute value Inequalities).**	**Big Ideas Math Algebra 1 Chapter 2**		**5 days**

Functions	**A1.2.1.1.3**	**Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Vocabulary:** • **Range** • **Domain**	**Big Ideas Math Algebra 1 Chapter 3.1**		**5 days**
Functions	**A1.2.1.1.2**	**Determine whether a relation is a function, given a set of points or a graph.**	**Big Ideas Math Algebra 1 Chapter 3.1**		**2 days**
Functions	**A1.2.1.1.1**	**Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.**	**Big Ideas Math Algebra 1 Chapter 3.1**		**5 days**
Rate Of Change	**A1.2.2.1.1**	**Identify, describe, and/or use constant rates of change.**	**Big Ideas Math Algebra 1 Chapter 3.2**		**3 days**
Rate Of Change	**A1.2.2.1.2**	**Apply the concept of linear rate of change (slope) to solve problems.**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**3 days**

Linear Equations with two variables	**A1.2.2.1.3**	**Write or identify a linear equation when given** • **The graph of the line,** • **Two points on the line, or** • **The slope and a point on the line.** **Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.**	**Big Ideas Math Algebra 1 Chapter 4.1-4.3**		**5 days**
Linear Equations with two variables		**Write or identify a linear equation parallel or perpendicular to a given line.**	**Big Ideas Math Algebra 1 Chapter 4.1-4.3**		**5 days**
Linear Equations with two variables	**A1.2.2.1.4**	**Determine the slope and/or y-intercept represented by a linear equation or graph.**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**4 days**
Linear Equations with two variables	**A1.1.2.1.3**	**Interpret solutions to problems in the context of the problem situation. Note: Linear equations only.**	**Use throughout the unit**		**5 days**
Linear Equations with two variables	**A1.2.2.2.1**	**Draw, identify, find, and/or write an equation for a line to best fit for a scatter plot.**	**Big Ideas Math Algebra 1 Chapter 4.4**		**5 days**

Linear Equations with two variables	**A1.2.3.2.3**	**Make predictions using the equations or graphs of best-fit lines of scatter plots**	**Big Ideas Math Algebra 1 Chapter 4.5**		**3 days**
Linear Equations with two variables	**A1.2.1.2.1**	**Create, interpret, and/or use the equation, graph, or table of al linear function.**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**5 days**
Linear Equations with two variables	**A1.2.1.2.2**	**Translate from one representation of a linear function to another (i.e., graph, table, and equation).**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**5 days**
Apply Probability to practical situations	**A1.2.3.3.1**	**Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**
Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**

Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.2**	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**
Final Exam Review					**10 days**

Algebra I Part 9A

Curriculum Guide

Scranton School District

Scranton, PA

Algebra I Part 9A

Prerequisite :

- Successful completion of Common Core Math 8 with a grade greater than 76.

Intended Audience: This course is designed for the student who has successfully completed Common Core Math 8 by the end of the 8th grade.

Algebra I Part 9A and Algebra I Part 10B/K together create an Algebra I course taken over two years. The students who select Algebra I Part 9A in ninth grade will complete their studies of Algebra I when they complete the Algebra I Part 10B/K course in tenth grade. These Algebra courses are designed for students who may experience difficulty with a one year Algebra I course Topics covered focus on the Pennsylvania Common Core Standards and are parallel to the Algebra I course, presenting all the same major topics but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts.

At the culmination of the Algebra I Part 10B/K, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. After successfully completing the course, students will be allowed to enroll in Geometry 11 or Applied Geometry 11.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra I 9A	**Grade Level: 9**	**Date Completed: 10-22-14**

1st Quarter

Topic	**Resources**	**CCSS**
Review Pre-Algebra Skills: Evaluating and simplifying expressions, order of operations, integer operations, exponential and standard notation, simplifying basic square roots, review properties of real numbers	**Big Ideas Math Algebra 1** online teacher resources	
Represent and use numbers in equivalent forms	Keystone Finish Line workbook	A1.1.1.1.1

2nd Quarter

Topic	Resources	CCSS
Solving Linear Equations: 1-step, 2-step, combining like terms, with the distributive property, with variables on both sides.	**Big Ideas Math Algebra 1** Chapter 1	A1.1.2.1.2, A1.1.2.1.1
Solving and graphing linear inequalities: including identifying the solution set of an inequality. Solving compound inequalities	**Big Ideas Math Algebra 1** Chapter 2	A1.1.3.1.2, A1.1.3.1.3, A1.1.3.1.1

3rd Quarter

Topic	Resources	CCSS
Concepts of functions: domain/range, determining whether a function is a relation, function notation, evaluating functions	**Big Ideas Math Algebra 1** Chapter 3	A1.2.1.1.3, A1.2.1.1.2, A1.2.1.1.1
Rate of change problems	**Big Ideas Math Algebra 1** Chapter 3	A1.2.2.1.1, A1.2.2.1.2
Graph linear equations using t-table, intercepts, and slope and the y intercept	**Big Ideas Math Algebra 1** Chapter 3	A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.1
Scatter plots: writing line of best fit and making predictions	**Big Ideas Math Algebra 1** Chapter 4	A1.2.2.2.1,

4th Quarter

Topic	Resources	CCSS
Writing linear equations	**Big Ideas Math Algebra 1** Chapter 4	A1.2.2.1.3, A1.2.3.2.3
Identifying slope	**Big Ideas Math Algebra 1** Chapter 4	A1.2.2.1.2
Probability and statistics	**Big Ideas Math Algebra 1** Chapter 4	A1.2.3.3.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents).	**A1.1.1.1.1**	**Compare and/or order any real numbers. Rational and irrational may be mixed.**	**Keystone Algebra I Workbook: Chapter 1 Section 1**		**20 days**
Use Estimation strategies in problem-solving situations	**A1.1.1.4.1**	**Use estimation to solve problems**	**Use throughout the year**		**5 days**

Linear Equations	**A1.1.2.1.2**	**Use and/or identify an algebraic property to justify any step in an equation-solving process.** **Note: Linear equations only** **Vocabulary:** • **Additive inverse** • **Multiplicative Inverse** • **Commutative property** • **Associative Property** • **Identity Property** • **Distributive Property** • **Multiplicative Property of Zero** • **Additive Property of Equality** • **Multiplicative Property of Equality**	**Big Ideas Math Algebra 1 Chapter 1**		**25 days**
Linear Equations		**Solve linear equations by clearing fractions and decimals from the equation by:** **a. Using the appropriate power of 10.** **b. Using the least common multiple of the denominator**	**Supplemental Materials**		**5 days**

Linear Equations		**Solve linear equations involving absolute value**	**Big Ideas Math Algebra 1 Chapter 1**		**5 days**
Linear Equations		**Write and/or solve proportions**	**Supplemental Materials**		**5 days**
Linear Equations		**Solve percent problems including percent change, percent increase, percent decrease, and percent error.**	**Supplemental Materials**		**5 days**
Linear Equations	**A1.1.2.1.1**	**Write, solve, and/or apply a linear equation (including problem situations).**	**Big Ideas Math Algebra 1 Chapter 1**		**5 days**
Linear Inequalities	**A1.1.3.1.2**	**Identify or graph the solution set to a linear inequality on a number line.**	**Big Ideas Math Algebra 1 Chapter 2**		**10 days**
Linear Inequalities	**A1.1.3.1.3**	**Interpret solutions to the problems in the context of the problem situations. Note: Linear in equalities only.**	**Big Ideas Math Algebra 1 Chapter 2**		**5 days**
Linear Inequalities	**A1.1.3.1.1**	**Write or solve compound in equalities and/or graph their solution sets on a number line (may include absolute value Inequalities).**	**Big Ideas Math Algebra 1 Chapter 2**		**5 days**

Functions	**A1.2.1.1.3**	**Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Vocabulary:** • **Range** • **Domain**	**Big Ideas Math Algebra 1 Chapter 3.1**		**5 days**
Functions	**A1.2.1.1.2**	**Determine whether a relation is a function, given a set of points or a graph.**	**Big Ideas Math Algebra 1 Chapter 3.1**		**2 days**
Functions	**A1.2.1.1.1**	**Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.**	**Big Ideas Math Algebra 1 Chapter 3.1**		**5 days**
Rate Of Change	**A1.2.2.1.1**	**Identify, describe, and/or use constant rates of change.**	**Big Ideas Math Algebra 1 Chapter 3.2**		**3 days**
Rate Of Change	**A1.2.2.1.2**	**Apply the concept of linear rate of change (slope) to solve problems.**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**3 days**

Linear Equations with two variables	**A1.2.2.1.3**	**Write or identify a linear equation when given** • **The graph of the line,** • **Two points on the line, or** • **The slope and a point on the line.** **Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.**	**Big Ideas Math Algebra 1 Chapter 4.1-4.3**		**5 days**
Linear Equations with two variables		**Write or identify a linear equation parallel or perpendicular to a given line.**	**Big Ideas Math Algebra 1 Chapter 4.1-4.3**		**5 days**
Linear Equations with two variables	**A1.2.2.1.4**	**Determine the slope and/or y-intercept represented by a linear equation or graph.**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**4 days**
Linear Equations with two variables	**A1.1.2.1.3**	**Interpret solutions to problems in the context of the problem situation. Note: Linear equations only.**	**Use throughout the unit**		**5 days**
Linear Equations with two variables	**A1.2.2.2.1**	**Draw, identify, find, and/or write an equation for a line to best fit for a scatter plot.**	**Big Ideas Math Algebra 1 Chapter 4.4**		**5 days**

Linear Equations with two variables	**A1.2.3.2.3**	**Make predictions using the equations or graphs of best-fit lines of scatter plots**	**Big Ideas Math Algebra 1 Chapter 4.5**		**3 days**
Linear Equations with two variables	**A1.2.1.2.1**	**Create, interpret, and/or use the equation, graph, or table of al linear function.**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**5 days**
Linear Equations with two variables	**A1.2.1.2.2**	**Translate from one representation of a linear function to another (i.e., graph, table, and equation).**	**Big Ideas Math Algebra 1 Chapter 3.2-3.5**		**5 days**
Apply Probability to practical situations	**A1.2.3.3.1**	**Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**
Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**

Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.2**	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Big Ideas Math Algebra 1 Chapter 11**		**5 days**
Final Exam Review					**10 days**

Algebra II

Curriculum Guide

Scranton School District

Scranton, PA

Algebra II

Prerequisite:

- Successful completion of Geometry 10 or Geometry 11

Building on their work with linear and quadratic functions, students will extend their repertoire of functions to include polynomial, rational, radical, exponential, and logarithmic functions. Students will work closely with the expressions that define the functions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. Other topics that are included in this course are arithmetic and geometric sequences, probability, permutations, and combinations.

After successful completion of this course, the students may enroll in Trigonometry, thus essentially completing an Algebra II/Trigonometry class in two years, as well as other mathematics courses.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra II	**Grade Level** 11th and 12th	**Date Completed:** 2/5/2015

1st Quarter

Topic	Resources	CCSS
Linear Equations and Inequalities in one variable	Prentice Hall Algebra II/Trigonometry Text 1.5, 1.6, 2.1, 2.2, 2.4, 2.5, 2.6, 2.7	A1.1.2.1.1 A1.1.3.1.2 A1.1.3.1.1
Exponents	Prentice Hall Algebra II/Trigonometry Text 1.7, 1.8	A2.1.2.1.1 A2.1.2.1.3
Relations/Linear Equations in 2 Variables	Prentice Hall Algebra II/Trigonometry Text 3.1, 3.3, 3.4, 3.5, 3.6, 3.7	A1.2.1.1.3 A1.2.1.1.2 A1.2.2.1.3
Correlation	Prentice Hall Algebra II/Trigonometry Text 3.8 Also refer to Big Ideas Algebra 2 Text Sect. 1.3	A2.2.1.1.1 A2.2.3.1.1 A2.2.3.1.2

2nd Quarter

Topic	Resources	CCSS
Systems of Linear Equations/Inequalities	Prentice Hall Algebra II/Trigonometry Text 4.1, 4.2, 4.3, 4.7	A1.1.2.2.1 A1.1.3.2.1
Polynomials	Prentice Hall Algebra II/Trigonometry Text 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 Refer to 4.2 & 4.4 in Big Ideas	A1.1.1.5.1 A1.1.1.5.2 A2.1.2.2.1
Quadratic Functions	Big Ideas Algebra 2 Text Chapter 2 and accompanying resources	A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1 A2.2.3.1.1

3rd Quarter

Topic	Resources	CCSS
Quadratic Equations AND Imaginary and Complex Numbers	Big Ideas Algebra 2 Text Chapter 3 and accompanying resources EXCLUDING SECTION 3.5 AND 3.6 Supplemental materials/worksheets for powers of *i* and dividing complex numbers.	A2.1.3.1.1 A2.1.1.1.1 A2.1.1.2.1 A2.1.1.1.2 A2.1.1.2.2
Polynomial Functions	Big Ideas Algebra 2 Text Chapter 4 and accompanying resources EXCLUDING 4.9	A2.2.2.1.1 A2.2.2.1.3 A2.2.1.1.4 A2.2.2.1.4
Rational Exponents and Radical Functions	Big Ideas Algebra 2 Text Chapter 5 and accompanying resources. EXCLUDING 5.5	A2.1.2.1.2 A2.1.3.1.2 A2.2.1.1.3
Exponential and Logarithmic Functions	Big Ideas Algebra 2 Text Chapter 6 and accompanying resources.	A2.2.2.1.3 A2.2.1.1.4 A2.2.2.1.2 A2.2.2.1.4 A2.1.2.1.4

4th Quarter

Topic	Resources	CCSS
Rational Functions/Expressions and Variation	Big Ideas Algebra 2 Text Chapter 7 and accompanying resources. EXCLUDING 7.2	A2.1.3.2.1 A2.1.2.2.2 A2.1.3.1.2
Solving Formulas	Supplemental Materials and worksheets.	A2.1.3.2.2
Probability	Big Ideas Algebra 2 Text Chapter 10 and accompanying resources. EXCLUDING 10.3 and 10.6	A2.2.3.2.1 A2.2.3.2.3 A2.2.3.2.2
Series and Sequence	Big Ideas Algebra 2 Text Chapter 8 and accompanying resources. EXCLUDING 8.5	A2.2.1.1.2
Final Exam Review	Teacher Prepared Final Exam Review Packet	

Scranton School District
Curriculum Guide

* **Note:** ***Italicized standards and topics are currently classified as Algebra I CC/Geometry CC. These will eventually be phased out as the Common Core is completely implemented.***

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Linear Equations in one variable	***A1.1.2.1.1***	***Write, solve, and/or apply linear equations (including problem situations)*** ***a. Evaluate expressions*** ***b. Collect like terms*** ***c. Solving multi-step equations*** ***d. Application to real life situations***	***Prentice Hall Text*** **1.5** **1.6** **2.1** **2.2**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)**	**7 days**
Inequalities in one variable	***A1.1.3.1.2*** ***A1.1.3.1.1***	***Identify or graph the solution set to a linear inequality on a number line*** ***Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities)***	***Prentice Hall Text*** ***2.4*** ***2.5*** ***2.6*** ***2.7***		**7 days**

Exponents	**A2.1.2.1.1** **A2.1.2.1.3**	**Using exponential expressions to represent rational numbers** **Simplify/evaluate expressions involving multiplying with exponents, powers of powers, and powers of products. Note: limit to rational exponents** **Simplifying real number exponents.**	**Prentice Hall Text** **1.7** **1.8** **Supplemental materials**		**6 days**
Relations	***A1.2.1.1.3*** ***A1.2.1.1.2***	***Identify the domain or range of a relation (may be presented as ordered pairs, graph, or, a table.)*** ***Determine whether a relation is a function, given a set of points or a graph.*** ***Include function notation and finding function values.***	***Prentice Hall Text*** ***3.1*** ***3.3***		**5 days**

Linear Equations in 2 Variables	*A1.2.2.1.3*	*Write, identify, and/or graph a linear equation given:* *a. The graph of a line* *b. Two points on the line* *c. The slope and a point on the line* *d. Parallel and Perpendicular lines* *Note: Linear equation may be in point-slope, standard, and/or slope intercept form*	*Prentice Hall Text* *3.4* *3.5* *3.6* *3.7*		**9 days**
Correlation	**A2.2.1.1.1** **A2.2.3.1.1** **A2.2.3.1.2**	**Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically** **Draw, identify, find, interpret, and/or write an equation for a regression model (lines of best fit) for a scatter plot** **Make predictions using the equations or graphs of regression models (lines of best fit) of scatter plots**	**Prentice Hall Text** **3.8** **Big Ideas section 1.3**		**4 days**

Systems of Linear Equations	*A1.1.2.2.1*	*Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations*	*Prentice Hall Text* *4.1* *4.2* *4.3*		**8 days**
Systems of Linear Inequalities	*A1.1.3.2.1*	*Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear equalities*	*Prentice Hall Text* *4.7*		**3 days**

Polynomials	*A1.1.1.5.1*	*Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Including Multiplying two trinomials.* *(Be sure to cover special products such as squares and cubes of binomials)*	**Prentice Hall Text** **5.1** **5.2** **5.3**		**13 days**
	A2.1.2.2.1	**Factor algebraic expressions, including difference of squares and trinomials. Note: trinomials are limited to the form of ax^2+bx+c where a does not equal zero. Includes factoring by grouping, sum and difference of 2 cubes.**	**5.4** **5.5** **5.6**		

QUADRATIC FUNCTIONS	**A2.2.2.1.1**	**Create, interpret, and/or use the equation, graph, or table of a quadratic function**	**Big Ideas Algebra 2 Text Chapter 2**		**15 days**
	A2.2.2.1.3	**Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a quadratic function**			
	A2.2.1.1.4	**Identify and/or determine the characteristics of a quadratic function (e.g. intervals of increase/decrease, intercepts, zeros)**			

		Identify or describe the effect of changing parameters within a family of functions **Draw, identify, find, interpret, and/or write an equation for a regression model (curve of best fit) for a scatter plot**			
Quadratic Equations	**A2.1.3.1.1**	**Write and/or solve quadratic equations (including factoring and using the quadratic formula)** **a. By factoring** **b. Completing the square** **c. Quadratic formula** **d. Word problems by factoring and using quadratic formula**	**Big Ideas Algebra 2 Text** **3.1** **3.3** **3.4** **Supplemental materials/worksheets**		**8 days**

Imaginary and Complex Numbers	**A2.1.1.1.1**	**Simplify/write square roots in terms of '*i*'**	**Big Ideas Algebra 2 Text 3.2**		**9 days**
	A2.1.1.2.1	**Add and subtract complex numbers**	**Supplemental material needed**		
	A2.1.1.1.2	**Simplify/evaluate expressions involving powers of 'i'**			
	A2.1.1.2.2	**Multiply and divide complex numbers**			

POLYNOMIAL FUNCTIONS	**A2.2.2.1.1**	**Create, interpret, and/or use the equation, graph, or table of a polynomial function** **A. Remainder and factor theorems** **B. Theorems about roots/rational root theorem**	**Big Ideas Algebra 2 Text** **Chapter 4** **excluding 4.9**		**15 days**
	A2.2.2.1.3	**Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial function**			
	A2.2.1.1.4	**Identify and/or determine the characteristics of a polynomial function (e.g. intervals of increase/decrease, intercepts, zeros)**			

	A2.2.1.1.4	**Translate a polynomial function from one representation of a function to another (graph, table, and equation)**			
Rational Exponents	**A2.1.2.1.2**	**Simplify/evaluate expressions involving positive and negative exponents and/or roots (may contain all types of real numbers – exponents should not exceed power of 10)** **a. Simplify radical expressions** **b. Multiply /Divide radicals expressions** **c. Add/Subtract radical expressions** **d. Rationalizing the denominator** **e. Rational exponents**	**Big Ideas Algebra 2 Text** **5.1** **5.2**		**10 days**

Radical Functions	**A2.1.3.1.2**	**Solve equations involving radical expressions**	**Big Ideas Algebra 2 Text** **5.3** **5.4**		**3 days**
EXPONENTIAL AND LOGARITHMIC FUNCTIONS	**A2.2.1.1.3** **A2.2.2.1.3** **A2.2.1.1.4**	**Determine the domain, range, or inverse of a relation** **Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of an exponential and logarithmic function** **Identify and/or determine the characteristics of a exponential and logarithmic functions (e.g. intervals of increase/decrease, intercepts, zeros)**	**Big Ideas Algebra 2 Text Chapter 6**		**17 days**

	A2.2.2.1.2	**Create, interpret, and/or use the equation, graph, or table of an exponential or logarithmic function (including common and natural logarithms)**			
	A2.2.2.1.4	**Translate an exponential or logarithmic function from one representation of a function to another (graph, table, and equation)**			
	A2.1.2.1.4	**Simplify or evaluate expressions involving logarithms and exponents**			
	A2.1.3.1.3	**Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms)**			

	A2.1.3.1.4	**Write, solve, and/or apply exponential growth or decay (including problem situations)**			
Variation	**A2.1.3.2.1**	**Determine how a change in one variable relates to a change in a second variable** **a. direct variation** **b. inverse variation**	**Big Ideas Algebra 2 Text** **7.1**		**2 days**
Rational Expressions	**A2.1.2.2.2**	**Simplify rational algebraic expressions** **a. Reduce** **b. Multiply** **c. Divide** **d. Add** **e. Subtract** **f. Complex Fractions**	**Big Ideas Algebra 2 Text** **7.3** **7.4** **Supplemental materials needed**		**11 days**
Rational Equations	**A2.1.3.1.2**	**Solve equations involving rational expressions.**	**Big Ideas Algebra 2 Text** **7.5**		**3 days**
Solving Formulas	**A2.1.3.2.2**	**Use algebraic processes to solve a formula for a given variable**	**Supplemental materials needed**		**2 days**

PROBABILITY	**A2.2.3.2.1** **A2.2.3.2.3** **A2.2.3.2.2**	**Use combinations, permutations, and the fundamental counting principle to solve problems involving probability** **Use probability for independent, dependent, or compound events to predict outcomes.** **Use odds to find probability and/or use probability to find odds**	**Big Ideas Algebra 2 Text Chapter 10, excluding 10.3 and 10.6**		**6 days**
SERIES AND SEQUENCES	**A2.2.1.1.2**	**Identify and/or extend the pattern as either an arithmetic or geometric sequence**	**Big Ideas Algebra 2 Text Chapter 8, excluding 8.5**		**6 days**
Final Exam and Review					**10 days**

Algebra II/Trigonometry

Curriculum Guide

Scranton School District

Scranton, PA

Algebra II/Trigonometry

Prerequisite:

- Successful completion of Honors Geometry, Geometry 9 or Geometry 10
- Student must have earned an 80% or better final average in both the Algebra I and Geometry courses previously taken

Building on their work with linear and quadratic functions, students will extend their repertoire of functions to include polynomial, rational, radical, exponential, and logarithmic functions. Students will work closely with the expressions that define the functions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. Other topics that are included in this course are arithmetic and geometric sequences, probability, permutations, and combinations.

Building on their previous work with functions, and on their work with trigonometric ratios and circles in Geometry, students now use the coordinate plane to study angles in standard position and understand radian measure. The trigonometric functions, their graphs, and identities will be explored.

The skills acquired in this course will prepare students to continue their mathematical study in the field of Elementary Analysis.

After successful completion of this course, the students may enroll in Elementary Analysis as well as other mathematics courses.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Algebra II/Trigonometry	**Grade Level** 10th and 11th	**Date Completed:** 2/5/2015

1st Quarter

Topic	Resources	CCSS
Linear Equations and Inequalities in one variable	Prentice Hall Algebra II/Trigonometry Text 1.5, 1.6, 2.1, 2.2, 2.4, 2.5, 2.6, 2.7	A1.1.2.1.1 A1.1.3.1.2 A1.1.3.1.1
Exponents	Prentice Hall Algebra II/Trigonometry Text 1.7, 1.8	A2.1.2.1.1 A2.1.2.1.3
Relations/Linear Equations in 2 Variables	Prentice Hall Algebra II/Trigonometry Text 3.1, 3.3, 3.4, 3.5, 3.6, 3.7	A1.2.1.1.3 A1.2.1.1.2 A1.2.2.1.3
Correlation	Prentice Hall Algebra II/Trigonometry Text 3.8 Also refer to Big Ideas Sect. 1.3	A2.2.1.1.1 A2.2.3.1.1 A2.2.3.1.2
Systems of Linear Equations/Inequalities	Prentice Hall Algebra II/Trigonometry Text 4.1, 4.2, 4.3, 4.7	A1.1.2.2.1 A1.1.3.2.1

2nd Quarter

Topic	Resources	CCSS
Polynomials	Prentice Hall Algebra II/Trigonometry Text 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 Refer to 4.2 & 4.4 in Big Ideas	A1.1.1.5.1 A1.1.1.5.2 A2.1.2.2.1
Quadratic Functions	Big Ideas Algebra 2 Text Chapter 2 and accompanying resources	A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1 A2.2.3.1.1
Quadratic Equations AND Imaginary and Complex Numbers	Big Ideas Algebra 2 Text Chapter 3 and accompanying resources EXCLUDING SECTION 3.5 AND 3.6 Supplemental materials/worksheets for powers of *i* and dividing complex numbers.	A2.1.3.1.1 A2.1.1.1.1 A2.1.1.2.1 A2.1.1.1.2 A2.1.1.2.2

3rd Quarter

Topic	Resources	CCSS
Polynomial Functions	Big Ideas Algebra 2 Text Chapter 4 and accompanying resources EXCLUDING 4.9	A2.2.2.1.1 A2.2.2.1.3 A2.2.1.1.4 A2.2.2.1.4
Rational Exponents and Radical Functions	Big Ideas Algebra 2 Text Chapter 5 and accompanying resources. EXCLUDING 5.5	A2.1.2.1.2 A2.1.3.1.2 A2.2.1.1.3
Exponential and Logarithmic Functions	Big Ideas Algebra 2 Text Chapter 6 and accompanying resources.	A2.2.2.1.3 A2.2.1.1.4 A2.2.2.1.2 A2.2.2.1.4 A2.1.2.1.4
Rational Functions/Expressions and Variation	Big Ideas Algebra 2 Text Chapter 7 and accompanying resources. EXCLUDING 7.2	A2.1.3.2.1 A2.1.2.2.2 A2.1.3.1.2
Solving Formulas	Supplemental Materials and worksheets.	A2.1.3.2.2

4th Quarter

Topic	Resources	CCSS
Trigonometry	Big Ideas Algebra 2 Text Chapter 9 and accompanying resources. EXCLUDING 9.6 and 9.8 and Supplemental materials	HSG.SRT.C.6 HSG.SRT.C.7 HSG.SRT.C.8 HSF.TF.A.2 HSF.TF.A.2 HSF.TF.A.3 HSF.TF.A.4 HSF.TF.A.5 HSF.TF.A.4 HSF.TF.A.5 HSF.TF.C.8 HSG.SRT.D.10 HSG.SRT.D.11
Probability	Big Ideas Algebra 2 Text Chapter 10 and accompanying resources. EXCLUDING 10.3 and 10.6	A2.2.3.2.1 A2.2.3.2.3 A2.2.3.2.2
Series and Sequence	Big Ideas Algebra 2 Text Chapter 8 and accompanying resources. EXCLUDING 8.5	A2.2.1.1.2
Final Exam Review	Teacher Prepared Final Exam Review packet	

* **Note:** ***Italicized standards and topics are currently classified as Algebra I CC/Geometry CC. These will eventually be phased out as the Common Core is completely implemented.***

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Linear Equations in one variable	*A1.1.2.1.1*	*Write, solve, and/or apply linear equations (including problem situations)* *a. Evaluate expressions* *b. Collect like terms* *c. Solving multi-step equations* *d. Application to real life situations*	*Prentice Hall Text* 1.5 1.6 2.1 2.2	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)**	**6 days**
Inequalities in one variable	*A1.1.3.1.2* *A1.1.3.1.1*	*Identify or graph the solution set to a linear inequality on a number line* *Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities)*	*Prentice Hall Text* *2.4* *2.5* *2.6* *2.7*		**6 days**

Exponents	**A2.1.2.1.1** **A2.1.2.1.3**	**Using exponential expressions to represent rational numbers** **Simplify/evaluate expressions involving multiplying with exponents, powers of powers, and powers of products. Note: limit to rational exponents** **Simplifying real number exponents.**	**Prentice Hall Text** **1.7** **1.8** **Supplemental materials**		**5 days**
Relations	***A1.2.1.1.3*** ***A1.2.1.1.2***	***Identify the domain or range of a relation (may be presented as ordered pairs, graph, or, a table.)*** ***Determine whether a relation is a function, given a set of points or a graph.*** ***Include function notation and finding function values.***	***Prentice Hall Text*** ***3.1*** ***3.3***		**4 days**

Linear Equations in 2 Variables	*A1.2.2.1.3*	*Write, identify, and/or graph a linear equation given:* *a. The graph of a line* *b. Two points on the line* *c. The slope and a point on the line* *d. Parallel and Perpendicular lines* *Note: Linear equation may be in point-slope, standard, and/or slope intercept form*	*Prentice Hall Text* *3.4* *3.5* *3.6* *3.7*		**7 days**
Correlation	**A2.2.1.1.1** **A2.2.3.1.1** **A2.2.3.1.2**	**Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically** **Draw, identify, find, interpret, and/or write an equation for a regression model (lines of best fit) for a scatter plot** **Make predictions using the equations or graphs of regression models (lines of best fit) of scatter plots**	**Prentice Hall Text** **3.8** **Big Ideas Algebra 2 Text** **section 1.3**		**3 days**

Systems of Linear Equations	***A1.1.2.2.1***	***Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations***	***Prentice Hall Text 4.1 4.2 4.3***		**7 days**
Systems of Linear Inequalities	***A1.1.3.2.1***	***Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear equalities***	***Prentice Hall Text 4.7***		**3 days**

Polynomials	*A1.1.1.5.1*	*Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Including Multiplying two trinomials.* *(Be sure to cover special products such as squares and cubes of binomials)*	**Prentice Hall Text** **5.1** **5.2** **5.3**		**11 days**
	A2.1.2.2.1	**Factor algebraic expressions, including difference of squares and trinomials. Note: trinomials are limited to the form of ax^2+bx+c where a does not equal zero. Includes factoring by grouping, sum and difference of 2 cubes.**	**5.4** **5.5** **5.6**		

QUADRATIC FUNCTIONS	**A2.2.2.1.1**	**Create, interpret, and/or use the equation, graph, or table of a quadratic function**	**Big Ideas Algebra 2 Text Chapter 2**		**13 days**
	A2.2.2.1.3	**Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a quadratic function**			
	A2.2.1.1.4	**Identify and/or determine the characteristics of a quadratic function (e.g. intervals of increase/decrease, intercepts, zeros)**			

		Identify or describe the effect of changing parameters within a family of functions **Draw, identify, find, interpret, and/or write an equation for a regression model (curve of best fit) for a scatter plot**			
Quadratic Equations	**A2.1.3.1.1**	**Write and/or solve quadratic equations (including factoring and using the quadratic formula)** **a. By factoring** **b. Completing the square** **c. Quadratic formula** **d. Word problems by factoring and using quadratic formula**	**Big Ideas Algebra 2 Text** **3.1** **3.3** **3.4** **Supplemental materials/worksheets**		**6 days**

Imaginary and Complex Numbers	**A2.1.1.1.1**	**Simplify/write square roots in terms of *'i'***	**Big Ideas Algebra 2 Text 3.2**		**7 days**
	A2.1.1.2.1	**Add and subtract complex numbers**	**Supplemental material needed**		
	A2.1.1.1.2	**Simplify/evaluate expressions involving powers of 'i'**			
	A2.1.1.2.2	**Multiply and divide complex numbers**			

POLYNOMIAL FUNCTIONS	**A2.2.2.1.1**	**Create, interpret, and/or use the equation, graph, or table of a polynomial function** **A. Remainder and factor theorems** **B. Theorems about roots/rational root theorem**	**Big Ideas Algebra 2 Text Chapter 4 excluding 4.9**		**13 days**
	A2.2.2.1.3	**Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial function**			
	A2.2.1.1.4	**Identify and/or determine the characteristics of a polynomial function (e.g. intervals of increase/decrease, intercepts, zeros)**			

	A2.2.1.1.4	**Translate a polynomial function from one representation of a function to another (graph, table, and equation)**			
Rational Exponents	**A2.1.2.1.2**	**Simplify/evaluate expressions involving positive and negative exponents and/or roots (may contain all types of real numbers – exponents should not exceed power of 10)** **a. Simplify radical expressions** **b. Multiply /Divide radicals expressions** **c. Add/Subtract radical expressions** **d. Rationalizing the denominator** **e. Rational exponents**	**Big Ideas Algebra 2 Text** **5.1** **5.2**		**8 days**

Radical Functions	**A2.1.3.1.2**	**Solve equations involving radical expressions**	**Big Ideas Algebra 2 Text** **5.3** **5.4**		**3 days**
EXPONENTIAL AND LOGARITHMIC FUNCTIONS	**A2.2.1.1.3** **A2.2.2.1.3** **A2.2.1.1.4**	**Determine the domain, range, or inverse of a relation** **Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of an exponential and logarithmic function** **Identify and/or determine the characteristics of a exponential and logarithmic functions (e.g. intervals of increase/decrease, intercepts, zeros)**	**Big Ideas Algebra 2 Text Chapter 6**		**16 days**

	A2.2.2.1.2	**Create, interpret, and/or use the equation, graph, or table of an exponential or logarithmic function (including common and natural logarithms)**			
	A2.2.2.1.4	**Translate an exponential or logarithmic function from one representation of a function to another (graph, table, and equation)**			
	A2.1.2.1.4	**Simplify or evaluate expressions involving logarithms and exponents**			
	A2.1.3.1.3	**Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms)**			

	A2.1.3.1.4	**Write, solve, and/or apply exponential growth or decay (including problem situations)**			
Variation	**A2.1.3.2.1**	**Determine how a change in one variable relates to a change in a second variable** **a. direct variation** **b. inverse variation**	**Big Ideas Algebra 2 Text** **7.1**		**2 days**
Rational Expressions	**A2.1.2.2.2**	**Simplify rational algebraic expressions** **a. Reduce** **b. Multiply** **c. Divide** **d. Add** **e. Subtract** **f. Complex Fractions**	**Big Ideas Algebra 2 Text** **7.3** **7.4** **Supplemental materials needed**		**10 days**
Rational Equations	**A2.1.3.1.2**	**Solve equations involving rational expressions.**	**Big Ideas Algebra 2 Text** **7.5**		**2 days**
Solving Formulas	**A2.1.3.2.2**	**Use algebraic processes to solve a formula for a given variable**	**Supplemental materials needed**		**2 days**

Trigonometry	**HSG.SRT.C.6** **HSG.SRT.C.7** **HSG.SRT.C.8**	**Evaluate trigonometric functions of acute angles. Find unknown side lengths and angle measures of right triangles. Use trigonometric functions to solve real-life problems.**	**Big Ideas Algebra 2 Text** **9.1**		**24 days**
	HSF.TF.A.2	**Draw angles in standard position and use radian measure.**	**9.2**		
	HSF.TF.A.2 **HSF.TF.A.3**	**Evaluate trigonometric functions of any angle. Find and use reference angles to evaluate trigonometric functions.**	**9.3**		
	HSF.TF.A.4 **HSF.TF.A.5**	**Graph sine and cosine functions including stretches and shrinks, translations, and reflections.**	**9.4**		
	HSF.TF.A.4 **HSF.TF.A.5**	**Graph tangent, cosecant, secant, and cotangent functions.**	**9.5**		
	HSF.TF.C.8	**Using trigonometric identities.**	**9.7**		
	HSG.SRT.D.10 **HSG.SRT.D.11**	**Law of Sines and Cosines**	**Supplemental materials**		

PROBABILITY	**A2.2.3.2.1** **A2.2.3.2.3** **A2.2.3.2.2**	**Use combinations, permutations, and the fundamental counting principle to solve problems involving probability** **Use probability for independent, dependent, or compound events to predict outcomes.** **Use odds to find probability and/or use probability to find odds**	**Big Ideas Algebra 2 Text Chapter 10, excluding 10.3 and 10.6**		**6 days**
SERIES AND SEQUENCES	**A2.2.1.1.2**	**Identify and/or extend the pattern as either an arithmetic or geometric sequence**	**Big Ideas Algebra 2 Text Chapter 8, excluding 8.5**		**6 days**
Final Exam and Review					**10 days**

Advanced Placement Calculus

Curriculum Guide

Scranton School District

Scranton, PA

Advanced Placement Calculus

Prerequisites:

- Successful completion of Honors Elementary Analysis
- Be in compliance with the SSD Honors and AP Criteria Policy

Advanced Placement Calculus is the highest level mathematics course offered by the Scranton School District. It is very rigorous and taught at the college level. Topics covered in this course include analytic geometry, limits of functions, differentiation and integration of functions, and applications of differentiation and integration.

The Advanced Placement Calculus course prepares students to take the Advanced Placement Calculus Examination in May of their senior year, thus affording these students with the opportunity to do college level work and earn college credit while still in high school. This course will challenge even the most capable of mathematical minds. The work covered in this course will help the student develop analytical reasoning skills and disciplined study habits necessary for success in college. Students pursuing college majors requiring advanced mathematics courses will benefit from this advanced mathematics training.

Since the content of the Advanced Placement Calculus AB course is beyond the scope of Common Core, the Collegeboard Curriculum Framework 2016-2017 document was used as a guide to write this curriculum.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: AP Calculus AB	**Grade Level: 12**	**Date Completed: 3/1/15**

1st Quarter

Topic	**Resources**	**AP Calculus Standard**
Elementary Analysis Review	Summer Packet Chapter P	
Limits	**Larson/Hostetler Calculus 8th Ed.** Chapter One, Chapter Three	LO 1.1A(a), LO 1.1A(b) LO 1.1B, LO 1.1C, LO 1.1D EK 1.1A2, EK 1.1B1, EK 1.1C1, EK 1.1C2, EK 1.1C3, EK 1.1D1
Continuity	**Larson/Hostetler Calculus 8th Ed.** Chapter One	LO 1.2A, LO 1.2B
Differentiablilty	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.2B, EK 2.2B1, EK 2.2B2
Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two, Chapter Five (natural logarithmic and exponential functions)	LO 2.1A, EK 2.1A5 EK 2.1B1

2nd Quarter

Topic	Resources	AP Calculus Standard
Derivative Rules	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1C, EK 2.1C4 EK 2.1C2, EK 2.1A5
Geometric Applications of Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1A
Implicit Differentiation	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1C, EK 2.1C5 LO 2.3B, EK 2.3B1, EK 2.3B2
Higher Order Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1D
Related Rates	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.3C, EK 2.3C2
Motion	**Throughout Larson/Hostetler Calculus 8th Ed. Exercises and Supplemental Materials**	LO 2.3C, EK 2.3C1
Extreme Values	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3C, EK 2.3C3
Implications of Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.4A, EK 2.4A1

3rd Quarter

Topic	Resources	AP Calculus Standard
Using Derivatives to Analyze Graphs	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.2A, EK 2.2A1
Connecting f' and f'' with the Graph of f(x)	**Larson/Hostetler Calculus 8th Ed.** Chapter Three, Supplemental Materials	LO 2.2A, EK 2.1D1, EK 2.2A1
Optimization Problems	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3C, EK 2.3C3
More Applications of Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3B, EK 2.3B1, EK 2.3B2
Antiderivatives	**Larson/Hostetler Calculus 8th Ed.** Chapters Four and Five	LO 3.1A, EK 3.1A1, EK 3.1A2, LO 3.3B(a), EK 3.3B3, EK 3.3B5
The Definite Integral Concept	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.2A(a), EK 3.2A1, EK 3.2A3 LO 3.2B, EK 3.2B1, EK 3.2B2, LO 3.2C
Evaluate Definite Integrals	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.3B(b), EK 3.3B2
The Definite Integral	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.3A, EK 3.3A1, EK 3.3A2, EK 3.3A3

4th Quarter

Topic	Resources	AP Calculus Standard
Applications of Integrals I	**Larson/Hostetler Calculus 8th Ed.** Chapter Six	LO 2.3E, EK 2.3E2, LO 2.3F, EK 2.3F1, LO 3.5A, EK 3.5A1 EK 3.5A2, LO 3.5B, EK 3.5B1
Applications of Integrals II	**Larson/Hostetler Calculus 8th Ed.** Chapter Seven	LO 3.4A, EK 3.4A1, EK 3.4A2, LO 3.4B, EK 3.4B1, LO 3.4C, EK 3.4C1, LO 3.4D, EK 3.4D1, EK 3.4D2, LO 3.4E, EK 3.4E1
AP Review	Review Packet	
Post AP Topics	**Teacher designed enrichment topics and projects.**	

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Review (Summer Assignment)		**Calculus Library of Functions** **Linear functions** **Functions as models of change** **Transformation of functions** **Solving equations(algebraically and on the calculator)**	**Summer Packet**	**Teacher prepared tests, quizzes, etc.**	**3**
Limits	**LO 1.1A(a)** **LO 1.1A(b)**	**Express limits symbolically using correct notation.** **Interpret limits expressed symbolically.** ***Intuitive definition of Limits***	**Larson/Hostetler Calculus 8th Ed.** **1.2**		**15**
	LO 1.1B **EK 1.1B1**	**Estimate limits of functions.** **Numerical and graphical information can be used to estimate limits.** ***Visualizing limits***	**Larson/Hostetler Calculus 8th Ed.** **1.2**		
Limits at a point	**EK 1.1A2**	**The concept of a limit can be extended to include one-sided limits, limits at infinity, and infinite limits.**	**Larson/Hostetler Calculus 8th Ed.** **1.2, 3.5**		

The algebra of limits:	**LO 1.1C** **EK 1.1C1** **EK 1.1C2** **EK 1.1C 3**	**Determine limits of functions.** **Limits of sums, differences, products, quotients, and composite functions can be found using the basic theorems of limits and algebraic rules.** **The limit of a function may be found by using algebraic manipulation, alternate forms of trigonometric functions, or the squeeze theorem (Sandwich Theorem).** **Limits of the indeterminate forms, $\frac{0}{0}$ and $\frac{\infty}{\infty}$ may be evaluated using L'Hospital's Rule.** ***Substitution (continuous functions)*** ***Intuitive discussion of removable versus non-removable discontinuities*** ***Factoring (removable discontinuities)***	**Larson/Hostetler Calculus 8th Ed.** **1.3, 1.4** **Chapter 8**		

Limits Involving Infinity	**LO 1.1D** **EK 1.1D1**	**Deduce and interpret behavior of functions using limits** **Asymptotic and unbounded behavior of functions can be explained and described using limits** ***Asymptotic behavior (horizontal and vertical asymptotes)***	**Larson/Hostetler Calculus 8th Ed.** **1.5** **3.5**		
Continuity	**LO 1.2A**	**Analyze functions for intervals of continuity or points of discontinuity.** ***Continuity at a point*** ***Continuous Functions*** ***Discontinuous functions:*** ***Removable discontinuities*** ***Jump discontinuities***	**Larson/Hostetler Calculus 8th Ed.** **1.4**		
	LO 1.2B	**Determine the applicability of important Calculus theorems using continuity.** ***Continuous functions*** ***Intermediate Value Theorem***	**Larson/Hostetler Calculus 8th Ed.** **1.4**		

Derivative Concepts	**LO 2.1A** **EK 2.1A5** **EK 2.1B1**	**Identify the derivative of a function as the limit of a difference quotient.** **The derivative can be represented graphically, numerically, analytically, and verbally.** **The derivative at a point can be estimated from information given in tables or graphs.** ***Definition of the derivative (difference quotient)*** ***Derivative at a point*** ***Proof: Power Rule for derivatives by using the definition of derivative***	**Larson/Hostetler Calculus 8th Ed.** **2.1**		**35**

Derivative Rules	**LO 2.1C**	**Calculate derivatives.** ***Constant rule*** ***Constant multiple rule*** ***Sum and difference*** ***Power rule*** ***Product and quotient rules*** ***Proper form of derivatives (factored)***	**Larson/Hostetler Calculus 8th Ed.** **2.2, 2.3**		
Chain rule	**EK 2.1C4**	**The chain rule provides a way to differentiate composite functions** ***Derivatives of composite functions*** ***Derivatives using repeated use of the chain rule***	**Larson/Hostetler Calculus 8th Ed.** **2.4**		
Derivatives of Various Functions	**EK 2.1C2**	**Specific rules can be used to calculate derivatives for classes of functions, including polynomial, rational, power, exponential, logarithmic, trigonometric, and inverse trigonometric.**	**Larson/Hostetler Calculus 8th Ed.** **2.2, 2.3, 2.4** **5.1,** **5.4,** **5.6**		

Derivatives Geometric Applications	**LO 2.1A**	**Identify the derivative of a function as the limit of a difference quotient.** ***Geometric applications of the derivative and rates of change*** ***Average rates of change versus instantaneous rates of change*** ***Using the derivative to find information necessary to write the equations of tangent lines and normal lines*** ***Using the derivative to calculate points of horizontal tangencies*** ***Approximating derivatives from tables and graphs***	**Throughout Larson/Hostetler Calculus 8th Ed. Chapter 2 Exercises**		
Higher Order Derivatives	**LO 2.1D**	**Determine higher order derivatives.** ***Second and higher order derivatives***	**Larson/Hostetler Calculus 8th Ed. 2.3, 2.4**		

Differentiability	**LO 2.2B** **EK 2.2B1** **EK 2.2B2**	**Recognize the connection between differentiability and continuity.** **A continuous function may fail to be differentiable at a point in its domain.** **If a function is differentiable at a point, then it is continuous at that point.** ***Why the derivative may fail to exist*** ***Local linearity***	**Larson/Hostetler Calculus 8th Ed.** **2.1**		
Numerical Derivatives	**EK 2.1A5**	**The derivative can be represented graphically, numerically, analytically, and verbally.** ***Finding derivatives on the graphing calculator***	**Supplemental Material**		
Implicit Derivatives	**LO 2.1C** **EK 2.1C5**	**Calculate derivatives.** **The chain rule is the basis for implicit differentiation.** ***Explicit versus implicit definitions of functions*** ***Implicit differentiation process***	**Larson/Hostetler Calculus 8th Ed.** **2.5**		

Derivatives Geometric Applications	**LO 2.3B** **EK 2.3B1** **EK 2.3B2**	**Solve problems involving the slope of the tangent line.** **The *derivative* at a point is the slope of the line tangent to a graph at that point on the graph.** **The tangent line is the graph of a locally linear approximation of the function near the point of tangency.** ***Using implicit differentiation write equations of tangent and normal lines to functions*** ***Using implicit differentiation calculate points of horizontal tangencies and equations of vertical asymptotes***	**Larson/Hostetler Calculus 8th Ed.** **2.5**		
Numerical Derivatives	**EK 2.1A5**	**The derivative can be represented graphically, numerically, analytically, and verbally.** ***Finding and evaluating implicit derivatives on the graphing calculator***	**Supplemental Material**		

Related Rates	**LO 2.3C** **EK 2.3C2**	**Solve problems involving related rates, optimization, rectilinear motion, and planar motion.** **The derivative can be used to solve related rates problems, that is, finding a rate at which one quantity is changing by relating it to other quantities whose rates of change are known.** ***What are related rates of change*** ***Related rate equations*** ***Related rate problem strategies***	**Larson/Hostetler Calculus 8th Ed.** **2.6**		

Motion	**LO 2.3C** **EK 2.3C1**	**Solve problems involving related rates, optimization, rectilinear motion, and planar motion.** **The derivative can be used to solve rectilinear motion problems involving position, speed, velocity, and acceleration.** ***Position, velocity, acceleration, and particle motion*** ***Finding position, velocity, and acceleration from graphs and tables***	**Throughout** **Larson/Hostetler Calculus 8th Ed. Exercises** **Supplemental Materials**		
Extreme Values	**LO 2.3C** **EK 2.3C3**	**Solve problems involving related rates, optimization, rectilinear motion, and planar motion.** **The derivative can be used to solve optimization problems, that is, finding a maximum or minimum value of a function over a given interval.** ***Absolute (global) extrema*** ***Relative (local) extrema*** ***Definition of critical value***	**Larson/Hostetler Calculus 8th Ed.** **3.1, 3.3**		**25**

Implications of the Derivatives	**LO 2.4A** **EK 2.4A1**	**Apply the Mean Value Theorem to describe the behavior of a function over an interval.** **If a function *f* is continuous over the interval [a, b] and differentiable over the interval (a,b), the Mean Value Theorem guarantees a point within that open interval where the instantaneous rate of change equals the average rate of change over the interval.** ***Rolle's theorem*** ***Mean Value theorem***	**Larson/Hostetler Calculus 8th Ed.** **3.2** **Supplemental Material**		

Using derivatives to analyze graphs	**LO 2.2A** **EK 2.2A1**	**Use derivatives to analyze properties of a function.** **First and second derivatives of a function can provide information about the function and its graph including intervals of increase or decrease, local (relative) and global (absolute) extrema, intervals of upward or downward concavity, and points of inflection**. ***The first derivative test*** ***Increasing and decreasing (intervals)*** ***The second derivative test*** ***Concavity and inflection points*** ***Curve Sketching***	**Larson/Hostetler Calculus 8th Ed.** **3.3, 3.4, 3.6**		

Connecting *f'* and *f''* with the graph of *f(x)*	**LO 2.2A** **EK 2.1D1** **EK 2.2A1**	**Use derivatives to analyze properties of a function.** **Differentiating *f'* produces the second derivative *f''*, provided the derivative of *f'* exists; repeating this process produces higher order derivatives of *f*.** **First and second derivatives of a function can provide information about the function and its graph including intervals of increase or decrease, local (relative) and global (absolute) extrema, intervals of upward or downward concavity, and points of inflection.** ***Connecting the graphs of f' and f'' with the graph of f(x)***	**Larson/Hostetler Calculus 8th Ed.** **Throughout Chapter 3** **Exercises** **Supplemental Material**		

Optimization Problems	**LO 2.3C** **EK 2.3C3**	**Solve problems involving related rates, optimization, rectilinear motion, and planar motion.** **The derivative can be used to solve optimization problems, that is, finding a maximum or minimum value of a function over a given interval.** ***Writing and optimizing functions***	**Larson/Hostetler Calculus 8th Ed.** **3.7**		
More Applications of Derivatives	**LO 2.3B** **EK 2.3B1** **EK 2.3B2**	**Solve problems involving the slope of the tangent line.** **The *derivative* at a point is the slope of the line tangent to a graph at that point on the graph.** **The tangent line is the graph of a locally linear approximation of the function near the point of tangency.** ***Local Linearization*** ***Differentials*** ***Tangent line approximations***	**Larson/Hostetler Calculus 8th Ed.** **3.9**		**4**

Antiderivatives	**LO 3.1A** **EK 3.1A1** **EK 3.1A2** **LO 3.3B(a)** **EK 3.3B3** **EK 3.3B5**	**Recognize antiderivatives of basic functions.** **An antiderivative of a function *f* is a function *g* whose derivative is *f*.** **Differentiation rules provide the foundation for finding antiderivatives.** **Calculate Antiderivatives** **The notation $\int f(x)dx = Fx+C$ means that $F'(x) = f(x)$ and $\int f(x)$ is called an indefinite integral of the function *f*.** **Techniques for finding antiderivatives include algebraic manipulation such as long division and completing the square, substitution of variables.** ***Indefinite Integral rules*** ***Power rules*** ***Trigonometric rules*** ***Exponential and logarithmic rules*** ***Inverse trigonometric rules***	**Larson/Hostetler Calculus 8th Ed.** **4.1, 5.2, 5.3, 5.4, 5.5, 5.7**		**25**

The Definite Integral Concept	**LO 3.2A(a)** **EK 3.2A1** **EK 3.2A3**	**Interpret the definite integral as a limit of a Riemann sum.** **A Riemann sum, which requires a partition of an interval *I*, is the sum of products, each of which is the value of the function at a point in a subinterval multiplied by the length of that subinterval of the partition.** **The information in a definite integral can be translated into the limit of a related Riemann sum, and the limit of a Riemann sum can be written as a definite integral.**	**Larson/Hostetler Calculus 8th Ed.** **4.2, 4.3**		**7**

The Definite Integral Concept (continued)	**LO 3.2B** **EK 3.2B1** **EK 3.2B2** **LO 3.2C**	**Approximate a definite integral.** **Definite integrals can be approximated for functions that are represented graphically, numerically, algebraically, and verbally.** **Definite integrals can be approximated using a left Riemann sum, a right Riemann sum, a midpoint Riemann sum, or a trapezoidal sum; approximations can be computed using either uniform or non-uniform partitions.** **Calculate a definite integral using areas and properties of definite integrals.**			

Evaluate Definite Integrals	**LO 3.3B(b)** **EK 3.3B2**	**Evaluate definite integrals.** **If *f* is continuous on the interval [a, b] and *F* is an antiderivative of *f*. then** $\int_a^b f(x)dx = F(b) - F(a)$. ***Evaluation by hand and on the calculator*** ***Properties of definite integrals***			

The Definite Integral	**LO 3.3A** **EK 3.3A1** **EK 3.3A2** **EK 3.3A3**	**Analyze functions defined by an integral.** **The definite integral can be used to define new functions.** **If *f* is a continuous function on the interval (a,b], then** $\frac{d}{dx}\left(\int_a^x f(t)dt\right) = f(x)$ **where *x* is between *a* and *b*.** **Graphical, numerical, analytical, and verbal representations of a function *f* provide information about the function *g* defined as** $g(x) = \int_a^x f(t)dt$**.** ***Mean Value theorem for Integrals*** ***The Fundamental Theorem of Calculus*** ***FTC 1*** ***FTC 2***	**Larson/Hostetler Calculus 8th Ed.** **4.3, 4.4**		**10**

Applications of Integrals I	**LO.2.3E** **EK 2.3E2** **LO 2.3F** **EK 2.3F1** **LO 3.5A** **EK 3.5A 1**	**Verify solutions to differential equations.** **Derivatives can be used to verify that a function is a solution to a given differential equation.** **Estimate solutions to differential equations.** **Slope fields provide visual clues to the behavior of solutions to first order differential equations.** **Analyze differential equations to obtain general and specific solutions.** **Antidifferentiation can be used to find specific solutions to differential equations with given initial conditions, including applications to motion along a line, and exponential growth and decay.**	**Larson/Hostetler Calculus 8th Ed.** **6.1, 6.2,**		**10**

Applications of Integrals I (continued)	**EK 3.5A2** **LO 3.5B** **EK 3.5B1**	**Some differential equations can be solved by separation of variables.** **Interpret, create and solve differential equations from problems in context.** **The model for exponential growth and decay that arises from the statement "The rate of change of a quantity is proportional to the size of the quantity" is** $\frac{dy}{dx} = ky$. ***General Differential equations*** ***Slopefields*** ***Exponential growth and decay*** ***Newton's Law of Cooling***			

Applications of Integrals II	**LO 3.4A** **EK 3.4A1** **EK 3.4A2** **LO 3.4B** **EK 3.4B1**	**Interpret the meaning of a definite integral within a word problem.** **A function defined as an integral represents an accumulation of a rate of change.** **The definite integral of the rate of change of a quantity over an interval gives the net change of that quantity over that interval.** **Apply definite integrals to problems involving the average value of a function.** **The average value of a function f over an interval $[a, b]$ is $\frac{1}{b-a}\int_a^b f(x)dx$.**	**Larson/Hostetler Calculus 8th Ed.** **7.1, 7.2, 7.3**		**15**

Applications of Integrals II (continued)	**LO 3.4C** **EK 3.4C1** **LO 3.4D** **EK 3.4D1** **EK 3.4D2**	**Apply definite integrals to problems involving motion.** **For a particle in rectilinear motion over an interval of time, the definite integral of velocity represents the particle's displacement over the interval of time, and the definite integral of speed represents the particle's total distance traveled over the interval of time.** **Apply definite integrals to problems involving area and volume.** **Areas of certain regions in the plane can be calculated with definite integrals.** **Volumes of solids with known cross sections, including discs and washers, can be calculated with definite integrals.**			

Applications of Integrals II (continued)	**LO 3.4E** **EK 3.4E1**	**Use the definite integral to solve problems in various contexts.** **The definite integral can be used to express information about accumulation and net change in many applied contexts.** ***Area (with respect to either axis)*** ***Area Between a curve and an axis*** ***Area Between two curves*** ***Volumes of solids of revolution (with respect to either axis)*** ***Disc method*** ***Shell method*** ***Volumes of solids with known cross-sections (with respect to either axis)***			
Review		**Review Packet**			**6**
Post AP Topics		**Teacher designed enrichment topics and projects**			**25**

Appendices

- Scranton School District Honors and AP Criteria
- Scranton School District Secondary Mathematics Curriculum Pathways
- Textbooks/Workbooks (referenced in the Mathematics Curriculum Guides)
- PA Core – Mathematics, Grades PreK-12
- PA Crosswalks -Mathematics Grades K-8
- PA Core Crosswalks - Mathematics Grades 9-12

Applied Geometry 11

Curriculum Guide

Scranton School District

Scranton, PA

Applied Geometry 11

Prerequisite : Algebra I, Part A and Part B, or Algebra I

Intended Audience: This course is designed for the student who has successfully completed Algebra I by the end of the 10th grade.

Applied Geometry 11 is a course for students who may experience difficulty with a Geometry 10 course. It is designed to emphasize the study of the properties and applications of common two and three dimensional figures. This course formalizes what students have learned about geometry in the middle grades, with a concentration on real world applications. Topics covered focus on the Pennsylvania Common Core Standards and are parallel to the Geometry 10 and Geometry 11 courses, presenting all the same major topics but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts. Applied Geometry 11 is designed for students who do not intend to pursue a course of study in any mathematics or science related field.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Applied Geometry 11	**Grade Level 11th**	**Date Completed: Oct 2014**

1st Quarter

Topic	Resources	CCSS
Basic Terms and Coordinate Geometry	Big Ideas Geometry 1.1, 1.2, 1.3	G.2.1.2.1, G.2.1.2.2, G.2.1.2.3
Perimeter and Area in the Coordinate Plane	Big Ideas Geometry 1.4	G.2.2.2.1, G.2.2.2.2, G.2.2.2.4, G.2.2.2.5,
Angles	Big Ideas Geometry 1.5, 1.6, 5.1, 7.1	G.2.2.1.1, G.2.2.1.2, G.1.2.1.4
Parallel and Perpendicular Lines	Big Ideas Geometry 3.1, 3.2, 3.3, 3.4, 3.5	G.2.2.1.2, G.2.1.2.2

2nd Quarter

Topic	Resources	CCSS
Reasoning and Proof	Big Ideas Geometry 2.4, 2.5, 2.6	G.1.3.2.1
Congruent Triangles	Big Ideas Geometry 5.2, 5.3, 5.4, 5.5, 5.6	G.1.2.1.1, G.1.2.1.3, G.1.3.1.1, G.1.3.2.1
Relationships Within Triangles	Big Ideas Geometry 6.1, 6.3, 6.4, 6.5	G.1.2.1.1

3rd Quarter

Topic	Resources	CCSS
Similar Triangles	Big Ideas Geometry 8.1, 8.2, 8.4, 8.4	G.1.3.1.2, G.1.3.1.1
Right Triangles and Trigonometry	Big Ideas Geometry 9.1, 9.4, 9.5	G.2.1.1.1, G.2.1.1.2
Quadrilaterals and Their Area	Big Ideas Geometry 7.2, 7.3, 7.4, 7.5	G.2.1.2.3, G.1.2.1.2, G.2.2.2.2, G.2.2.2.3,

4th Quarter

Topic	Resources	CCSS
Circles	Big Ideas Geometry 10.1, 10.2, 10.3, 10.4, 10.5, 10.6	G.1.1.1.1, G.1.1.1.2, G.1.1.1.3
Circumference, Area, and Volume	Big Ideas Geometry 11.1, 11.2, 11.4, 11.5, 11.6, 11.7, 11.8	G.1.1.1.2, G.2.2.2.5, G.1.1.1.4, G.1.2.1.5, G.2.3.1.1, G.2.3.1.2,
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Basic Terms And Coordinate Geometry	**G.2.1.2.1**	Name points, lines, planes, segments, and rays. Use the Ruler and Segment Addition Postulate. **Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Using the Midpoint and Distance Formula.*	**Big Ideas Geometry 1.1 – 1.2** **Big Ideas Geometry 1.3** **www.bigideasmath.com – Skills Review Handbook Sec 7.1** **http://departments.jordandistrict.org/curriculum/mathematics/secondary/impact/Algebra/Alg%208%20Geometry%20in%20Algebra/Alg8.4Solving%20for%20the%20midpoint.pdf**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)** **www.bigideasmath.com (Optional)**	**12 days**

Perimeter and Area in the Coordinate Plane	**G.2.2.2.1** **G.2.2.2.4**	**Estimate area, perimeter or circumference of an irregular figure.** *Using area, perimeter, and circumference formulas in the coordinate plane.* **Develop and/or use strategies to estimate the area of a compound/composite figure.**	**Big Ideas Geometry 1.4** **http://shodor.org/interactivate-java/activities/ShapeBuilder/**		**8 days**
Angles		*Name, measure and classify angles. Identify congruent angles.*	**Big Ideas Geometry 1.5**		**10 days**
	G.2.2.1.1	**Use properties of angles formed by intersecting lines to find the measures of missing angles.** *Complementary, Supplementary, and Vertical Angles.*	**Big Ideas Geometry 1.6** **http://www.palmbeachschools.org/students/Grade12/GeometryActivity2.pdf**		

	G.1.2.1.1	**Identify and/or use properties of triangles.** *Triangle Sum and Exterior Angle Theorems.*	**Big Ideas Geometry 5.1**		
	G.1.2.1.4	**Identify and/or use properties of regular polygons.** *Interior and Exterior Angle Theorems.*	**Big Ideas Geometry 7.1** **http://illuminations.nctm.org/Activity.aspx?id=3546**		
Parallel and Perpendicular Lines	**G.2.2.1.2**	Review and Identify pairs of lines. **Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.**	**Big Ideas Geometry 3.1** **Big Ideas Geometry 3.2-3.3**		**15 days**
	G.2.1.2.2	**Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).** *Identify parallel and perpendicular lines. Write equations of parallel and perpendicular lines.*	**Big Ideas Geometry 3.4-3.5**		

Reasoning and Proofs	**G.1.3.2.1**	*Use Algebraic Properties of Equality to justify the steps in solving an equation in a two-column proof.* **Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction.)** ***Use properties of equality involving segment lengths and angle measures to complete two-column proofs.***	**Big Ideas Geometry 2.4** **Big Ideas Geometry 2.5-2.6** ***Students are expected to fill in missing steps of partially completed proofs.***		**15 days**
Congruent Triangles	**G.1.3.1.1**	**Identify and/or use properties of congruent polygons or solids.** *Identify and use corresponding parts.*	**Big Ideas Geometry 5.2**		**20 days**
	G.1.2.1.3	**Identify and/or use properties of isosceles and equilateral triangles.** *Use the Base Angles Theorems.*	**Big Ideas Geometry 5.4**		

	G.1.3.2.1	**Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction).** *Proving triangles congruent using the SAS, SSS, HL, ASA and AAS Congruence Theorems.*	**Big Ideas Geometry 5.3, 5.5, 5.6** **http://www.lcps.org/cms/lib4/VA01000195/Centricity/Domain/1445/Geo%20G.6%20Chapter%204%20Congruent%20Triange%20Lab%20WS%20PDF.pdf** ***Students are expected to fill in missing steps of partially completed proofs.***		

Relationships Within Triangles	**G.1.2.1.1**	**Identify and/or use properties of triangles.** *Identify and/or use properties of medians, altitudes, and perpendicular bisectors.* *Use midsegments in the coordinate plane and the Triangle Midsegment Theorem to find distance.* *Use Triangle Inequality Theorem.*	**Big Ideas Geometry 6.1, 6.3** **Big Ideas Geometry 6.4** **Big Ideas Geometry 6.5** **http://www.glencoe.com/sites/common_assets/support_pages/MC_Course3/Triangle_Inequality.pdf**		**10 days**

Similar Triangles	**G.1.3.1.1 and G.1.3.1.2**	**Identify and/or use properties of similar polygons or solids.** *Use the Triangle Similarity Theorems to solve real-life problems.* Identify and/or use proportional relationships in similar figures.	**Big Ideas Geometry 8.1** **Big Ideas Geometry 8.2-8.3** **Big Ideas Geometry 8.4**		**15 days**
Right Triangles and Trigonometry	**G.2.1.1.1**	**Use the Pythagorean Theorem to write and/or solve problems involving right triangles.** *Find side lengths in special right triangles and solve real-life problems.*	**www.bigideasmath.com – Skills Review Handbook Sec 3.3-3.4** **Big Ideas Geometry 9.1** **http://www.cimt.plymouth.ac.uk/projects/mepres/book8/y8s3act.pdf** **Big Ideas Geometry 9.2**		**15 days**

	G.2.1.1.2	**Use trigonometric ratios to write and/or solve problems involving right triangles.** ******Use as enrichment if time permits.*	**Big Ideas Geometry 9.4-9.5** **http://en.wikibooks.org/wiki/High_School_Trigonometry/Applications_of_Right_Triangle_Trigonometry** **http://jwilson.coe.uga.edu/emt668/emat6680.folders/brooks/6690stuff/righttriangle/Applications.html**		
Quadrilaterals And Their Areas	**G.1.2.1.2**	**Identify and/or use properties of quadrilaterals.** *Use properties of trapezoids and the Trapezoid Midsegment Theorem to find distances.*	**Big Ideas Geometry 7.2, 7.4, 7.5** **http://illuminations.nctm.org/Lesson.aspx?id=1992** **Big Ideas Geometry 7.5**		**15 days**
	G.2.1.2.3	**Use slope, distance and/or midpoint between 2 points on a coordinate plane to establish properties of a 2-dimensional shape.**	**Big Ideas Geometry 7.3, 7.4**		

	G.2.2.2.2	**Find the measurement of a missing length given the perimeter, circumference, or area.** *Use formulas for quadrilaterals.*			
	G.2.2.2.3	**Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon.** *Use formulas for quadrilaterals.*	**http://map.mathshell.org/materials/download.php?fileid=1226**		
	G.2.2.3.1	**Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area. (e.g., How does changing the length of the radius of a circle affect the circumference of the circle?).** *Use formulas for quadrilaterals.*	**http://www.ssms.scps.k12.fl.us/Portals/104/assets/pdf/Math%207th%20garde/Change%20in%20geometric%20dimensions.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf**		

Circles	**G.1.1.1.1**	**Identify, determine and/or use the radius, diameter, segment and/or tangent of a circle.**	**Big Ideas Geometry 10.1** **http://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/9-12/PiLine-AS-Slope.pdf**		**15 days**
	G.1.1.1.2	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find arc measures.*	**Big Ideas Geometry 10.2**		

	G.1.1.1.3	**Use chords, tangents, and secants to find missing arc measures or missing segment measures.** *Use Chord Theorems to find lengths and arc measures.* *Use inscribed angles and inscribed polygons to find angle and arc measures.* *Use circumscribed angles to find angle and arc measures.* *Use chords, tangents, and secants to find missing segment measures.*	**Big Ideas Geometry 10.3** **Big Ideas Geometry 10.4** **Big Ideas Geometry 10.5** **Big Ideas Geometry 10.6** **http://www.nsa.gov/academia/_files/collected_learning/high_school/geometry/tangents_scants_chords.pdf** **http://illuminations.nctm.org/Lesson.aspx?id=2417**		

Circumference, Area, and Volume	**G.1.1.1.2**	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find circumference and use arc length to find measures and solve real-life problems.*	**Big Ideas Geometry 11.1**		**20 days**
	G.2.2.2.5	**Find the area of a sector of a circle.** **Use as enrichment if time permits.*	**Big Ideas Geometry 11.2** **http://www.regentsprep.org/regents/math/geometry/GP14/CircleSectors.htm**		
	G.1.2.1.5 **G.1.1.1.4**	**Identify and/or use properties of pyramids and prisms.** **Identify and/or use the properties of a sphere or cylinder.**	**Big Ideas Geometry 11.4**		

	G.2.3.1.2	**Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.5-11.8** **http://intermath.coe.uga.edu/tweb/gwin1-01/luce/SAV/SAVRes.html**		
	G.2.3.1.1	**Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.7-11.8** **http://www.mybookezzz.org/surface-area-hands-on-activity/**		
	G.2.3.1.3	**Find the measurement of a missing length given the surface area or volume.**	**http://illuminations.nctm.org/Lesson.aspx?id=2911**		
	G.2.3.2.1	**Describe how a change in the linear dimension of a figure affects its surface area or volume. (e.g., How does changing the length of the edge of a cube affect the volume of the cube?).**	**http://www.shodor.org/interactivate/lessons/SurfaceAreaAndVolume/** **http://www.k12.wa.us/mathematics/MathAve/Landscaping/Assessment.pdf**		

	G.2.2.4.1	**Use area models to find probabilities.** **Use as enrichment if time permits.*			
Final Exam Review					**10 days**

Applied Geometry 12

Curriculum Guide

Scranton School District

Scranton, PA

Applied Geometry 12

Prerequisite : Algebra I, Part A and Part B, or Algebra I

Intended Audience: This course is designed for the student who has successfully completed Algebra I by the end of the 11th grade.

This course is of the same philosophy as Applied Geometry 11 and covers the same content as Applied Geometry 11. The goal of this course is to ensure the mastery of course content for the students who have selected this course. It is designed to emphasize the study of the properties and applications of common two and three dimensional figures. This course formalizes what students have learned about geometry in the middle grades, with a concentration on real world applications. Topics covered focus on the Pennsylvania Common Core Standards and are parallel to the Geometry 10 and Geometry 11 courses, presenting all the same major topics but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts. Applied Geometry 12 is designed for students who do not intend to pursue a course of study in any mathematics or science related field. Applied Geometry 12 is the final course in Curriculum Pathway III. This course prepares the students to enter the workforce.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Applied Geometry 12	**Grade Level 12th**	**Date Completed: Oct 2014**

1st Quarter

Topic	Resources	CCSS
Basic Terms and Coordinate Geometry	Big Ideas Geometry 1.1, 1.2, 1.3	G.2.1.2.1, G.2.1.2.2, G.2.1.2.3
Perimeter and Area in the Coordinate Plane	Big Ideas Geometry 1.4	G.2.2.2.1, G.2.2.2.2, G.2.2.2.4, G.2.2.2.5,
Angles	Big Ideas Geometry 1.5, 1.6, 5.1, 7.1	G.2.2.1.1, G.2.2.1.2, G.1.2.1.4
Parallel and Perpendicular Lines	Big Ideas Geometry 3.1, 3.2, 3.3, 3.4, 3.5	G.2.2.1.2, G.2.1.2.2

2nd Quarter

Topic	Resources	CCSS
Reasoning and Proof	Big Ideas Geometry 2.4, 2.5, 2.6	G.1.3.2.1
Congruent Triangles	Big Ideas Geometry 5.2, 5.3, 5.4, 5.5, 5.6	G.1.2.1.1, G.1.2.1.3, G.1.3.1.1, G.1.3.2.1
Relationships Within Triangles	Big Ideas Geometry 6.1, 6.3, 6.4, 6.5	G.1.2.1.1

3rd Quarter

Topic	Resources	CCSS
Similar Triangles	Big Ideas Geometry 8.1, 8.2, 8.4, 8.4	G.1.3.1.2, G.1.3.1.1
Right Triangles and Trigonometry	Big Ideas Geometry 9.1, 9.4, 9.5	G.2.1.1.1, G.2.1.1.2
Quadrilaterals and Their Area	Big Ideas Geometry 7.2, 7.3, 7.4, 7.5	G.2.1.2.3, G.1.2.1.2, G.2.2.2.2, G.2.2.2.3,

4th Quarter

Topic	Resources	CCSS
Circles	Big Ideas Geometry 10.1, 10.2, 10.3, 10.4, 10.5, 10.6	G.1.1.1.1, G.1.1.1.2, G.1.1.1.3
Circumference, Area, and Volume	Big Ideas Geometry 11.1, 11.2, 11.4, 11.5, 11.6, 11.7, 11.8	G.1.1.1.2, G.2.2.2.5, G.1.1.1.4, G.1.2.1.5, G.2.3.1.1, G.2.3.1.2,
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Basic Terms And Coordinate Geometry	**G.2.1.2.1**	*Name points, lines, planes, segments, and rays. Use the Ruler and Segment Addition Postulate.* **Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Using the Midpoint and Distance Formula.*	**Big Ideas Geometry 1.1 – 1.2** **Big Ideas Geometry 1.3** **www.bigideasmath.com – Skills Review Handbook Sec 7.1** **http://departments.jordandistrict.org/curriculum/mathematics/secondary/impact/Algebra/Alg%208%20Geometry%20in%20Algebra/Alg8.4Solving%20for%20the%20midpoint.pdf**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)** **www.bigideasmath.com (Optional)**	**12 days**

Perimeter and Area in the Coordinate Plane	**G.2.2.2.1** **G.2.2.2.4**	**Estimate area, perimeter or circumference of an irregular figure.** *Using area, perimeter, and circumference formula in the coordinate plane.* **Develop and/or use strategies to estimate the area of a compound/composite figure.**	**Big Ideas Geometry 1.4** **http://shodor.org/interactivate-java/activities/ShapeBuilder/**		**8 days**
Angles		***Name, measure and classify angles. Identify congruent angles.***	**Big Ideas Geometry 1.5**		**10 days**
	G.2.2.1.1	**Use properties of angles formed by intersecting lines to find the measures of missing angles.** *Complementary, Supplementary, and Vertical Angles.*	**Big Ideas Geometry 1.6** **http://www.palmbeachschools.org/students/Grade12/GeometryActivity2.pdf**		

	G.1.2.1.1	**Identify and/or use properties of triangles.** *Triangle Sum and Exterior Angle Theorems.*	**Big Ideas Geometry 5.1**		
	G.1.2.1.4	**Identify and/or use properties of regular polygons.** *Interior and Exterior Angle Theorems.*	**Big Ideas Geometry 7.1** **http://illuminations.nctm.org/Activity.aspx?id=3546**		
Parallel and Perpendicular Lines	**G.2.2.1.2**	Review and Identify pairs of lines. **Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.**	**Big Ideas Geometry 3.1** **Big Ideas Geometry 3.2-3.3**		**15 days**
	G.2.1.2.2	**Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).** *Identify parallel and perpendicular lines. Write equations of parallel and perpendicular lines.*	**Big Ideas Geometry 3.4-3.5**		

Reasoning and Proofs	**G.1.3.2.1**	*Use Algebraic Properties of Equality to justify the steps in solving an equation in a two-column proof.* **Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction.)** *Use properties of equality involving segment lengths and angle measures to complete two-column proofs.*	**Big Ideas Geometry 2.4** **Big Ideas Geometry 2.5-2.6** ***Students are expected to fill in missing steps of partially completed proofs.***		**15 days**
Congruent Triangles	**G.1.3.1.1**	**Identify and/or use properties of congruent polygons or solids.** *Identify and use corresponding parts.*	**Big Ideas Geometry 5.2**		**20 days**
	G.1.2.1.3	**Identify and/or use properties of isosceles and equilateral triangles.** *Use the Base Angles Theorems.*	**Big Ideas Geometry 5.4**		

	G.1.3.2.1	**Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction).** *Proving triangles congruent using the SAS, SSS, HL, ASA and AAS Congruence Theorems.*	**Big Ideas Geometry 5.3, 5.5, 5.6** **http://www.lcps.org/cms/lib4/VA01000195/Centricity/Domain/1445/Geo%20G.6%20Chapter%204%20Congruent%20Triange%20Lab%20WS%20PDF.pdf** ***Students are expected to fill in missing steps of partially completed proofs.***		
Relationships Within Triangles	**G.1.2.1.1**	**Identify and/or use properties of triangles.** *Identify and/or use properties of medians, altitudes, and perpendicular bisectors.* *Use midsegments in the coordinate plane and the Triangle Midsegment Theorem to find distance.* *Use Triangle Inequality Theorem.*	**Big Ideas Geometry 6.1, 6.3** **Big Ideas Geometry 6.4** **Big Ideas Geometry 6.5** **http://www.glencoe.com/sites/common_assets/support_pages/MC_Course3/Triangle_Inequality.pdf**		**10 days**

Similar Triangles	**G.1.3.1.1** **G.1.3.1.2**	**Identify and/or use properties of similar polygons or solids.** *Use the Triangle Similarity Theorems to solve real-life problems.* **Identify and/or use proportional relationships in similar figures.**	**Big Ideas Geometry 8.1** **Big Ideas Geometry 8.2-8.3** **Big Ideas Geometry 8.4**		**15 days**
Right Triangles and Trigonometry	**G.2.1.1.1**	**Use the Pythagorean Theorem to write and/or solve problems involving right triangles.** *Find side lengths in special right triangles and solve real-life problems.*	**www.bigideasmath.com – Skills Review Handbook** **Sec 3.3-3.4** **Big Ideas Geometry 9.1** **http://www.cimt.plymouth.ac.uk/projects/mepres/book8/y8s3act.pdf**		**15 days**

	G.2.1.1.2	**Use trigonometric ratios to write and/or solve problems involving right triangles.** **Use as enrichment if time permits.*	**Big Ideas Geometry 9.4-9.5** **http://en.wikibooks.org/wiki/High_School_Trigonometry/Applications_of_Right_Triangle_Trigonometry** **http://jwilson.coe.uga.edu/emt668/emat6680.folders/brooks/6**		
Quadrilaterals And Their Areas	**G.1.2.1.2**	**Identify and/or use properties of quadrilaterals.** *Use properties of trapezoids and the Trapezoid Midsegment Theorem to find distances.*	**Big Ideas Geometry 7.2, 7.4, 7.5** **http://illuminations.nctm.org/Lesson.aspx?id=1992** **Big Ideas Geometry 7.5**		**15 days**
	G.2.1.2.3	**Use slope, distance and/or midpoint between 2 points on a coordinate plane to establish properties of a 2-dimensional shape.**	**Big Ideas Geometry 7.3, 7.4**		

	G.2.2.2.2	**Find the measurement of a missing length given the perimeter, circumference, or area.** *Use formulas for quadrilaterals.*			
	G.2.2.2.3	**Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon.** *Use formulas for quadrilaterals.*	**http://map.mathshell.org/materials/download.php?fileid=1226**		
	G.2.2.3.1	**Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area. (e.g., How does changing the length of the radius of a circle affect the circumference of the circle?).** *Use formulas for quadrilaterals.*	**http://www.ssms.scps.k12.fl.us/Portals/104/assets/pdf/Math%207th%20garde/Change%20in%20geometric%20dimensions.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf**		

Circles	**G.1.1.1.1**	**Identify, determine and/or use the radius, diameter, segment and/or tangent of a circle.**	**Big Ideas Geometry 10.1** **http://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/9-12/PiLine-AS-Slope.pdf**		**15 days**
	G.1.1.1.2	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find arc measures.*	**Big Ideas Geometry 10.2**		

	G.1.1.1.3	**Use chords, tangents, and secants to find missing arc measures or missing segment measures.** *Use Chord Theorems to find lengths and arc measures.* *Use inscribed angles and inscribed polygons to find angle and arc measures.* *Use circumscribed angles to find angle and arc measures.* *Use chords, tangents, and secants to find missing segment measures.*	**Big Ideas Geometry 10.3** **Big Ideas Geometry 10.4** **Big Ideas Geometry 10.5** **Big Ideas Geometry 10.6** **http://www.nsa.gov/academia/_files/collected_learning/high_school/geometry/tangents_scants_chords.pdf**		

Circumference, Area, and Volume	**G.1.1.1.2**	Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle. *Find circumference and use arc length to find measures and solve real-life problems.*	**Big Ideas Geometry 11.1**		**20 days**
	G.2.2.2.5	**Find the area of a sector of a circle.** **Use as enrichment if time permits.*	**Big Ideas Geometry 11.2** **http://www.regentsprep.org/regents/math/geometry/GP14/CircleSectors.htm**		
	G.1.2.1.5 **G.1.1.1.4**	**Identify and/or use properties of pyramids and prisms.** **Identify and/or use the properties of a sphere or cylinder.**	**Big Ideas Geometry 11.4**		
	G.2.3.1.2	**Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.5-11.8** **http://intermath.coe.uga.edu/tweb/gwin1-01/luce/SAV/SAVRes.html**		

	G.2.3.1.1	**Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.7-11.8** **http://www.mybookezzz.org/surface-area-hands-on-activity/**		
	G.2.3.1.3	**Find the measurement of a missing length given the surface area or volume.**	**http://illuminations.nctm.org/Lesson.aspx?id=2911**		
	G.2.3.2.1	**Describe how a change in the linear dimension of a figure affects its surface area or volume. (e.g., How does changing the length of the edge of a cube affect the volume of the cube?).**	**http://www.shodor.org/interactivate/lessons/SurfaceAreaAndVolume/** **http://www.k12.wa.us/mathematics/MathAve/Landscaping/Assessment.pdf**		
	G.2.2.4.1	**Use area models to find probabilities.** **Use as enrichment if time permits.*			
Final Exam Review					**10 days**

Secondary Mathematics Curriculum

Scranton School District

Scranton, PA

Business Math

Curriculum Guide

Scranton School District

Scranton, PA

Business Math

Prerequisite : Geometry 11 or Applied Geometry 11

Course Description: This course is dedicated to real world applications of Algebra Concepts. As such, nearly every problem is a word problem. This course is designed to expose students to the facets of running their own business including but not limited to Banking, Payroll, Taxes, Insurance, Managing People, Managing Inventory, Managing Business Costs and Marketing.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Business Math	**Grade Level 12**	**Date Completed: 2/2015**

1st Quarter

Topic	Resources	CCSS
Gross Pay	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	8.F.4, HS.A-SSE.3.c, HS. A-CED.1, HS.A-CED.2, HS.A-CED.3, HS.A-CED.4, HS.A-REI.1, HS.A-REI.2, HS.A-REI.3, HS.F-IF.4, HS.F-IF.5, HS.F-IF.6, HS.F-BF.1, HS.F-LE.5
Net Pay	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.F-BF.1, HS.F-LE.2, HS.F-LE.5
Benefits	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.A-REI.1, HS.A-REI.2, HS.A-REI.3,

2nd Quarter

Topic	Resources	CCSS
Banking	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.F-LE.2, HS.F-LE.5
Loans	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.F-LE.2, HS.F-LE.5

3rd Quarter

Topic	Resources	CCSS
Insurance	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.F-BF.1, HS.F-LE.5
Manage People	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.F-BF.1, HS.F-LE.5
Manage Inventory	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.F-BF.1, HS.F-LE.5

4th Quarter

Topic	Resources	CCSS
Business Costs	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.S-ID.1, HS.S-ID.2, HS.S-ID.3, HS.S-ID.4, HS. S-ID.5, HS.S-ID.6, HS.S-ID.7, HS.S-ID.9, HS.S-IC.2, HS.S-IC.3
Sales and Marketing	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	HS.S-ID.1, HS.S-ID.2, HS.S-ID.3, HS.S-ID.4, HS. S-ID.5, HS.S-ID.6, HS.S-ID.7, HS.S-ID.9, HS.S-IC.2, HS.S-IC.3
Final Exam Review	Business Math by Schulteis and Kaczmarski Or Business Math 6th Edition by Cleaves and Hobbs	

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
I. Gross Pay **A. Hourly** **B. Salary** **C. Average Pay** **1. Find the average for one person** **2. Find the average for a group** **3. Use the group average to find individual pay** **D. Regular Pay** **E. Overtime and Holiday Pay** **F. Commission** **1. Straight Commission** **2. Commission based on Quota** **3. Graduated commission** **4. Commission plus salary** **5. Find the rate of commission**	**8.F.4** **HS.ASSE.3.c**	**Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.** **Use the properties of exponents to transform expressions for exponential functions. *For example the expression* 1.15^t *can be rewritten as* $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%*.**	**Business Math by Schultheis and Kaczmarski** **Or** **Business Math 6th Edition by Cleaves and Hobbs** **Teacher made worksheets for averages and commissions** **Teacher made lab to compare piece work and per diem**	**Teacher prepared tests, quizzes, etc.**	**25 days**

	HS. A-CED.1 **HS.A-CED.2** **HS.A-CED.3** **HS.A-CED.4**	**Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions*.** **Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.** **Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*.** **Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R*.**			

	HS.A-REI.1 **HS.A-REI.2** **HS.A-REI.3**	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.** **Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.** **Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**			

	HS.F-IF.4 **HS.F-IF.5** **HS.F-IF.6**	**For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*.** **Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.** **Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.***			

	HS.F-BF.1 **HS.F-LE.5**	**Write a function that describes a relationship between two quantities.** **Interpret the parameters in a linear or exponential function in terms of a context.**			

II. Net Pay **A. Federal Withholding Tax** **B. Social Security Tax** **C. Medicare Tax** **D. Total Deductions**	**HS.F-BF.1, HS.F-LE.2, HS.F-LE.5**	**Write a function that describes a relationship between two quantities.** **Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).** **Interpret the parameters in a linear or exponential function in terms of a context.**	**www.moneyinstructor.com.**		**7 days**

III. Benefits **A. Total job Benefits** **B. Net job Benefits** **C. Comparing Job benefits**	**HS.A-REI.1** **HS.A-REI.2** **HS.A-REI.3**	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.** **Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.** **Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**	**Teacher made essay project decide which job is best and explain why.**		**7 days**

IV. Banking **A. Checking Accounts** **1. Comparing Checking accounts** **2. Deposits** **a) Endorsing Checks** **b) Deposit Slips** **c) Recoding deposits in the register** **3. Writing Checks** **a) Recording checks in the register** **4. (ATM) Electronic Banking** **a) Recording withdrawals in the register** **b) Recording purchases in the register** **5. Online banking** **a) Expected or pending Payments** **6. Reconciling a Register** **B. Savings Accounts** **1. Simple Interest** **2. Compound Interest** **3. Money Markets and CD Accounts** **4. Penalties** **5. Effective rate of interest** **6. Comparing Savings accounts**	**HS.F-LE.2** **HS.F-LE.5**	**Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).** **Interpret the parameters in a linear or exponential function in terms of a context.**	**Teacher made supplements and activities for hands on practice** **www.everfi.com**		**30 days**

V. Loans **A. Interest Bearing Promissory notes** **1. Exact Interest** **2. Ordinary Interest** **3. Finding the rate of Interest** **4. Discounted Promissory Notes** **5. Finding the True rate of interest** **6. Calculate the interest due using tables** **7. Find the due date** **8. Find the number of days between dates** **B. Installment Loans** **1. Installment Price** **2. Finance Charges** **3. Monthly Installment payments** **C. Early loan Repayments** **1. Earned and Unearned Finance Charges** **D. Calculate APR (Annual Percentage Rate)**	**HS.F-LE.2** **HS.F-LE.5**	**Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).** **Interpret the parameters in a linear or exponential function in terms of a context.**	**Project from pg 153 of text** **Speakers when available** **Clarence Money and Matt from Aaron's at 570-558-4949**		**18 days**

VI. Insurance **A. Property Insurance** **1. Homeowner Premiums** **2. Renter Premiums** **3. Collecting on a claim** **4. Co-Insurance** **B. Auto Insurance** **1. Collision /Comprehensive** **2. Premiums** **3. Deductibles** **C. Life Insurance** **1. Types** **2. Premiums** **3. Net Cost of Insurance** **4. Life Insurance Cash Values** **D. Health Insurance** **1. Premiums** **2. Deductibles** **3. Co-insurance** **E. Disability Insurance**	**HS.F-BF.1** **HS.F-LE.5**	**Write a function that describes a relationship between two quantities.** **Interpret the parameters in a linear or exponential function in terms of a context.**	**Speakers when available** **Find 5 facts about each type of insurance: Fire, Flood, Auto, Homeowner, Renter, Term Life, Whole Life, Universal Life** **Use graphic organizers to make comparisons between the group's findings about insurances**	**Report is an assessment**	**21 days**

VII. Manage People **A. Recruitment Costs** **1. Advertising** **2. Hiring Costs** **3. Using an Agency** **B. Wage and Salary Increases** **1. COLA** **2. Bonus** **3. Profit Sharing** **C. Cost of Labor** **1. Full-time** **2. Part time**	**HS.F-BF.1** **HS.F-LE.5**	**Write a function that describes a relationship between two quantities.** **Interpret the parameters in a linear or exponential function in terms of a context.**	**Teacher made project: Negotiate a Contract**	**Contract is an assessment**	**13 days**

VIII. Manage Inventory **A. Tracking Inventory** **B. Reordering Inventory** **C. Inventory Valuation** **1. FIFO** **2. LIFO** **3. Weighted Average** **D. Cost of Ordering Inventory** **E. Cost of Carrying Inventory**	**HS.F-BF.1** **HS.F-LE.5**	**Write a function that describes a relationship between two quantities.** **Interpret the parameters in a linear or exponential function in terms of a context.**	**Teacher made worksheets** Possible Speakers: **Clarence Money and Matt from Aaron's at: 570-558-4949**		**15 days**

IX. Business Costs **A. Manufacturing Costs** **1. Prime Cost** **2. Distributing Factory overhead to each unit** **3. Total Manufacturing Cost** **B. Break Even point** **C. Depreciation** **1. Declining Balance Method** **2. Sum-of-the-years Method** **3. MACRS Method** **D. Shipping Costs** **1. Shipping Charges** **2. Freight Charges** **E. Office Costs** **F. Travel Expenses**	**HS.S-ID.1** **HS.S-ID.2** **HS.S-ID.3** **HS.S-ID.4** **HS. S-ID.5**	**Represent data with plots on the real number line (dot plots, histograms, and box plots).** **Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.** **Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).** **Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.** **Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.**			**15 days**

	HS.S-ID.6 **HS.S-ID.7,** **HS.S-ID.9** **HS.S-IC.2** **HS.S-IC.3**	**Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.** **Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.** **Distinguish between correlation and causation.** **Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model*?** **Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.**			

X. Sales and Marketing **A. Discounts** **1. Cash Discounts** **2. Trade Discounts** **3. Series Discounts** **B. Markup** **1. Based on selling price** **2. Based on Cost** **C. Markdown** **D. Marketing Survey** **1. Response Rate** **2. Survey Results** **3. Validity of Results** **E. Sales Forecasts** **F. Market Share**	**HS.S-ID.1** **HS.S-ID.2** **HS.S-ID.3** **HS.S-ID.4** **HS. S-ID.5**	**Represent data with plots on the real number line (dot plots, histograms, and box plots).** **Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.** **Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).** **Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.** **Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.**	**Teacher made project: Conduct a Survey; present your results. Team two present same results but draw a different conclusion** **Possible Speakers: Clarence Money and Matt from Aaron's at: 570-558-4949**		**17 days**

	HS.S-ID.6 **HS.S-ID.7** **HS.S-ID.9** **HS.S-IC.2** **HS.S-IC.3**	**Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.** **Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.** **Distinguish between correlation and causation.** **Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model*?** **Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.**			
XI. Review for Final Exam					**15 days**

Honors Calculus I

Curriculum Guide

Scranton School District

Scranton, PA

Honors Calculus I

Prerequisites:

- Successful completion of Elementary Analysis or Honors Elementary Analysis
- Be in compliance with the SSD Honors and AP Criteria Policy

Honors Calculus I is a high level mathematics course offered by the Scranton School District. It is very rigorous and taught at the college level. Topics covered in this course include analytic geometry, limits of functions, differentiation and integration of functions, and applications of differentiation and integration.

The work covered in this course will help the student develop analytical reasoning skills and disciplined study habits necessary for success in college. Students pursuing college majors requiring advanced mathematics courses will benefit from this advanced mathematics training.

Since the content of the Honors Calculus I is beyond the scope of Common Core, the Collegeboard Curriculum Framework for AP Calculus AB 2016-2017 document was used as a guide to write this curriculum.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Honors Calculus I	**Grade Level: 12**	**Date Completed: 3/1/15**

1st Quarter

Topic	Resources	AP Calculus Standard
Elementary Analysis Review	Chapter P	
Limits	**Larson/Hostetler Calculus 8th Ed.** Chapter One, Chapter Three	LO 1.1A(a), LO 1.1A(b) LO 1.1B, LO 1.1C, LO 1.1D EK 1.1A2, EK 1.1B1, EK 1.1C1, EK 1.1C2, EK 1.1D1
Continuity	**Larson/Hostetler Calculus 8th Ed.** Chapter One	LO 1.2A, LO 1.2B
Differentiablilty	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.2B, EK 2.2B1, EK 2.2B2
Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two, Chapter Five (natural logarithmic and exponential functions)	LO 2.1A, EK 2.1A5 EK 2.1B1

2nd Quarter

Topic	Resources	AP Calculus Standard
Derivative Rules	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1C, EK 2.1C4 EK 2.1C2, EK 2.1A5
Geometric Applications of Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1A
Implicit Differentiation	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1C, EK 2.1C5 LO 2.3B, EK 2.3B1, EK 2.3B2
Higher Order Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1D
Related Rates	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.3C, EK 2.3C2
Motion	**Throughout Larson/Hostetler Calculus 8th Ed. Exercises and Supplemental Materials**	LO 2.3C, EK 2.3C1

3rd Quarter

Topic	Resources	AP Calculus Standard
Extreme Values	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3C, EK 2.3C3
Implications of Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.4A, EK 2.4A1
Using Derivatives to Analyze Graphs	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.2A, EK 2.2A1
Connecting f' and f'' with the Graph of f(x)	**Larson/Hostetler Calculus 8th Ed.** Chapter Three, Supplemental Materials	LO 2.2A, EK 2.1D1, EK 2.2A1
Optimization Problems	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3C, EK 2.3C3
Antiderivatives	**Larson/Hostetler Calculus 8th Ed.** Chapters Four and Five	LO 3.1A, EK 3.1A1, EK 3.1A2, LO 3.3B(a), EK 3.3B3, EK 3.3B5

4th Quarter

Topic	Resources	AP Calculus Standard
Antiderivatives (continued)	**Larson/Hostetler Calculus 8th Ed.** Chapters Four and Five	LO 3.1A, EK 3.1A1, EK 3.1A2, LO 3.3B(a), EK 3.3B3, EK 3.3B5
The Definite Integral Concept	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.2A(a), EK 3.2A1, EK 3.2A3 LO 3.2B, EK 3.2B1, EK 3.2B2, LO 3.2C
Evaluate Definite Integrals	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.3B(b), EK 3.3B2
The Definite Integral	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.3A, EK 3.3A1, EK 3.3A3
Applications of Integrals	**Larson/Hostetler Calculus 8th Ed.** Chapter Seven	LO 3.4D, EK 3.4D1, EK 3.4D2
Final Review	Review Packet	

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Review		**Calculus Library of Functions** **Linear functions** **Functions as models of change** **Transformation of functions** **Solving equations(algebraically and on the calculator)**	**Larson/Hostetler Calculus 8th Ed.** **Chapter P**	**Teacher prepared tests, quizzes, etc.**	**15**
Limits	**LO 1.1A(a)** **LO 1.1A(b)**	**Express limits symbolically using correct notation.** **Interpret limits expressed symbolically.** ***Intuitive definition of Limits***	**Larson/Hostetler Calculus 8th Ed.** **1.2**		**18**
	LO 1.1B **EK 1.1B1**	**Estimate limits of functions.** **Numerical and graphical information can be used to estimate limits.** ***Visualizing limits***	**Larson/Hostetler Calculus 8th Ed.** **1.2**		
Limits at a point	**EK 1.1A2**	**The concept of a limit can be extended to include one-sided limits, limits at infinity, and infinite limits.**	**Larson/Hostetler Calculus 8th Ed.** **1.2, 3.5**		

The algebra of limits:	**LO 1.1C** **EK 1.1C1** **EK 1.1C2**	**Determine limits of functions.** **Limits of sums, differences, products, quotients, and composite functions can be found using the basic theorems of limits and algebraic rules.** **The limit of a function may be found by using algebraic manipulation, alternate forms of trigonometric functions, or the squeeze theorem (Sandwich Theorem).** ***Substitution (continuous functions)*** ***Intuitive discussion of removable versus non-removable discontinuities*** ***Factoring (removable discontinuities)***	**Larson/Hostetler Calculus 8th Ed.** **1.3, 1.4**		

Limits Involving Infinity	**LO 1.1D** **EK 1.1D1**	**Deduce and interpret behavior of functions using limits** **Asymptotic and unbounded behavior of functions can be explained and described using limits** ***Asymptotic behavior (horizontal and vertical asymptotes)***	**Larson/Hostetler Calculus 8th Ed.** **1.5** **3.5**		
Continuity	**LO 1.2A**	**Analyze functions for intervals of continuity or points of discontinuity.** ***Continuity at a point*** ***Continuous Functions*** ***Discontinuous functions:*** ***Removable discontinuities*** ***Jump discontinuities***	**Larson/Hostetler Calculus 8th Ed.** **1.4**		
	LO 1.2B	**Determine the applicability of important Calculus theorems using continuity.** ***Continuous functions*** ***Intermediate Value Theorem***	**Larson/Hostetler Calculus 8th Ed.** **1.4**		

Derivative Concepts	**LO 2.1A** **EK 2.1A5** **EK 2.1B1**	**Identify the derivative of a function as the limit of a difference quotient.** **The derivative can be represented graphically, numerically, analytically, and verbally.** **The derivative at a point can be estimated from information given in tables or graphs.** ***Definition of the derivative (difference quotient)*** ***Derivative at a point***	**Larson/Hostetler Calculus 8th Ed.** **2.1**		**40**

Derivative Rules	**LO 2.1C**	**Calculate derivatives.** ***Constant rule*** ***Constant multiple rule*** ***Sum and difference*** ***Power rule*** ***Product and quotient rules*** ***Proper form of derivatives (factored)***	**Larson/Hostetler Calculus 8th Ed.** **2.2, 2.3**		
Chain rule	**EK 2.1C4**	**The chain rule provides a way to differentiate composite functions** ***Derivatives of composite functions*** ***Derivatives using repeated use of the chain rule***	**Larson/Hostetler Calculus 8th Ed.** **2.4**		
Derivatives of Various Functions	**EK 2.1C2**	**Specific rules can be used to calculate derivatives for classes of functions, including polynomial, rational, power, exponential, logarithmic and trigonometric functions.**	**Larson/Hostetler Calculus 8th Ed.** **2.2, 2.3, 2.4** **5.1,** **5.4,** **5.6**		

Derivatives Geometric Applications	**LO 2.1A**	**Identify the derivative of a function as the limit of a difference quotient.** ***Geometric applications of the derivative and rates of change*** ***Average rates of change versus instantaneous rates of change*** ***Using the derivative to find information necessary to write the equations of tangent lines and normal lines*** ***Using the derivative to calculate points of horizontal tangencies***	**Throughout Larson/Hostetler Calculus 8th Ed. Chapter 2 Exercises**		
Higher Order Derivatives	**LO 2.1D**	**Determine higher order derivatives.** ***Second and higher order derivatives***	**Larson/Hostetler Calculus 8th Ed. 2.3, 2.4**		

Differentiability	**LO 2.2B** **EK 2.2B1** **EK 2.2B2**	**Recognize the connection between differentiability and continuity.** **A continuous function may fail to be differentiable at a point in its domain.** **If a function is differentiable at a point, then it is continuous at that point.** ***Why the derivative may fail to exist***	**Larson/Hostetler Calculus 8th Ed.** **2.1**		
Numerical Derivatives	**EK 2.1A5**	**The derivative can be represented graphically, numerically, analytically, and verbally.** ***Finding derivatives on the graphing calculator***	**Supplemental Material**		
Implicit Derivatives	**LO 2.1C** **EK 2.1C5**	**Calculate derivatives.** **The chain rule is the basis for implicit differentiation.** ***Explicit versus implicit definitions of functions*** ***Implicit differentiation process***	**Larson/Hostetler Calculus 8th Ed.** **2.5**		

Derivatives Geometric Applications	**LO 2.3B** **EK 2.3B1** **EK 2.3B2**	**Solve problems involving the slope of the tangent line.** **The *derivative* at a point is the slope of the line tangent to a graph at that point on the graph.** **The tangent line is the graph of a locally linear approximation of the function near the point of tangency.** ***Using implicit differentiation write equations of tangent and normal lines to functions*** ***Using implicit differentiation calculate points of horizontal tangencies and equations of vertical asymptotes***	**Larson/Hostetler Calculus 8th Ed.** **2.5**		
Numerical Derivatives	**EK 2.1A5**	**The derivative can be represented graphically, numerically, analytically, and verbally.** ***Finding and evaluating implicit derivatives on the graphing calculator***	**Supplemental Material**		

Related Rates	**LO 2.3C** **EK 2.3C2**	**Solve problems involving related rates and optimization.** **The derivative can be used to solve related rates problems, that is, finding a rate at which one quantity is changing by relating it to other quantities whose rates of change are known.** ***What are related rates of change*** ***Related rate equations*** ***Related rate problem strategies***	**Larson/Hostetler Calculus 8th Ed.** **2.6**		

Motion	**LO 2.3C** **EK 2.3C1**	**Solve problems involving related rates and optimization and motion.** **The derivative can be used to solve rectilinear motion problems involving position, speed, velocity, and acceleration.** ***Position, velocity, and acceleration***	**Throughout Larson/Hostetler Calculus 8th Ed. Exercises Supplemental Materials**		

Extreme Values	**LO 2.3C** **EK 2.3C3**	**The derivative can be used to solve optimization problems, that is, finding a maximum or minimum value of a function over a given interval.** ***Absolute (global) extrema*** ***Relative (local) extrema*** ***Definition of critical value***	**Larson/Hostetler Calculus 8th Ed.** **3.1, 3.3**		**30**
Implications of the Derivatives	**LO 2.4A** **EK 2.4A1**	**Apply the Mean Value Theorem to describe the behavior of a function over an interval.** **If a function *f* is continuous over the interval [a, b] and differentiable over the interval (a,b), the Mean Value Theorem guarantees a point within that open interval where the instantaneous rate of change equals the average rate of change over the interval.** ***Rolle's theorem*** ***Mean Value theorem***	**Larson/Hostetler Calculus 8th Ed.** **3.2** **Supplemental Material**		

Using derivatives to analyze graphs	**LO 2.2A** **EK 2.2A1**	**Use derivatives to analyze properties of a function.** **First and second derivatives of a function can provide information about the function and its graph including intervals of increase or decrease, local (relative) and global (absolute) extrema, intervals of upward or downward concavity, and points of inflection**. ***The first derivative test*** ***Increasing and decreasing (intervals)*** ***The second derivative test*** ***Concavity and inflection points*** ***Curve Sketching***	**Larson/Hostetler Calculus 8th Ed.** **3.3, 3.4, 3.6**		

Connecting *f'* and *f''* with the graph of *f(x)*	**LO 2.2A** **EK 2.1D1** **EK 2.2A1**	**Use derivatives to analyze properties of a function.** **Differentiating *f'* produces the second derivative *f''*, provided the derivative of *f'* exists; repeating this process produces higher order derivatives of *f*.** **First and second derivatives of a function can provide information about the function and its graph including intervals of increase or decrease, local (relative) and global (absolute) extrema, intervals of upward or downward concavity, and points of inflection.** ***Connecting the graphs of f' and f'' with the graph of f(x)***	**Larson/Hostetler Calculus 8th Ed.** **Throughout Chapter 3** **Exercises** **Supplemental Material**		

Optimization Problems	**LO 2.3C** **EK 2.3C3**	**The derivative can be used to solve optimization problems, that is, finding a maximum or minimum value of a function over a given interval.** ***Writing and optimizing functions***	**Larson/Hostetler Calculus 8th Ed.** **3.7**		

Antiderivatives	**LO 3.1A** **EK 3.1A1** **EK 3.1A2** **LO 3.3B(a)** **EK 3.3B3** **EK 3.3B5**	**Recognize antiderivatives of basic functions.** **An antiderivative of a function *f* is a function *g* whose derivative is *f*.** **Differentiation rules provide the foundation for finding antiderivatives.** **Calculate Antiderivatives** **The notation $\int f(x)dx = Fx+C$ means that $F'(x) = f(x)$ and $\int f(x)$ is called an indefinite integral of the function *f*.** **Techniques for finding antiderivatives include algebraic manipulation such as long division and completing the square, substitution of variables.** ***Indefinite Integral rules*** ***Power rules*** ***Trigonometric rules*** ***Exponential and logarithmic rules***	**Larson/Hostetler Calculus 8th Ed.** **4.1, 5.2, 5.3, 5.4, 5.5, 5.7**		**35**

The Definite Integral Concept	**LO 3.2A(a)** **EK 3.2A1** **EK 3.2A3**	**Interpret the definite integral as a limit of a Riemann sum.** **A Riemann sum, which requires a partition of an interval *I*, is the sum of products, each of which is the value of the function at a point in a subinterval multiplied by the length of that subinterval of the partition.** **The information in a definite integral can be translated into the limit of a related Riemann sum, and the limit of a Riemann sum can be written as a definite integral.**	**Larson/Hostetler Calculus 8th Ed.** **4.2, 4.3**		**10**

The Definite Integral Concept (continued)	**LO 3.2B** **EK 3.2B1** **EK 3.2B2** **LO 3.2C**	**Approximate a definite integral.** **Definite integrals can be approximated for functions that are represented graphically, numerically, algebraically, and verbally.** **Definite integrals can be approximated using a left Riemann sum, a right Riemann sum, a midpoint Riemann sum, or a trapezoidal sum; approximations can be computed using either uniform or non-uniform partitions.** **Calculate a definite integral using areas and properties of definite integrals.**			

Evaluate Definite Integrals	**LO 3.3B(b)** **EK 3.3B2**	**Evaluate definite integrals.** **If *f* is continuous on the interval [a, b] and *F* is an antiderivative of *f*. then** $\int_a^b f(x)dx = F(b) - F(a)$. ***Evaluation by hand and on the calculator*** ***Properties of definite integrals***			

The Definite Integral	**LO 3.3A** **EK 3.3A1** **EK 3.3A3**	**Graphical, numerical, analytical, and verbal representations of a function f provide information about the function g defined as $g(x) = \int_a^x f(t)dt$.** ***The Fundamental Theorem of Calculus*** ***FTC 1*** ***FTC 2***	**Larson/Hostetler Calculus 8th Ed.** **4.3, 4.4**		**12**

Applications of Integrals	**LO 3.4D** **EK 3.4D1** **EK 3.4D2**	**Apply definite integrals to problems involving area and volume.** **Areas of certain regions in the plane can be calculated with definite integrals.** **Volumes of solids with known cross sections, including discs and washers, can be calculated with definite integrals.** ***Area (with respect to either axis)*** ***Area Between a curve and an axis*** ***Area Between two curves*** ***Volumes of solids of revolution (with respect to either axis)*** ***Disc method*** ***Shell method*** ***Volumes of solids with known cross-sections (with respect to either axis)***			**10**
Final Review		**Review Packet**			**10**

Calculus I

Curriculum Guide

Scranton School District

Scranton, PA

Calculus I

Prerequisites:

- Successful completion of Elementary Analysis or Honors Elementary Analysis

Calculus I is a high level mathematics course offered by the Scranton School District. Topics covered in this course include analytic geometry, limits of functions, differentiation and integration of functions, and applications of differentiation and integration.

The work covered in this course will help the student develop analytical reasoning skills and disciplined study habits necessary for success in college. Students pursuing college majors requiring advanced mathematics courses will benefit from this advanced mathematics training.

Since the content of Calculus I is beyond the scope of Common Core, the Collegeboard Curriculum Framework for AP Calculus AB 2016-2017 document was used as a guide to write this curriculum.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Calculus I	**Grade Level: 12**	**Date Completed: 3/1/15**

1st Quarter

Topic	**Resources**	**AP Calculus Standard**
Elementary Analysis Review	Chapter P	
Limits	**Larson/Hostetler Calculus 8th Ed.** Chapter One, Chapter Three	LO 1.1A(a), LO 1.1A(b) LO 1.1B, LO 1.1C, LO 1.1D EK 1.1A2, EK 1.1B1, EK 1.1C1, EK 1.1C2, EK 1.1D1

2nd Quarter

Topic	Resources	AP Calculus Standard
Limits (continued)	**Larson/Hostetler Calculus 8th Ed.** Chapter One, Chapter Three	LO 1.1A(a), LO 1.1A(b) LO 1.1B, LO 1.1C, LO 1.1D EK 1.1A2, EK 1.1B1.
Continuity	**Larson/Hostetler Calculus 8th Ed.** Chapter One	LO 1.2A, LO 1.2B
Differentiablilty	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.2B, EK 2.2B1, EK 2.2B2
Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1A, EK 2.1A5 EK 2.1B1
Derivative Rules	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1C, EK 2.1C4 EK 2.1C2, EK 2.1A5
Geometric Applications of Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1A

3rd Quarter

Topic	Resources	AP Calculus Standard
Implicit Differentiation	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1C, EK 2.1C5 LO 2.3B, EK 2.3B1, EK 2.3B2
Higher Order Derivatives	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.1D
Related Rates	**Larson/Hostetler Calculus 8th Ed.** Chapter Two	LO 2.3C, EK 2.3C2
Motion	**Throughout Larson/Hostetler Calculus 8th Ed. Exercises and Supplemental Materials**	LO 2.3C, EK 2.3C1
Extreme Values	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3C, EK 2.3C3
Using Derivatives to Analyze Graphs	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.2A, EK 2.2A1
Optimization Problems	**Larson/Hostetler Calculus 8th Ed.** Chapter Three	LO 2.3C, EK 2.3C3

4th Quarter

Topic	Resources	AP Calculus Standard
Antiderivatives	**Larson/Hostetler Calculus 8th Ed.** Chapters Four and Five	LO 3.1A, EK 3.1A1, EK 3.1A2, LO 3.3B(a), EK 3.3B3, EK 3.3B5
The Definite Integral Concept	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.2A(a), EK 3.2A1, EK 3.2A3 LO 3.2B, EK 3.2B1, EK 3.2B2, LO 3.2C
Evaluate Definite Integrals	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.3B(b), EK 3.3B2
The Definite Integral	**Larson/Hostetler Calculus 8th Ed.** Chapter Four	LO 3.3A, EK 3.3A1, EK 3.3A3
Applications of Integrals	**Larson/Hostetler Calculus 8th Ed.** Chapter Seven	LO 3.4D, EK 3.4D1
Final Review	Review Packet	

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Review		**Calculus Library of Functions** **Linear functions** **Functions as models of change** **Transformation of functions** **Solving equations(algebraically and on the calculator)**	**Larson/Hostetler Calculus 8th Ed.** **Chapter P**	**Teacher prepared tests, quizzes, etc.**	**35**
Limits	**LO 1.1A(a)** **LO 1.1A(b)**	**Express limits symbolically using correct notation.** **Interpret limits expressed symbolically.** ***Intuitive definition of Limits***	**Larson/Hostetler Calculus 8th Ed.** **1.2**		**20**
	LO 1.1B **EK 1.1B1**	**Estimate limits of functions.** **Numerical and graphical information can be used to estimate limits.** ***Visualizing limits***	**Larson/Hostetler Calculus 8th Ed.** **1.2**		
Limits at a point	**EK 1.1A2**	**The concept of a limit can be extended to include one-sided limits, limits at infinity, and infinite limits.**	**Larson/Hostetler Calculus 8th Ed.** **1.2, 3.5**		

The algebra of limits:	**LO 1.1C** **EK 1.1C1** **EK 1.1C2**	**Determine limits of functions.** **Limits of sums, differences, products, quotients, and composite functions can be found using the basic theorems of limits and algebraic rules.** **The limit of a function may be found by using algebraic manipulation, alternate forms of trigonometric functions, or the squeeze theorem (Sandwich Theorem).** ***Substitution (continuous functions)*** ***Intuitive discussion of removable versus non-removable discontinuities*** ***Factoring (removable discontinuities)***	**Larson/Hostetler Calculus 8th Ed.** **1.3, 1.4**		

Limits Involving Infinity	**LO 1.1D** **EK 1.1D1**	**Deduce and interpret behavior of functions using limits** **Asymptotic and unbounded behavior of functions can be explained and described using limits** ***Asymptotic behavior (horizontal and vertical asymptotes)***	**Larson/Hostetler Calculus 8th Ed.** **1.5** **3.5**		
Continuity	**LO 1.2A**	**Analyze functions for intervals of continuity or points of discontinuity.** ***Continuity at a point*** ***Continuous Functions*** ***Discontinuous functions:*** ***Removable discontinuities*** ***Jump discontinuities***	**Larson/Hostetler Calculus 8th Ed.** **1.4**		
	LO 1.2B	**Determine the applicability of important Calculus theorems using continuity.** ***Continuous functions*** ***Intermediate Value Theorem***	**Larson/Hostetler Calculus 8th Ed.** **1.4**		

Derivative Concepts	**LO 2.1A** **EK 2.1A5** **EK 2.1B1**	**Identify the derivative of a function as the limit of a difference quotient.** **The derivative can be represented graphically, numerically, analytically, and verbally.** **The derivative at a point can be estimated from information given in tables or graphs.** ***Definition of the derivative (difference quotient)*** ***Derivative at a point***	**Larson/Hostetler Calculus 8th Ed.** **2.1**		**38**

Derivative Rules	**LO 2.1C**	**Calculate derivatives.** ***Constant rule*** ***Constant multiple rule*** ***Sum and difference*** ***Power rule*** ***Product and quotient rules*** ***Proper form of derivatives (factored)***	**Larson/Hostetler Calculus 8th Ed.** **2.2, 2.3**		
Chain rule	**EK 2.1C4**	**The chain rule provides a way to differentiate composite functions** ***Derivatives of composite functions*** ***Derivatives using repeated use of the chain rule***	**Larson/Hostetler Calculus 8th Ed.** **2.4**		
Derivatives of Various Functions	**EK 2.1C2**	**Specific rules can be used to calculate derivatives for classes of functions, including polynomial, rational, power, and trigonometric functions.**	**Larson/Hostetler Calculus 8th Ed.** **2.2, 2.3, 2.4**		

Derivatives Geometric Applications	**LO 2.1A**	**Identify the derivative of a function as the limit of a difference quotient.** ***Geometric applications of the derivative and rates of change*** ***Average rates of change versus instantaneous rates of change*** ***Using the derivative to find information necessary to write the equations of tangent lines and normal lines*** ***Using the derivative to calculate points of horizontal tangencies***	**Throughout Larson/Hostetler Calculus 8th Ed. Chapter 2 Exercises**		
Higher Order Derivatives	**LO 2.1D**	**Determine higher order derivatives.** ***Second and higher order derivatives***	**Larson/Hostetler Calculus 8th Ed. 2.3, 2.4**		

Differentiability	**LO 2.2B** **EK 2.2B1** **EK 2.2B2**	**Recognize the connection between differentiability and continuity.** **A continuous function may fail to be differentiable at a point in its domain.** **If a function is differentiable at a point, then it is continuous at that point.** ***Why the derivative may fail to exist***	**Larson/Hostetler Calculus 8th Ed.** **2.1**		
Numerical Derivatives	**EK 2.1A5**	**The derivative can be represented graphically, numerically, analytically, and verbally.** ***Finding derivatives on the graphing calculator***	**Supplemental Material**		
Implicit Derivatives	**LO 2.1C** **EK 2.1C5**	**Calculate derivatives.** **The chain rule is the basis for implicit differentiation.** ***Explicit versus implicit definitions of functions*** ***Implicit differentiation process***	**Larson/Hostetler Calculus 8th Ed.** **2.5**		

Derivatives Geometric Applications	**LO 2.3B** **EK 2.3B1** **EK 2.3B2**	**Solve problems involving the slope of the tangent line.** **The *derivative* at a point is the slope of the line tangent to a graph at that point on the graph.** **The tangent line is the graph of a locally linear approximation of the function near the point of tangency.** ***Using implicit differentiation write equations of tangent and normal lines to functions*** ***Using implicit differentiation calculate points of horizontal tangencies and equations of vertical asymptotes***	**Larson/Hostetler Calculus 8th Ed.** **2.5**		
Numerical Derivatives	**EK 2.1A5**	**The derivative can be represented graphically, numerically, analytically, and verbally.** ***Finding and evaluating implicit derivatives on the graphing calculator***	**Supplemental Material**		

Related Rates	**LO 2.3C** **EK 2.3C2**	**Solve problems involving related rates and optimization.** **The derivative can be used to solve related rates problems, that is, finding a rate at which one quantity is changing by relating it to other quantities whose rates of change are known.** ***What are related rates of change*** ***Related rate equations*** ***Related rate problem strategies***	**Larson/Hostetler Calculus 8th Ed.** **2.6**		

Motion	**LO 2.3C** **EK 2.3C1**	**Solve problems involving related rates and optimization and motion.** **The derivative can be used to solve rectilinear motion problems involving position, speed, velocity, and acceleration.** ***Position, velocity, and acceleration***	**Throughout Larson/Hostetler Calculus 8th Ed. Exercises Supplemental Materials**		

Extreme Values	**LO 2.3C** **EK 2.3C3**	**The derivative can be used to solve optimization problems, that is, finding a maximum or minimum value of a function over a given interval.** ***Absolute (global) extrema*** ***Relative (local) extrema*** ***Definition of critical value***	**Larson/Hostetler Calculus 8th Ed.** **3.1, 3.3**		**25**

Using derivatives to analyze graphs	**LO 2.2A** **EK 2.2A1**	**Use derivatives to analyze properties of a function.** **First and second derivatives of a function can provide information about the function and its graph including intervals of increase or decrease, local (relative) and global (absolute) extrema, intervals of upward or downward concavity, and points of inflection**. ***The first derivative test*** ***Increasing and decreasing (intervals)*** ***The second derivative test*** ***Concavity and inflection points*** ***Curve Sketching***	**Larson/Hostetler Calculus 8th Ed.** **3.3, 3.4, 3.6**		

Optimization Problems	**LO 2.3C** **EK 2.3C3**	**The derivative can be used to solve optimization problems, that is, finding a maximum or minimum value of a function over a given interval.** ***Writing and optimizing functions***	**Larson/Hostetler Calculus 8th Ed.** **3.7**		

Antiderivatives	**LO 3.1A** **EK 3.1A1** **EK 3.1A2** **LO 3.3B(a)** **EK 3.3B3** **EK 3.3B5**	**Recognize antiderivatives of basic functions.** **An antiderivative of a function *f* is a function *g* whose derivative is *f*.** **Differentiation rules provide the foundation for finding antiderivatives.** **Calculate Antiderivatives** **The notation $\int f(x)dx = Fx+C$ means that $F'(x) = f(x)$ and $\int f(x)$ is called an indefinite integral of the function *f*.** **Techniques for finding antiderivatives include algebraic manipulation such as long division and completing the square, substitution of variables.** ***Indefinite Integral rules*** ***Power rules*** ***Trigonometric rules*** ***Exponential and logarithmic rules***	**Larson/Hostetler Calculus 8th Ed.** **4.1, 5.2, 5.3, 5.4, 5.5, 5.7**		**30**

The Definite Integral Concept	**LO 3.2A(a)** **EK 3.2A1** **EK 3.2A3**	**Interpret the definite integral as a limit of a Riemann sum.** **A Riemann sum, which requires a partition of an interval *I*, is the sum of products, each of which is the value of the function at a point in a subinterval multiplied by the length of that subinterval of the partition.** **The information in a definite integral can be translated into the limit of a related Riemann sum, and the limit of a Riemann sum can be written as a definite integral.**	**Larson/Hostetler Calculus 8th Ed.** **4.2, 4.3**		**5**

The Definite Integral Concept (continued)	**LO 3.2B** **EK 3.2B1** **EK 3.2B2** **LO 3.2C**	**Approximate a definite integral.** **Definite integrals can be approximated for functions that are represented graphically, numerically, algebraically, and verbally.** **Definite integrals can be approximated using a left Riemann sum, a right Riemann sum, a midpoint Riemann sum, or a trapezoidal sum; approximations can be computed using either uniform or non-uniform partitions.** **Calculate a definite integral using areas and properties of definite integrals.**			

Evaluate Definite Integrals	**LO 3.3B(b)** **EK 3.3B2**	**Evaluate definite integrals.** **If *f* is continuous on the interval [a, b] and *F* is an antiderivative of *f*. then** $\int_a^b f(x)dx = F(b) - F(a)$. ***Evaluation by hand and on the calculator*** ***Properties of definite integrals***			

The Definite Integral	**LO 3.3A** **EK 3.3A1** **EK 3.3A3**	**Graphical, numerical, analytical, and verbal representations of a function f provide information about the function g defined as $g(x) = \int_a^x f(t)dt$.** ***The Fundamental Theorem of Calculus*** ***FTC 1*** ***FTC 2***	**Larson/Hostetler Calculus 8th Ed.** **4.3, 4.4**		**12**

Applications of Integrals	**LO 3.4D** **EK 3.4D1**	**Apply definite integrals to problems involving area.** **Areas of certain regions in the plane can be calculated with definite integrals.** ***Area (with respect to either axis)*** ***Area Between a curve and an axis*** ***Area Between two curves***			**5**
Final Review		**Review Packet**			**10**

Common Core 7th Grade Accelerated

Curriculum Guide

Scranton School District

Scranton, PA

Common Core 7th Grade Accelerated

Prerequisite :

Students must pass the required placement exam with a grade of 85% or higher and must meet 4 out of the 5 following criteria:

- A grade of 90% or higher in Grade 6 Mathematics
- Teacher recommendation from the 6th grade mathematics teacher
- Students must maintain an average or 90% or above by the end of the 1st quarter to remain in the class
- Students must perform in the top 1/3 of the proficient or advanced scores on the sixth grade PSSA test
- Parent's consent

Intended Audience: This course is designed for the student who has successfully completed grade 6 with 4 out of the 5 criteria listed above, by the end of the 6th grade.

This course differs from the Common Core Math 7 course in that it contains some content from 8th grade. While coherence is retained, in that it logically builds from the 6th Grade, the additional content when compared to the non-accelerated course demands a faster pace for instruction and learning. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. The critical areas are as follows:

- Students develop a unified understanding of number, recognizing fractions, decimals, and percents as different representations of rational numbers.
- Students extend addition, subtraction, multiplication and division to all rational numbers, and view negative numbers in terms of everyday contexts. Students explain and interpret the rules of for adding, subtracting, multiplying and dividing with negative numbers. They extend their mastery of the properties of operations to develop an understanding of integer exponents, and to work with numbers written in scientific notation.

- Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students strategically choose and efficiently implement procedures to solve linear equations in one variable.
- Students build on their previous work differences between populations, solving problems involving area and circumference of a circle and surface area of three-dimensional objects. They solve real-world and mathematical problems involving area, surface area, and volumes of two- and three- dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Students use ideas about distance and angles, how they behave under translations, rotations, reflections and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line and complete their work on volume by solving problems involving cones, cylinders, and spheres.

After successfully completing the course, students will be allowed to enroll in Algebra I Accelerated K/CC or Common Core 8P Concepts of Algebra.

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Subject: Common Core 7th Grade Accelerated	Grade Level 7	Date Completed:10/24/14

1st Quarter

Topic	Resources	CCSS
The rational number operations, absolute value, properties of zero, real-world application, the distributive property,	Big Ideas Red Accelerated Chapter 1 and 2	7.NS.1, 1a,1b,1c,1d,2,2a,2b,2c
Combining algebraic like terms, using distributive property, writing expressions	Big Ideas Red Accelerated Chapter 3	7. EE. 1, 2, 3, 4a, 4b
Using real-world multi-step problems involving rational numbers	Big Ideas Red Accelerated Chapter 2	7 EE.3
Converting between decimals, fractions, with rational numbers	Big Ideas Red Accelerated Chapter 2	7 NS.2
Writing expressions and equations to solve real-world problems	Big Ideas Red Accelerated Chapter 3	7 EE.2; 7EE.3, 7 EE.4

2nd Quarter

Topic	Resources	CCSS
Compute unit rates with ratios of fractions	Big Ideas Red Accelerated Chapter 5	7 RP.1, 1a, 1b,1c, 1d
Decide whether two quantities are proportional	Big Ideas Red Accelerated Chapter 5	7 RP.2
Identify the constant of proportionality ; represent proportional relationships with equations; Explain what a point (x,y) on the graph of a proportional relationship	Big Ideas Red Accelerated Chapter 5	7RP.2
Constructions of triangles, angles. Identifying cross sections of three-dimensional figures. Scale drawings, reproducing a scale	Big Ideas Red Accelerated Chapter 7	7.G.1, 2, 3, 4, 5, 6
Using circumference and area in a circle.	Big Ideas Red Accelerated Chapter 8	7.G.4
Real-life problems involving volume and surface area	Big Ideas Red Accelerated Chapter 9	7.G.4, 6
Using equations to solve for angles in a polygon	Big Ideas Red Accelerated Chapter 7	7.G.5

3rd Quarter

Topic	Resources	CCSS
Statistics and probability, making inferences, predictions from a sample, using measures of central tendency	Big Ideas Red Accelerated Chapter 10	7.SP.1, 2, 3, 4, 5, 6, 7a, 7b, 8a,8b 8c
Tree diagrams, frequency tables, t-tables,	Big Ideas Red Accelerated Chapter 10	7.SP.8
Finding the probability of an event, compound events	Big Ideas Red Accelerated Chapter 10	7.SP.7, 8
Verify properties of translations; rotations; reflections; Angles, Lin e segments, Parallel lines	Big Ideas Red Accelerated Chapter 11	8.G.1, 1a,1b,1c
Understand that a 2-D is congruent/similar to another if the second can be obtained from the first	Big Ideas Red Accelerated Chapter 11	8. G.2,4,
Graphing proportional relationships	Big Ideas Red Accelerated Chapter 5	8.EE.5
Use similar triangles to explain slope: derive y = mx + b	Big Ideas Red Accelerated Chapter 13	8.EE.6

4th Quarter

Topic	Resources	CCSS
Describe the effect of dilations, translations, rotations and reflections on 2-D figures using coordinates	Big Ideas Red Accelerated Chapter 11	8.G.3
Establish facts about the angle sum and exterior angle of triangles	Big Ideas Red Accelerated Chapter 12	8.G.5
Know the formulas for volumes of cones, cylinders and spheres	Big Ideas Red Accelerated Chapter 15	8.G.9
Irrational Numbers; Compare irrational numbers	Big Ideas Red Accelerated Chapter 14	8. NS. 1, 2
Integers Exponents; Scientific Notation	Big Ideas Red Accelerated Chapter 16	8. EE. 1,2,3,4
Solve Linear equations with one variable	Big Ideas Red Accelerated Topic 1 and Topic 2 (Additional Topics in Back of Book)	8.EE. 7

Scranton School District
Curriculum Guide

* When Common Core becomes fully implemented, the suggested timeline should be adjusted accordingly.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time*
The Number System	**7.NS**			**Teacher prepared tests, quizzes, etc.** **Series available assessments online.** **www.bigideasmath.com** **Red Accelerated** **(OPTIONAL)**	
Rational Addition/ Subtraction	**7.NS.1**	• **Add and subtract rational number** • **horizontal and vertical number line**	**Big Ideas Red Accelerated Chapter 1.1**		**4 days**
Absolute Value	**7.NS.1a**	• **Absolute Value** • **Opposites** • **Describe situations in which opposite quantities combine to make 0.**	**Big Ideas Red Accelerated Chapter 1.1, 1.2, 2.2**		**3 days**

Absolute Value	**7.NS.1b**	• **Additive Inverse** • **Apply real world context to opposites and absolute value.**	**Crosswalk Coach Lesson 7** **Big Ideas Red Accelerated** **Chapter 1.1, 1.2, 2.2**		**4 days**
Real-life Application	**7.NS .1c**	• **Apply absolute value** • **real-world context**	**Crosswalk Coach Lesson 7** **Big Ideas Red Accelerated** **Chapter 1.1, 1.3, 2.3**		**4 days**
Rational Operations	**7.NS.1d**	• **Apply properties of operations strategies** • **add and subtract rational numbers**	**Crosswalk Coach Lesson 7** **Big Ideas Red Accelerated** **Chapter 1.1, 1.2, 1.3, 2.2, 2.3**		**3 days**
Reciprocals	**7.NS.2**	• **Rational Number** • **Reciprocal** • **Apply and extend previous understanding of x/y fractions and rational numbers**	**Crosswalk Coach Lesson 5**		**3 days**
Distributive property	**7.NS.2a**	• **Applying (-1)(-1)=1** • **In the real world** • **Distributive property**	**Crosswalk Coach Lesson 8** **Big Ideas Red Accelerated** **Chapter 1.4, 2.4**		**4 days**

Division of Rational Numbers	**7.NS.2b** **7.NS.2c**	• **Divisor** • **Dividend** • **properties of zero** • **non-zero divisor**	**Big Ideas Red Accelerated Chapter 1.4, 1.5, 2.1, 2.4**		**3 days**
Types of decimals	**7.NS.2d**	• **Terminating decimal** • **repeating decimal**	**Big Ideas Red Accelerated Chapter 2.1**		**4 days**
Real-life Application	**7.NS.3**	• **Solve real world mathematical problems involving the four operations and rational numbers**	**Crosswalk Coach Lesson 4** **Triumph Learning CC Lesson 6,7,8** **Big Ideas Red Accelerated Chapter 1.4, 1.5, 2.2, 2.3, 2.4**		**5 days**
Expressions	**7.EE.1**	• **Coefficient** • **like/unlike terms** • **Apply operations as strategies to add, subtract expressions**	**Crosswalk Coach Lesson 14,15** **Triumph Learning CC Lesson 13** **Big Ideas Red Accelerated Chapter 3.1, 3.2, Ext 3.2**		**6 days**
Writing Expressions	**7.EE.2**	• **A + 0.05A = 1.05A means increase by 5% or multiply by 1.05** • **Rewrite an expression**	**Crosswalk Coach Lesson 13, 16** **Big Ideas Red Accelerated Chapter 3.1, 3.2**		**4 days**
Real-life application	**7.EE.3**	• **Terminating decimal** • **repeating decimal**	**Crosswalk Coach Lesson 17** **Triumph Learning CC Lesson 15**		**3 days**

Equations	**7.EE.4**	• **Use equations to solve problems**	**Crosswalk Coach Lesson 17** **Triumph Learning CC Lesson 16**		**6 days**
Coefficients	**7.EE.4a**	• **Coefficient** • **like/unlike terms** • **Compare algebraic solutions to mathematical solutions**	**Crosswalk Coach Lesson 17** **Big Ideas Red Accelerated Chapter 3.3, 3.4, 3.5**		**6 days**
Inequalities	**7.EE.4b**	• **Compare inequalities to mathematical solutions**	**Crosswalk Coach Lesson 18** **Big Ideas Red Accelerated Chapter 4.1, 4.2, 4.3, 4.4**		**6 days**
Unit rates	**7.RP.1**	• **Compute unit rates associated with ratios of fractions**	**Big Ideas Red Accelerated Chapter 5.1**		**4 days**
Proportions	**7.RP.2a**	• **Describe whether two equal quantities are in a proportional relationship**	**Crosswalk Coach Lesson 17** **Triumph Learning CC Lesson 16**		**2 days**

Unit rate	**7.RP.2b**	• **Unit rate** • **Constant of proportionality**	**Crosswalk Coach Lesson 17** **Big Ideas Red Accelerated Chapter 3.3, 3.4, 3.5**		**2 days**
Cross Products	**7.RP.2c**	• **Represent proportional relationships by equations** • **Cross products**	**Crosswalk Lesson 18** **Big Ideas Red Accelerated Chapter 4.1, 4.2, 4.3, 4.4**		**2 days**
Graphing proportional relationships	**7.RP.2d**	• **Explain what a point (x, y) on the graph of a proportional relationship means**	**Crosswalk Coach- lesson 12** **Common Core Coach –Lesson 3** **Big Ideas Red Accelerated Chapter Ext 5.2, Ext 5.6**		**4 days**
Scale drawings	**7.G.1**	• **Scale drawings** • **reproducing a scale**	**Crosswalk Coach Lesson 20** **Triumph Learning CC Coach Lesson 18** **Big Ideas Red Accelerated Chapter 7.5**		**3 days**
Constructions of triangles	**7.G.2, 7.G.1.13**	• **Identify** • **describe the properties of all types of triangles based on angle and side measures**	**Crosswalk Coach Lesson 21** **Triumph Learning CC Lesson 19** **Big Ideas Red Accelerated Chapter 7**		**2 days**
Triangle Inequality	**7.G.1.13**	• **Use and** • **apply the triangle inequality theorem**	**Big Ideas Red Accelerated Chapter 7.5**		**2 days**

Equations for angles	**7.G.5**	• **Supplementary** • **Complementary** • **Vertical** • **Adjacent**	**Crosswalk Coach Lesson 24** **Triumph Learning CC Lesson 22** **Big Ideas Red Accelerated Chapter 7.1, 7.2, Ext 7.3**		**6 days**
Circles	**7.G.4**	• **Area of a circle** • **circumference**	**Crosswalk Coach Lesson 23** **Triumph Learning CC Lesson 21** **Big Ideas Red Accelerated Chapter 8.1, 8.2, 8.3, 9.3**		**4 days**
Real-world problems	**7.G.6**	• **Area of composite figures** • **surface area of 3-d figures: rectangular prisms, triangular prisms, pyramids, and cylinders**	**Crosswalk Coach Lesson 25,26,27** **Triumph Learning CC Lesson 23,24** **Big Ideas Red Accelerated Chapter 8.4, 9.1, 9.2, 9.4, 9.5**		**9 days**
Cross Sections	**7.G.3**	• **Describe the 2-d figures that result from slicing 3-d right rect. prisms and pyramids**	**Crosswalk Coach Lesson 22** **Triumph Learning CC Lesson 20** **Big Ideas Red Accelerated Chapter Ext 9.5**		**3 days**
Statistics/Probability	**7.SP**				
Sample Sizes	**7.SP.1**	• **Population** • **sample representative** • **sample size, population biased vs. unbiased samples** • **generating multiple samples**	**Crosswalk Coach Lesson 30** **Triumph Learning CC Lesson 25** **Big Ideas Red Accelerated Chapter 10.6**		**2 days**

Prediction based on a sample	**7.SP.2, 7.SP.3.2**	• **Find the probability of a simple event** • **probability of a simple event not occurring** • **probability of not rolling a 1 on a number cube**	**Crosswalk Coach Lesson 30, 35** **Triumph Learning CC Lesson 27** **Big Ideas Red Accelerated Chapter 10.6, Ext 10.6**		**1 day**
Measures of central tendency	**7.SP.4**	• **Variability of data** • **draw inferences**	**Crosswalk Coach Lesson 31,32,34,35** **Triumph Learning CC Lesson 27**		**2 days**
Variability	**7.SP.3**	• **Absolute deviation** • **dot plot**	**Crosswalk Coach Lesson 33,35** **Triumph Learning CC Lesson 27** **Big Ideas Red Accelerated Chapter 10.7**		**2 days**
Probability	**7.SP.5**	• **Unlikely event** • **Probability is a number between 0 and 1**	**Crosswalk Coach Lesson 28,** **Triumph Learning CC Lesson 28** **Big Ideas Red Accelerated Chapter 10.1, 10.2, 10.3**		**2 days**
Frequency of an event	**7.SP.6**	• **Rolling a number cube** • **Frequency of an event** • **Collecting data**	**Crosswalk Coach Lesson 28** **Triumph Learning CC Lesson 9** **Big Ideas Red Accelerated Chapter 10.3**		**2 days**

Develop a model	**7.SP.7**	• **Develop a model thru events** • **observed occurrences**			
Probability	**7.SP.7a**	• **Develop a uniform probability** • **assigning = probability to all outcomes**	**Crosswalk Coach Lesson 28** **Triumph Learning CC Lesson 30** **Big Ideas Red Accelerated Chapter 10.2, 10.3**		**2 days**
Probability model	**7.SP.7b**	• **Develop a probability model by observing**	**Crosswalk Coach Lesson 28** **Big Ideas Red Accelerated Chapter 10.3**		**2 days**
Probability of compound events	**7.SP**	• **Tables** • **tree diagram** • **Find the Probability of compound events**			
Probability	**7.SP.8a**	• **Find the probability of a compound event**	**Crosswalk Coach Lesson 29** **Triumph Learning CC Lesson 30** **Big Ideas Red Accelerated Chapter 10.4, 10.5**		**2 days**
Sample spaces	**7.SP.8b**	• **Sample spaces** • **compound events**	**Crosswalk Coach Lesson 29** **Big Ideas Red Accelerated Chapter 10.4, 10.5**		**3 days**

Design a simulation	**7.SP.8c**	• **Design a simulation** • **generate frequencies for compound events**	**Crosswalk Coach Lesson 29** **Triumph Learning CC Lesson 30** **Big Ideas Red Accelerated Chapter Ext 10.5**		**1 day**
Experimental Rotations	**8.G.1a**	• **Rotations** • **Reflections** • **Translations**	**Big Ideas Red Accelerated Chapter 11.2, 11.3, 11.4**		**3 days**
Angles	**8.G.1b**	• **Angles are taken to angles of the same measure**	**Big Ideas Red Accelerated Chapter 11.2, 11.3, 11.4**		**2 days**
Angles	**8.G.1c, 7.G.1.13**	• **Identify and use properties of angles formed when two parallel lines are cut by a transversal** • **alternate interior, alternate exterior, vertical, corresponding**	**Big Ideas Red Accelerated Chapter 11.2, 11.3, 11.4**		**2 days**
Congruence	**8.G.2**	• **Congruence** • **Describe a sequence that exhibits the congruence between them**	**Big Ideas Red Accelerated Chapter 11.1, 11.2, 11.3, 11.4**		**2 days**

Dilations, translations, rotations and reflections	**8.G.3**	• **Describe the effect of dilations, translations, rotations, and reflections on 2-D figures using the coordinate plane.**	**Big Ideas Red Accelerated Chapter 11.2, 11.3, 11.4, 11.7**		**2 days**
Similarity	**8.G.4**	• **Understand that a 2-d figure is similar to another** • **Describe a sequence that exhibits the similarity**	**Big Ideas Red Accelerated Chapter 11.5, 11.6, 11.7**		**4 days**
Angles formed by Parallel Lines	**8.G.5**	• **Use informal arguments to establish facts about the angle sum and exterior angle of triangles** • **And angles created when parallel lines are cut by a transversal.**	**Big Ideas Red Accelerated Chapter 12.1, 12.2, 12.3, 12.4**		**5 days**

Graph proportional relationships	**8.EE.5**	• **Unit rate** • **Slope of a graph and proportional relationships** • **compare proportional relationships in different ways**	**Big Ideas Red Accelerated Chapter 13.1, 13.3**		**2 days**
Slope of a linear equation	**8.EE.6**	$Y = mx + b$ • **Use similar triangles explain why slope m is the same between two points** • **a non-vertical line**	**Big Ideas Red Accelerated Chapter 13.2, Ext13.2, 13.3, 13.4, 13.5, 13.6, 13.7**		**4 days**
Solve linear equations	**8.EE.7**	• **Solve linear equations in one variable**	**Extension Topic 1 and Topic 2**		**2 days**
Square Root and Cube root equations	**8.EE.2**	• **Square root** • **cube root** • **Use square root and cube roots symbols to represent solutions to equations** • **$x^2 = p$**	**Big Ideas Red Accelerated Chapter 14.1, 14.2, 14.3**		**3 days**

Pythagorean Theorem	**8.G.7, 8.G.8**	• **Apply the Pythagorean Theorem** • **Determine unknown side lengths in a right triangles in the real-world** • **Apply the Pythagorean Theorem to find the distance between two points in a coordinate system**	**Big Ideas Red Accelerated Chapter 14.3, 14.5**		**2 days**
Irrational Numbers	**8NS.1**	• **Rational** • **Irrational** • **Repeating** • **Terminating**	**Big Ideas Red Accelerated Chapter 14.4, Ext 14.4**		**2 days**
Square Roots	**8NS.2**	• **Finding a decimal approximation for an irrational number** • **Square roots**	**Big Ideas Red Accelerated Chapter Ext 14.4**		**2 days**
Volume of figures	**8.G.9**	• **volume of cones cylinders** • **spheres** • **solve real-world and math**	**Big Ideas Red Accelerated Chapter 15.1, 15.2, 15.3, 15.4**		**5 days**
Rules of Exponents	**8.EE.1**	• **Negative Exponents**	**Big Ideas Red Accelerated Chapter 16.4**		**1 day**

Scientific Notation	**8.EE.3**	• **Scientific Notation** • **numbers expressed in the form of a single digit times an integer power of 10** • **estimate a very large or small quantities**	**Big Ideas Red Accelerated Chapter 16.5, 16.6, 16.7**		**3 days**
Scientific notation	**8.EE.4**	• **Perform operations with scientific notation**	**Big Ideas Red Accelerated Chapter 16.5, 16.6, 16.7**		**2 days**

Common Core Math 7 P

Curriculum Guide

Scranton School District

Scranton, PA

Common Core Math 7P

Prerequisite :

Students must meet 2 out of 3 criteria and pass Grade 6 Mathematics

- A grade of 80 or higher in a sixth grade mathematics course
- Teacher recommendation from the 6th grade math teacher
- Students must perform proficient on the sixth grade PSSA

Intended Audience: This course is designed for the student who has successfully completed Math 6 by the end of the sixth grade.

This course differs from the Common Core Math 7 course in that it contains some content from the 8th Grade Pennsylvania Core Standards for Mathematics. While coherence is retained, in that this course logically builds from the 6th Grade mathematics course, the depth, breadth, and pace of this course is accelerated when compared to the Common Core Math 7 course. The Mathematical Practice Standards apply throughout this course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. The critical areas are as follows:

- Students develop an understanding of number, recognizing fractions, decimals and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers. Students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They extend their mastery of the properties of operations to develop an understanding of integer exponents, and to work with numbers written in scientific notation.
- Students use linear equations and efficiently implement procedures to solve linear equations in one variable.
- Students solve problems involving the area and circumference of a circle and surface area of three-dimensional objects and solve real-world and mathematical problems involving area. Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems.
- Students show that the sum of the angles in a triangle is the angle formed by a straight line and complete their work on volume by solving problems involving cones, cylinders, and spheres.

After successfully completing the course, students will be allowed to enroll in Common Core 8P Concepts of Algebra.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject:Common Core Math 7P	**Grade Level 7**	**Date Completed:10/28/14**

1st Quarter

Topic	Resources	CCSS
The rational number operations, absolute value, properties of zero, real-world application, the distributive property,	Big Ideas Red Chapter 1 and 2	7.NS.1, 1a,1b,1c,1d,2,2a,2b,2c
Combining algebraic like terms, using distributive property, writing expressions	Big Ideas Red Chapter 3	7. EE. 1, 2, 3, 4a, 4b
Using real-world multi-step problems involving rational numbers	Big Ideas Red Chapter 2	7 EE.3
Converting between decimals, fractions, with rational numbers	Big Ideas Red Chapter 2	7. NS.2
Writing expressions and equations to solve real-world problems	Big Ideas Red Chapter 3 and 4	7 EE.2; 7EE.3, 7 EE.4

2nd Quarter

Topic	Resources	CCSS
Compute unit rates with ratios of fractions	Big Ideas Red Chapter 5	7 RP.1, 1a, 1b,1c, 1d
Decide whether two quantities are proportional	Big Ideas Red Chapter 5	
Identify the constant of proportionality ; represent proportional relationships with equations; Explain what a point (x,y) on the graph of a proportional relationship	Big Ideas Red Chapter 5	7 RP.2
Constructions of triangles, angles. Identifying cross sections of three-dimensional figures. Scale drawings, reproducing a scale	Big Ideas Red Chapter 7	7.G.1, 2, 3, 4, 5, 6
Using circumference and area in a circle.	Big Ideas Red Chapter 8	7.G.4
Real-life problems involving volume and surface area	Big Ideas Red Chapter 9	7.G.4,6
Using equations to solve for angles in a polygon	Big Ideas Red Chapter 7	7.G.5

3rd Quarter

Topic	Resources	CCSS
Statistics and probability, making inferences, predictions from a sample, using measures of central tendency	Big Ideas Red Chapter 10	7.SP.1, 2, 3, 4, 5, 6, 7a, 7b, 8a,8b 8c
Tree diagrams, frequency tables, t-tables, Finding the probability of an event	Big Ideas Red Chapter 10	7.SP.8
Solve Linear equations with one variable	Big Ideas Red Accelerated Topic 1 and Topic 2 (Additional Topics in Back of Book)	8.EE. 7
Graphing proportional relationships	Big Ideas Red Accelerated Chapter 13	8.EE.5

4th Quarter

Topic	Resources	CCSS
Integers Exponents; Scientific Notation	Big Ideas Red Accelerated Chapter 16	8. EE. 1,2,3,4
Irrational numbers; Comparing irrational numbers	Big Ideas Red Accelerated Chapter 14	8.NS. 1,2
Verify properties of translations, rotations and reflections; Angles Line segments, parallel lines	Big Ideas Red Accelerated Chapter 11	8.G.1, 1a,1b,1c
Understand that a 2-D is congruent/similar to another if the second can be obtained from the first	Big Ideas Red Accelerated Chapter 11	8. G.2,4,
Establish facts about the angle sum and exterior angle of triangles	Big Ideas Red Accelerated Chapter 12	8.G.5
Know the formulas for volumes of cones, cylinders and spheres	Big Ideas Red Accelerated Chapter 15	8.G.9

Scranton School District
Curriculum Guide

* When Common Core becomes fully implemented, the suggested timeline should be adjusted accordingly.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time*
The number system	**7.NS**			**Teacher prepared tests, quizzes, etc.** **Series available assessments online.** **www.bigideasmath.com** **(RED)** **(OPTIONAL)**	
Add and subtract rational numbers	**7.NS.1**	• **Integer** • **Number Line** • **Add and subtract rational number on a horizontal and vertical number line**	**Big Ideas Red Chapter 1: 1.2,1.3** **Big Ideas Red Chapter 2: 2.1,2.2,2.3**		**4 days**
Opposite quantities make 0.	**7.NS.1a**	• **Absolute Value** • **Opposites** • **opposite quantities combine to make 0.**	**Big Ideas Red Chapter 1: 1.2,1.3**		**2 days**

Additive Inverse	**7.NS.1b**	• **Additive Inverse** • **Apply real world context to opposites and absolute value**	**Big Ideas Red Chapter 1: 1.1,1.2** **Big Ideas Red Chapter 2: 2.2** **Crosswalk Coach Lesson 7**		**2 days**
Absolute value	**7.NS .1c**	• **Apply absolute value to real-world context**	**Big Ideas Red Chapter 1: 1.1,1.3,** **Big Ideas Red Chapter 2: 2.3** **Crosswalk Coach Lesson 7**		**2 days**
Add and subtract rational numbers	**7.NS.1d**	• **Apply properties of operations as strategies to add and subtract rational numbers**	**Crosswalk Coach Lesson 7** **Big Ideas Red Chapter 1: 1.1,1.2,1.3** **Big Ideas Red Chapter 2: 2.2, 2.3**		**3 days**
Rational Number Reciprocal	**7.NS.2**	• **Rational Number** • **Reciprocal** • **Apply and extend previous understanding of x/y fractions and rationals**	**Crosswalk Coach Lesson 5**		**2 days**
Distributive property	**7.NS.2a**	• **Distributive property** • **Applying (-1)(-1)=1** • **In the real world**	**Crosswalk Coach Lesson 8** **Big Ideas Red Chapter 1: 1.1,1.4** **Big Ideas Red Chapter 2: 2.4**		**3 days**

Division of integers Rational Numbers	**7.NS.2b 7.NS.2c**	• **Divisor, dividend, properties of zero** • **Understand that integers can be divided (with non-zero divisor)and the result is a rational number**	**Big Ideas Red Chapter 1: 1.1,1.4,1.5** **Big Ideas Red Chapter 2: 2.1,2.4**		**2 days**
Terminating decimal Repeating decimal	**7.NS.2d**	• **Terminating decimal** • **repeating decimal** • **Convert a rational number to a decimal using long division**	**Big Ideas Red Chapter 1: 1.1** **Big Ideas Red Chapter 2: 2.1**		**2 day**
Real world mathematical problems involving the four operations	**7.NS.3**	• **Solve real world and mathematical problems involving the four operations and rational numbers**	**Crosswalk Coach Lesson 4** **Triumph Learning CC Lesson 6,7,8** **Big Ideas Red Chapter 1: 1.1,1.2,1.3,1.4,1.5** **Big Ideas Red Chapter 2: 2.2,2.3,2.4**		**4 days**
Add, and subtract expressions	**7.EE.1**	• **Coefficient, like/unlike terms** • **Apply operations as strategies to add, subtract expressions**	**Crosswalk Coach Lesson 14,15** **Big Ideas Red Chapter 3: 3.1,3.2,Ext 3.2** **Triumph Learning CC Lesson 13**		**7 days**
Rewriting an expression	**7.EE.2**	• **A + 0.05A = 1.05A means increase by 5% or multiply by 1.05** • **Rewriting an expression can help understand the quantity**	**Crosswalk Coach 13, 16** **Big Ideas Red Chapter 3: 3.1,3.2**		**3 days**

Equations	**7.EE.4**	• **Use equations to solve problems**	**Crosswalk Coach Lesson 17** **Triumph Learning CC Lesson 16**		**6 days**
Algebraic solutions	**7.EE.4a**	• **Use formulas** • **Compare algebraic solutions to mathematical solutions**	**Big Ideas Red Chapter 3: 3.3,3.4,3.5** **Crosswalk Coach Lesson 17**		**5 days**
Inequalities	**7.EE.4b**	• **Use formulas involving inequalities** • **Compare inequalities to mathematical solutions**	**Crosswalk Coach Lesson 18** **Big Ideas Red Chapter 4: 4.1,4.2,4.3,4.4**		**6 days**
Linear Equations	**8.EE.7**	• **Solve linear equations in one variable**	**Big Ideas Red Accelerated: Topic 1 & 2 in back of book**		**8 days**
Ratios and Proportions	**7 RP**				
Unit rates	**7.RP.1**	• **Compute unit rates associated with ratios of fractions**	**Big Ideas Red Chapter 5: 5.1**		**4 day**
Two quantities are in a proportional relationship	**7.RP.2a**	• **Decide whether two quantities are in a proportional relationship**	**Big Ideas Red Chapter 5: 5.2,Ext 5.2, 5.6** **Crosswalk Coach Lesson 12**		**3 days**

The constant of proportionality (unit rate)	**7.RP.2b**	• **Identify the constant of proportionality (unit rate)**	**Big Ideas Red Chapter 5: 5.2,5.4,5.5,5.6** **Crosswalk Coach- Lesson 12** **Triumph Learning CC Lesson 3**		**3 days**
Proportional relationships with equations	**7.RP.2c**	• **Represent proportional relationships by equations**	**Big Ideas Red Chapter 5: 5.3,5.4,5.6** **Crosswalk Coach- Lesson 12** **Triumph Learning CC – Lesson 3**		**3 days**
Point (x,y) on the graph of a proportional relationship	**7.RP.2d**	• **Explain what a point (x,y) on the graph of a proportional relationship means**	**Crosswalk Coach- Lesson 12** **Triumph Learning CC – Lesson 3** **Big Ideas Red Chapter 5: Ext 5.2,5.6**		**4 days**
Multi-step real-life problem with rationals	**7.EE.3**	• **Multi-step real-life problem solving with rational numbers**	**Crosswalk Coach Lesson 17** **Common Core Coach Lesson 15** **Big Ideas Red Chapter 6: 6.1,6.2,6.4**		**7 days**
Graph and compare proportional relationships	**8.EE.5**	• **Unit rate; slope** • **Graph proportional relationships; compare proportional relationships**	**Big Ideas Red Extension 5.2** **Big Ideas Red Accelerated: Chapter 13: 13.1,13.3**		**3 days**

Geometry	**7.G**				
Scale drawings	**7.G.1**	• **Scale drawings** • **Reproducing a scale**	**Big Ideas Red Chapter 7: 7.5** **Crosswalk Coach Lesson 20** **Triumph Learning CC Lesson 18**		**4 days**
Constructions of triangles	**7.G.2**	• **Constructions of triangles**	**Big Ideas Red Chapter 7: 7.3,7.4** **Crosswalk Coach Lesson 21** **Triumph Learning CC Lesson 19**		**2 days**
Triangle Inequality	**7.G.1**	• **Use and apply the triangle inequality theorem**	**Big Ideas Red Chapter 7: 7.3**		**2 days**
2-d figures 3-d Figures	**7.G.3**	• **Describe the 2-d figures that result from slicing 3-d right rectangular prisms and pyramids**	**Crosswalk Coach Lesson 22** **Triumph Learning CC Lesson 20** **Big Ideas Red Chapter 9: Ext 9.5**		**4 days**
Area and Circumference	**7.G.4**	• **Formulas of area and circumference**	**Big Ideas Red Chapter 8: 8.1,8.2,8.3** **Big Ideas Red Chapter 9: 9.3** **Crosswalk Coach Lesson 23** **Triumph Learning CC Lesson 21**		**4 days**

Use equations to solve for angles	**7.G.5**	• **Supplementary** • **Complementary** • **vertical** • **adjacent**	**Big Ideas Red Chapter 7: 7.1,7.2, Extension 7.3** **Crosswalk Coach Lesson 24** **Triumph Learning CC Lesson 22**		**6 days**
Area, Volume and Surface area	**7.G.6**	• **Two and three dimensional figures** • **Triangles, quadrilaterals, polygons, cubes, right prisms**	**Big Ideas Red Chapter 8: 8.4** **Big Ideas Red Chapter 9: 9.1,9.2,9.4,9.5** **Crosswalk Coach Lesson 25,26,27** **Triumph Learning CC Lesson 23,24**		**10 days**
Statistics/Probability	**7 SP**				
Sampling and valid inferences	**7.SP.1**	• **Population, sample, representative** • **Random sampling and valid inferences**	**Crosswalk Coach Lesson 30** **Big Ideas Red Chapter 10:10.6** **Common Core Coach L.25**		**2 days**
Prediction based on a sample	**7.SP.2**	• **Making a prediction based on a sample**	**Crosswalk Coach Lesson 30,34** **Triumph Learning CC Lesson 27** **Chapter 10: 10.6, Ext 10.6**		**2 day**
Measures of central tendency	**7.SP.4**	• **Variability of data** • **Draw inferences** • **Using measures of central tendency**	**Crosswalk Coach Lesson 31,32,34,35** **Triumph Learning CC Lesson 27** **Big Ideas Red Chapter 10: 10.7**		**2 days**

Probability of an Event	**7.SP.3.2**	• **Find the probability of simple events, including the probability of an event not occurring**	**Crosswalk Coach Lesson 30,34** **Triumph Learning CC Lesson 27** **Big Ideas Red Chapter 10: 10.1,**		**3 days**
Multiple measures of variability	**7.SP.3**	• **Absolute deviation, dot plot** • **Multiple measures of variability in comparing two sets of data**	**Crosswalk Coach Lesson 33,35** **Triumph Learning CC Lesson 27** **Big Ideas Red Chapter 10: 10.7**		**2 days**
Probability	**7.SP.5**	• **Unlikely event,** • **Probability is a number between 0 and 1**	**Big Ideas Red Chapter 10: 10.1,10.2,10.3** **Crosswalk Coach Lesson 28,** **Triumph Learning CC Lesson Lesson 28**		**2 days**
Frequency of an event	**7.SP.6**	• **Rolling a number cube** • **Frequency of an event through collecting data**	**Big Ideas Red Chapter 10: 10.3** **Crosswalk Coach Lesson 28** **Triumph Learning CC Lesson 29**		**2 days**
Develop a model thru events vs observed occurrences	**7.SP.7**				
Uniform probability	**7.SP.7a**	• **Develop a uniform probability by assigning =probability to all outcomes**	**Triumph Learning CC Lesson 30** **Crosswalk Coach Lesson 28** **Big Ideas Red Chapter 10: 10.2,10.3**		**2 days**

Probability model by observing	**7.SP.7b**	• **Develop a probability model by observing**	**Crosswalk Coach Lesson 28** **Big Ideas Red Chapter 10: 10.3**		**2 days**
Probability of a compound event	**7.SP.8a**	• **Find the probability of a compound event**	**Crosswalk Coach Lesson 29** **Triumph Learning CC Lesson Lesson 30** **Big Ideas Red Chapter 10: 10.4,10.5**		**2 days**
Sample spaces for compound events	**7.SP.8b**	• **Sample spaces for compound events**	**Crosswalk Coach Lesson 29** **Big Ideas Red Chapter 10: 10.4,10.5**		**3 days**
Simulation to generate frequencies	**7.SP.8c**	• **Design a simulation to generate frequencies for compound events**	**Big Ideas Red Chapter 10: 10.5** **Crosswalk Coach Lesson 29** **Triumph Learning CC Lesson 30**		**1 day**
Irrational Numbers	**8NS.1**	• **Rational; Irrational;** • **Repeating; Terminating** • **Know that numbers that are not rational are irrational. Every number has a decimal form.**	**Big Ideas Red Chapter 2: 2.1** **Big Ideas Red Accelerated: Chapter 14: 14.4**		***-Extra standard for 7P** **2 day**
Rational approx. of irrational numbers	**8NS.2**	• **Finding a decimal approx. for a irrational number;** • **Square roots** • **Rational approx. of irrational numbers to compare irrational numbers.**	**Big Ideas Red Accelerated:: Chapter 14: 14.4**		***-Extra standard for 7P** **1 days**

Rules of Exponents	**8.EE.1**	• **Negative Exponents** • **Rules of Exponents**	**Big Ideas Red Accelerated: Chapter 16: 16.4**		***-Extra standard for 7P** **2 day**
Use square root and cube roots	**8.EE.2**	• **Square root; cube root** • **Use square root and cube roots symbols to represent solutions to equations of the form** • **$x^2 = p$**	**Big Ideas Red Accelerated: Chapter 14: 14.1,14,2**		***-Extra standard for 7P** **2 days**
Scientific Notation	**8.EE.3**	• **Scientific Notation** • **Use numbers expressed in the form of a single digit times an integer power of 10 to estimate a very large or small quantities**	**Big Ideas Red Accelerated: Chapter 16: 16.5,16.6,16.7**		***-Extra standard for 7P** **1.5 days**
Operations with scientific notation	**8.EE.4**	• **Perform operations with scientific notation**	**Big Ideas Red Accelerated: Chapter 16: 16.5,16.6,16.7**		***-Extra standard for 7P** **1.5 days**

Rotations, reflections and translations	**8.G.1a**	• **Rotations** • **Reflections** • **Translations** • **Verify experimentally the properties of rotations, reflections and translations**	**Big Ideas Red Accelerated: Chapter 11: 11.2, 11.3,11.4**		***-Extra standard for 7P** **2 days**
Angles	**8.G.1b**	• **Angles are taken to angles of the same measure**	**Big Ideas Red Accelerated: Chapter 11: 11.2, 11.3,11.4**		***-Extra standard for 7P** **2 days**
Parallel lines	**8.G.1c**	• **Parallel lines are taken to parallel lines**	**Big Ideas Red Accelerated: Chapter 11: 11.2, 11.3,11.4**		***-Extra standard for 7P** **2 days**
Congruence	**8.G.2**	• **Congruence** • **Understand that a 2-d figures is congruent to another** • **Describe a sequence that exhibits the congruence between them**	**Big Ideas Red Accelerated: Chapter 11: 11.1 11.2, 11.3,11.4**		***-Extra standard for 7P** **2 days**
Similarity	**8.G.4**	• **Understand that a 2-d figures is similar to another** • **Describe a sequence that exhibits the similarity between**	**Big Ideas Red Accelerated: Chapter 11: 11.5,11.6,11.7**		***-Extra standard for 7P** **4 days**

Angle sum and exterior angle of triangles ;Parallel lines are cut by a transversal.	**8.G.5**	• **Use informal arguments to establish facts about the angle sum and exterior angle of triangles** • **Angles created when parallel lines are cut by a transversal.**	**Big Ideas Red Accelerated: Chapter 12: 12.1,12.2,12.3,12.4**		***-Extra standard for 7P** **8 Days**
Formulas for volume of cones, cylinders and spheres	**8.G.9**	• **Know the formulas for volume of cones, cylinders and spheres and use them to solve real-world and math problems**	**Big Ideas Red Accelerated: Chapter 15: 15.1,15.2,15.3,15.4**		***-Extra standard for 7P** **8 Days**

Common Core Math 8

Curriculum Guide

Scranton School District

Scranton, PA

Common Core Math 8

Prerequisites:

- Successful Completion of Common Core Math 7

The concepts studied in Common Core Math 8 parallel those in the Common Core 8P Concepts of Algebra course but with a different depth, breadth, and pace, thus allowing time for discovering and understanding basic concepts. Students will demonstrate an understanding of the connections between the various branches of mathematics by applying computational skills, mathematical reasoning, and introductory algebraic and geometric principles to model and solve real-life problems. Students will demonstrate a basic understanding of rational and irrational numbers, exponents and scientific notation, proportional relationships, linear equations, functions, systems of equations, geometry, angle relationships, volume, statistics and probability.

After successfully completing this course, students will be allowed to enroll in Algebra I Part 9A or Pre-Algebra. In some rare cases, if they student meets the district's Algebra I requirements, the student may enroll in Algebra I K/CC.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Common Core Math 8	**Grade Level: 8th**	**Date Completed: 10/22/14**

1st Quarter

Topic	Resources	CCSS
Linear Equations: One Variable	Big Ideas Math Blue, Ch. 1 Lesson 1-4	8.EE 7a,b
Geometry	Big Ideas Math Blue, Ch. 2, Lessons 1-7	8.G 1 a,b,c, 2,3,4
Angle Relationship	Big Ideas Math Blue, Ch.3, Lessons 1-4	8.G 5

2nd Quarter

Topic	**Resources**	**CCSS**
Graphing linear Equations	Big Ideas Math Blue, Ch. 4 Lessons 1-2	8. EE 7a
Proportional Relationships	Big Ideas Math Blue, Ch. 4 Lessons 3	8.EE 5
Slope/ linear Equations	Big Ideas Math Blue, Ch. 4 Lessons 4-7	8.EE.6 8.EE.7b 8.F.3

3rd Quarter

Topic	**Resources**	**CCSS**
Systems of Equations	Big Ideas Math Blue Ch. 5 lessons 1-4	8.EE 8a,b,c
Functions	Big Ideas Math Blue Ch. 6 lessons 1-2	8.F 1,2
Functions & Linear Relationships	Big Ideas Math Blue Ch. 6 lessons 3-5	8.F 4,5

4th Quarter

Topic	**Resources**	**CCSS**
Rational & Irrational Numbers, Pythagorean Theorem	Big Ideas Math Blue Ch. 7 Lessons 1-5	8.NS 1,2 8.G 6,7,8
Volume	Big Ideas Math Blue Ch. 8 Lessons 1-4	8.G 9
Statistics & Probability	Big Ideas Math Blue Ch. 9 Lessons 1-4	8.SP 1,2,3,4
Exponents & Scientific Notation	Big Ideas Math Blue Ch. 10 Lessons 1-7	8.EE 1,2,3,4
Linear Equations/Slope (Review)	Big Ideas Math Blue Ch. 4 Lessons 4-7	8.EE.6,7b 8.F.3
Systems of Equations (Review)	Big Ideas Math Blue Ch. 5 Lessons 1-4	8.EE.8 a,b,c
Final Exam Review	Big Ideas Math Blue	All

Scranton School District
Curriculum Guide

* When Common Core becomes fully implemented, the suggested timeline should be adjusted accordingly.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time*
Solving Linear Equations	**8.EE 7a,b**	**One-Step, Multi-Step, Variables on Both Sides Solutions** • **One Solution** • **Infinite Solutions** • **No Solutions**	• **Big Ideas Math Blue, 1.1-1.4,** • **Bigideasmath.com** • **Triumph Learning CC Coach**	**Teacher prepared tests, quizzes, etc.** **Bigideasmath.com, Series available assessments online. (optional)**	**15 days**
Geometry	**8.G 1 a,b,c 2,3,4**	**Translations, , Reflections, Rotations, Dilations** • **Properties** • **Congruence** • **Effects** • **Similarity**	• **Big Ideas Math Blue,2.1-2.7** • **Bigideasmath.com** • **Triumphlearning CC Support Coach Lesson 10-14** • **Triumphlearning CC Coach Lesson 18-23** • **Promethean Board etc.**		**15 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Angle Relationships	**8.G 5**	**Parallel Lines** **Angles** **Angle Sums and Triangles** • **Interior Angles** • **Exterior Angles** • **Similarity** **Parallel Lines cut by a Transversal** **Applications to Coordinate System**	• **Big Ideas Math Blue, 3.1-3.4** • **Triumphlearning CC Support Coach Lesson 15-16** • **Triumphlearning CC Coach Lesson 24-27** • **Promethean Board etc.**		**10 days**
Graphing **&** **Proportional Relationships**	**8.EE 7a** **8.EE 5.**	• **Graphing Linear Equations: One and Two Variables** • **Proportional Relationships** • **Graphing proportional relationships** • **Comparing proportional relationships in different ways** • **Unit Rate** • **Interpreting unit rate as the slope of a graph**	• **Big Ideas Math Blue, 4.1-4.3** • **Triumphlearning CC Support Coach Lesson 4,6** • **Crosswalk Coach Lesson 9-10,12-14, 23** • **Triumphlearning CC Coach Lesson 7,9** • **Promethean Board etc**		**22 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Slope/Linear Equations	**8.EE 6** **8.EE 7b** **8. F 3**	**Determine slope:** • **Visually** • **Formula: given two points** • **Use to derive** $y = mx + b$	• **Big Ideas Math Blue, 4.4-4.7** **Triumphlearning CC Support Coach Lesson 5-6** • **Triumphlearning CC Coach Lesson 8-9,15** • **Promethean Board etc.**		**22 days**
Systems of Equations	**8.EE 8 a,b,c**	**Types of Solutions** **Solve by** • **Graphing,** • **Substitution** • **Elimination** **Real Life Applications**	• **Big Ideas Math Blue, 5.1-5.4** • **Triumphlearning CC Support Coach Lesson 7** • **Triumphlearning CC Coach Lesson 10-12**		**20 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Functions & Linear Relationships	**8.F 1,2** **8.F 4,5**	**Definition and Graph** **Determine function rule** • **from table of values** • **from a graph** **Rate of Change and Initial Value** **Linear and Non-Linear Functions** • **Increasing/decreasing** • **Linear/nonlinear**	• **Big Ideas Math Blue, 6.1-6.5** • **Triumphlearning CC Support Coach Lesson8, 9** • **Triumphlearning CC Coach Lesson 13-17** • **Promethean Board etc.**		**18 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Rational & Irrational Numbers	**8.NS 1,2** **8.G 6,7,8** **8 EE 6**	**Classify real numbers** **Irrational Numbers** • **Estimate the value** • **Comparing and ordering all real numbers** **Square roots & Cube roots** **Pythagorean Theorem** • **Proof and Converse** • **Applications in Two and Three Dimensions** • **Explain slope using similar triangles**	• **Big Ideas Math Blue, 7.1-7.4** • **Triumphlearning CC Support Coach Lesson 1** • **Crosswalk Coach Lesson 1-4** • **Triumphlearning CC Coach Lesson 1-2** • **Promethean Board etc**		**5 days**
Volume	**8.G 9**	**Volumes of Cones, Cylinders, Spheres** • **Formulas** • **Applications**	• **Big Ideas Math Blue, 8.1-8.4** • **Triumphlearning CC Support Coach Lesson 17** • **Triumphlearning CC Coach Lesson 28** • **Promethean Board etc.**		**4 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Statistics & Probability	**8.SP 1,2,3,4**	**Scatter Plots** • **Construct** • **Interpret** • **Lines of best fit (Slope and Intercept)** **Stem and Leaf Plots** **Two Way Tables** • **Construct** • **Interpret**	• **Big Ideas Math Blue, 9.1-9.3** • **Triumphlearning CC Support Coach Lesson 18-20** • **Triumphlearning CC Coach Lesson 29-32** • **Promethean Board etc.**		**12 days**
Exponents & Scientific Notation	**8 EE 1,2,3,4**	**Operations involving exponents** • **Integer (positive/negative)** • **Radical** **Scientific Notation** • **Operations involving scientific notation** • **Applications**	• **Big Ideas Math Blue, 10.1-10.7** • **Triumphlearning CC Support Coach Lesson 2-3** • **Triumphlearning CC Coach Lesson 3-6** • **Promethean Board etc**		**10 days**
Review of Linear Equations/Slope	**8.EE.6,7b 8.F.3**	**Review of these topics in preparation for Algebra 1**	• **Big Ideas Math Blue, 4.4-4.7**		**12 days**
Systems of Equations	**8.EE.8a,b,c**	**Review of topic in preparation for Algebra 1**	• **Big Ideas Math Blue, 5.1-5.4**		**9 days**
Final Exam Review	**All**	**Review of all topics for final exam**	• **Big Ideas Math Blue**		**6 days**

Common Core Math 7

Curriculum Guide

Scranton School District

Scranton, PA

Course Title Common Core Math 7

Prerequisite : Math 6

Intended Audience: This course is designed for the student who has successfully completed Math 6 by the end of the 6th grade.

Year-at-a-glance

This course is comprised of all the Pennsylvania Core Standards for grade 7 mathematics. While coherence is retained, in that it logically builds from the 6th Grade mathematics course, this course demands a normal pace for instruction and learning. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. The critical areas are as follows:

- Students develop an understanding of number, recognizing fractions, decimals and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers. Students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers and properties of operations to develop an understanding of integer exponents, and to work with numbers written in scientific notation.
- Students will use some linear equations and implement procedures to solve linear equations in one variable.
- Students solve problems involving the area and circumference of a circle and surface area of three-dimensional objects and solve real-world and mathematical problems involving area.
- Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line and complete their work on volume by solving problems involving cones, cylinders, and spheres.

After successfully completing the course, students will be allowed to enroll in Common Core Math 8.

Scranton School District
Curriculum Guide

Subject: Common Core Math 7	Grade Level 7	Date Completed: 10/22/14

1st Quarter

Topic	Resources	CCSS
The rational number operations, absolute value, properties of zero, real-world application, the distributive property,	Big Ideas Red Chapter 1,2	7.NS.1, 1a,1b,1c,1d,2,2a,2b,2c

2nd Quarter

Topic	Resources	CCSS
Combining algebraic like terms, using distributive property, writing expressions	Big Ideas Red Chapter 3, 4	7. EE. 1, 2, 3, 4a, 4b
Using real-world multi-step problems involving rational numbers	Big Ideas Red Chapter 2	7.EE.3
Converting between decimals, fractions, with rational numbers	Big Ideas Red Chapter 2	7.EE.2
Writing expressions and equations to solve real-world problems	Big Ideas Red Chapter 3,4	7 EE.2; 7EE.3, 7 EE.4

3rd Quarter

Topic	Resources	CCSS
Compute unit rates with ratios of fractions	Big Ideas Red Chapter 5,6	7 RP.1, 1a, 1b,1c, 1d
Decide whether two quantities are proportional	Big Ideas Red Chapter 5,6	7 RP.2
Identify the constant of proportionality ; represent proportional relationships with equations; Explain what a point (x,y) on the graph of a proportional relationship	Big Ideas Red Chapter 5,6	7.RP.2
Constructions of triangles, angles. Identifying cross sections of three-dimensional figures. Scale drawings, reproducing a scale	Big Ideas Red Chapter 7	7.G.1, 2, 3, 4, 5, 6
Using circumference and area in a circle.	Big Ideas Red Chapter 8	7.G.4
Real-life problems involving volume and surface area	Big Ideas Red Chapter 9	7.G.4,6
Using equations to solve for angles in a polygon	Big Ideas Red Chapter 7	7.G.5

4th Quarter

Topic	Resources	CCSS
Statistics and probability, making inferences, predictions from a sample, using measures of central tendency	Big Ideas Red Chapter 10	7.SP.1, 2, 3, 4, 5, 6, 7a, 7b, 8a,8b 8c
Tree diagrams, frequency tables, t-tables,	Big Ideas Red Chapter 10	7.SP.8
Finding the probability of an event, compound events	Big Ideas Red Chapter 10	7.SP.7,8

Scranton School District
Curriculum Guide

* When Common Core becomes fully implemented, the suggested timeline should be adjusted accordingly.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	*Suggested Time
The Number System	**7.NS**			**Teacher prepared tests, quizzes, etc.** **Series available assessments online. www.bigideasmath.com Red (optional)**	
Add and subtract rational number	**7.NS.1**	• **Integer** • **Number Line** • **Add and subtract rational number on a horizontal and vertical number line**	**Big Ideas Red Chapter 1:1.2,1.3 Big Ideas Red Chapter 2: 2.1,2.2,2.3**		**4 days**
Absolute Value	**7.NS.1a**	• **Absolute Value** • **Opposites** • **Describe situations in which opposite quantities combine to make 0.**	**Big Ideas Red Chapter 1: 1.1,1.2, Big Ideas Red Chapter2: 2.2**		**2 days**
Additive Inverse	**7.NS.1b**	• **Apply real world context to opposites and absolute value** • **Additive Inverses**	**Big Ideas Red Chapter 1: 1.1,1.2 Big Ideas Red Chapter2: 2.2**		**2 days**

Absolute Value	**7.NS .1c**	• **Apply absolute value** • **real-world context**	**Big Ideas Red Chapter 1: 1.1,1.3,** **Big Ideas Red Chapter2: 2.3** **Crosswalk Coach Lesson 7**		**2 days**
Addition/Subtraction of Rational Numbers	**7.NS.1d**	• **Apply properties of operations** • **strategies to add and subtract rational numbers**	**Big Ideas Red Chapter 1: 1.1,1.2,1.3** **Big Ideas Red Chapter 2: 2.2,2.3** **Crosswalk Coach Lesson 7**		**3 days**
Fractions as Rational Numbers	**7.NS.2**	• **Apply and extend previous understanding of x/y fractions and rational numbers**	**Crosswalk Coach Lesson 5**		**2 days**
Distributive Property	**7.NS.2a**	• **Distributive property** • **Applying (-1)(-1)=1** • **In real world application**	**Crosswalk Coach Lesson 8** **Big Ideas Red Chapter 1: 1.1,1.4** **Big Ideas Red Chapter 2: 2.4**		**3 days**
Property Of Zero	**7.NS.2b** **7.NS.2c**	• **Divisor** • **Dividend** • **properties of zero** • **Understand that integers can be divided (with non-zero divisor)and the result is a rational number**	**Big Ideas Red Chapter 1:1.1, 1.4, 1.5** **Big Ideas Red Chapter 2-2.1,2.4**		**3 days**

Types of Decimals	**7.NS.2d**	• **Terminating decimal** • **repeating decimal** • **Convert a rational number to a decimal using long division**	**Big Ideas Red Chapter 1:1.1** **Big Ideas Red Chapter 2: 2.1**		**2 days**
Real-world application of rational numbers	**7.NS.3**	• **Solve real world and mathematical problems involving the four operations and rational numbers**	**Crosswalk Coach Lesson 4** **Triumph Learning CC Lesson 6,7,8** **Big Ideas Red Chapter1: 1.1,1.2,1.3,1.4,1.5** **Chapter 2: 2.2,2.3,2.4**		**5 days**
Algebraic Expressions	**7.EE.1**	• **Coefficient** • **like/unlike terms** • **Apply operations as strategies to add, subtract expressions**	**Crosswalk Coach lesson 14,15** **Triumph Learning CC L 13** **Big Idea Red Chapter 3: 3.1,3.2, Ext:3.2**		**5 days**
Writing algebraic expressions	**7.EE.2**	• **A + 0.05A = 1.05A means increase by 5% or multiply by 1.05** • **Rewriting an expression can help understand the quantity**	**Triumph learning CC Lessons 13, 16** **Big Idea Red Chapter 3: 3.1,3.2**		**2 days**
Equations	**7.EE.4**	• **equations to solve problems** • **real-life application**	**Triumph Learning CC L17** **Common Core Coach L16**		**3 days**

Equations	**7.EE.4a**	• **Compare algebraic solutions to mathematical solutions**	**Big Ideas Red Chapter 3: 3.3,3.4,3.5 Crosswalk Coach Lesson 17**		**10 days**
Inequalities	**7.EE.4b**	• **Compare inequalities to mathematical solutions**	**Crosswalk Coach Lesson 18 Big Ideas Red Chapter 4: 4.1,4.2,4.3,4.4**		**10 days**
Ratios and Proportions	**7RP**				
Unit rates	**7.RP.1**	• **Compute unit rates** • **ratios of fractions**	**Big Idea Red Chapter 5: 5.1 Crosswalk Coach**		**2 days**
Proportions	**7.RP.2a**	• **Decide whether two quantities are in a proportional relationship**	**Crosswalk Lesson 12 Triumph Learning CC Lesson 3 www.ixl.com/math/grade7 Big Ideas Red Chapter5:5.2,Ext 5.2,5.6**		**4 days**
Unit Rate	**7.RP.2b**	• **Identify the constant of proportionality** • **unit rate**	**Crosswalk Coach Lesson 12 Triumph Learning CC lesson 3 Big Ideas Red Chapter5: Ext 5.2,5.4,5.5,5.6**		**4 days**
Proportional Relationships	**7.RP.2c**	• **Represent proportional relationships by equations** • **Use cross products to solve**	**Crosswalk Coach lesson 12 Triumph Learning CC Lesson 3 Big Ideas Red Chapter5: 5.3,5.4,5.6**		**4 days**

Coordinate Plane	**7.RP.2d**	• **Explain what a point (x, y) on the graph of a proportional relationship means**	**Crosswalk Coach lesson 12** **Triumph Learning CC –L3** **Big Ideas Red Chapter5: 5.3,5.4,5.6**		**8 days**
Problem Solving	**7.EE.3**	• **Multi-step real-life problem** • **solving with rational numbers**	**Crosswalk Coach L.17** **Triumph Learning CC L15** **Big Ideas Red Chapter 6: 6.1,6.2,6.3,6.4,6.5,6.6,6.7**		**18 days**
Geometry	**7.B**		**Big Ideas Red Chapter 7: 7.5** **Crosswalk Coach L.20** **Triumph Learning CC L18**		**1 day**
Scale Drawings	**7.G.1**	• **Scale drawings** • **reproducing a scale**	**Big Ideas Red Chapter 7: 7.5** **Crosswalk Coach L20** **Triumph Learning CC 18**		**1 day**
Constructions of triangles	**7.G.2**	• **Describe the properties of all types of triangles** • **based on angle and side measures**	**Common Core Coach L.19** **Big Ideas Red Chapter 7: 7.3,7.4**		**4 days**
Triangle Inequality	**7.G.1.1.3**	• **Use triangle inequality theorem** • **apply the triangle inequality theorem**	**Big Ideas Red Chapter7: 7.3**		**3 days**

Cross Sections	**7.G.3**	• **Describe the 2-d figures that result from slicing 3-d figures** • **right rectangular prisms** • **pyramids**	**Crosswalk Coach L.22** **Triumph Learning CC L.20** **Big Ideas Red Chapter 9: Extension 9.5**		**3 days**
Circles	**7.G.4**	• **area of a circle** • **circumference of a circle**	**Big Ideas Red Chapter 8: 8.1,8.2,8.3** **Big Ideas Red Chapter9: 9.3** **Crosswalk Coach L.23** **Triumph Learning CC L.21**		**8 days**
Use equations to solve for angles	**7.G.5**	• **Identify types of angles: supplementary, complementary** • **vertical, adjacent** • **Identify and use properties of angles formed by parallel lines cut by a transversal** • **include alternate interior, alternate exterior, vertical, corresponding**	**Big Ideas Red Chapter 7: 7.1,7.2, Ext 7.3** **Crosswalk Coach L.24** **Triumph Learning CC L 22**		**8 days**
Real-world problems involving area, volume, and surface area	**7.G.6**	• **Two and three dimensional figures** • **Triangles, quadrilaterals, polygons, cubes, right prisms**	**Big Ideas Red Chapter 8: 8.4,** **Big Ideas Red Chapter 9: 9.1,9.2,9.4,9.5** **Crosswalk Coach L.25,26,27** **Triumph Learning CC L23,24**		**12 days**

Statistics/Probability	**7.SP**				
Random sampling and valid inferences	**7.SP.1**	• **Population sample representative** • **Random sampling and valid inferences**	**Crosswalk Coach L.30** **Big Ideas Red Chapter 10: 10.6** **Triumph Learning CC L.25**		**3 days**
Predictions	**7.SP.2**	• **Making a prediction based on a sample**	**Crosswalk Coach L.30,34** **Triumph Learning L 27** **Big Ideas Red Chapter 10:**		**3 days**
Measures of Central Tendency	**7.SP.4**	• **Variability of data** • **draw inferences** • **Using measures of central tendency**	**Crosswalk Coach L.31,32,34,35** **Triumph Learning CC L.27** **Big Ideas Red Chapter 10: 10.7**		**2 days**
Probability of an Event	**7.SP.3.2**	• **Find the probability of simple events, including the probability of an event not occurring**	**Big Ideas Red Chapter 10: 10.1**		**2 days**
Absolute Deviation	**7.SP.3**	• **Absolute deviation** • **dot plot** • **multiple measures of variability** • **two sets of data**	**Big Ideas Red Chapter 10:10.7** **Crosswalk Coach L.33,35** **Triumph Learning CC L.27**		**2 days**
Probability	**7.SP.5**	• **Unlikely events** • **Between 0 and 1**	**Big Ideas Red Chapter 10:10.1,10.2,10.3** **Crosswalk Coach L.28,** **Triumph Learning CC L.28**		**6 days**

Rolling numbered cube	**7.SP.6**	• **Rolling a number cube** • **Frequency of an event** • **Collecting data**	**Big Ideas Red Chapter 10: 10.3** **Crosswalk Coach L.28** **Triumph Learning CC L.29**		**2 days**
	7.SP.7	• **Develop models** • **Observe occurrences**			
Probable Outcomes	**7.SP.7a**	• **Develop a uniform probability assigning probability to outcomes**	**Triumph Learning CC L.30** **Crosswalk Coach L.28** **Big Ideas Red Chapter 10: 10.2,10.3**		**4 days**
Probability Models	**7.SP.7b**	• **Develop a probability model by observing**	**Big Ideas Red Chapter 10: 10.3** **Crosswalk Coach L.28**		**2 days**
Compound events	**7.SP.7b**	• **Tables** • **tree diagram**	**Crosswalk Coach L 29**		**2 days**
Compound Events	**7.SP.8a**	• **Probability** • **compound event**	**Triumph Learning CC L.30** **Big Ideas Red Chapter 10: 10.4,10.5**		**6 days**
Sample Spaces	**7.SP.8b**	• **Sample spaces** • **compound events**	**Crosswalk Coach L.29, Triumph Learning CC Big Ideas Red Chapter 10: 10.4,10.5**		**5 days**
Simulations	**7.SP.8c**	• **Design a simulation** • **generate frequencies for compound events**	**Big Ideas Red Chapter 10: 10.5** **Crosswalk Coach L.29** **Triumph Learning CC L.30**		**3 days**

Computer Science

Curriculum Guide

Scranton School District

Scranton, PA

Computer Science

Prerequisite: Algebra II/Trig, Honors Geometry

Intended Audience: This course is designed for the student who has a strong math background and an interest in computer science.

A computer program is a set of instructions that tell a computer how to accomplish a given task. Computer programming is the art and science of planning and writing computer programs. This course is designed to introduce students to the process of computer programming. Students will learn fundamental concepts of computer programming using the programming language JAVA. During the year, students will learn to write JAVA programs to solve a variety of interesting and useful problems, some of which may include the use of graphics and game playing. By the end of the course, students will have acquired enough knowledge and skill to plan and develop programs for their own use. This course also provides the foundation for further study in computer programming. Students who do well in mathematics and have a possible interest in pursuing careers in any math or science related area should consider taking this course.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Computer Science	**Grade Level: 10th – 12th**	**Date Completed: 3-17-15**

1st Quarter

Topic	Resources	AP Standard
Introduction	Text Book: Big Java, Chapter 1, Computer	CR1 CR2a CR7
Using Objects	Text Book: Big Java, Chapter 2, Computer	CR1 CR2a CR3 CR4
Implementing Classes	Text Book: Big Java, Chapter 3, Computer	CR1 CR2a CR3 CR4

2nd Quarter

Topic	Resources	AP Standard
Fundamental Data Types	Text Book: Big Java, Chapter 4, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6
Decisions	Text Book: Big Java, Chapter 5, Computer	CR1 CR2a CR3 CR4 CR6
Loops	Text Book: Big Java, Chapter 6, Computer	CR1 CR2a CR2b CR3 CR4 CR6

3rd Quarter

Topic	Resources	AP Standard
Arrays and Array Lists	Text Book: Big Java, Chapter 7, Computer	CR1 CR2a CR3 CR4 CR6
Designing Classes	Text Book: Big Java, Chapter 8, Computer	CR1 CR2a CR2b CR3 CR4 CR6
Inheritance	Text Book: Big Java, Chapter 9, Computer	CR1 CR2a CR2b CR4 CR6

4th Quarter

Topic	Resources	AP Standard
Interfaces	Text Book: Big Java, Chapter 10, Computer	CR1 CR2a CR2b CR3 CR4 CR6
Robocode (optional)	IBM developerWorks Robocode, Computer	

Curricular Standards

CR1	The course teaches students to design and implement computer-based solutions to problems.
CR2a	The course teaches students to use and implement commonly used algorithms.
CR2b	The course teaches students to use commonly used data structures.
CR3	The course teaches students to select appropriate algorithms and data structures to solve problems.
CR4	The course teaches students to code fluently in an object-oriented paradigm using the programming language Java.
CR5	The course teaches students to use elements of the standard Java library from the AP Java subset in Appendix A of the AP Computer Science A Course Description.
CR6	The course includes a structured lab component comprised of a minimum of 20 hours of hands-on lab experiences.
CR7	The course teaches students to recognize the ethical and social implications of computer use.

Since the content of Computer Science course is beyond the scope of Common Core, the Collegeboard Computer Science Curriculum Standards was used for this course.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Computer Programs The Anatomy of a Computer The Java Programming Language Becoming Familiar with Your Programming Environment Analyzing Your First Program Errors Problem Solving: Algorithm Design	CR1 CR2a CR7	• Describe the relationship between hardware and software. • Define various types of software and how they are used. • Identify basic computer hardware • Explain how the hardware components execute programs and manage data. • Describe how computers are connected together into networks to share information. • Introduce the Java Programming Language. • Describe the steps involved in program compilation and execution. • Identify the different types of compiler errors • Introduce Algorithms: sequence of steps that is unambiguous, executable, and terminating. • Law and Ethics Acceptable User's Policy	Text Book: *BIG JAVA* Computer (Bullets below match previous column) • 1.1 • 1.1 • 1.2 • 1.2 • 1.3 • 1.4 • 1.5 • 1.6 • 1.7 • 1.7	Teacher prepared tests, quizzes, etc. Daily Class Work Quizzes	8
Test – Introduction				Multiple Choice Test	1

Objects and Classes Variables Calling Methods Constructing Objects Accessor and Mutator Methods The API Documentation Implementing a Test Program Object References Graphical Applications	CR1 CR2a CR3 CR4	• Define the difference between primitive data and objects. • Declare and use variables. • Perform mathematical computations. • Create objects and use them. • Create graphical programs that draw shapes. • Understand the concepts of classes and objects. • Be able to call methods. • Learn about arguments and return values. • Write programs that display simple shapes. • Understand how to search and use the API documentation.	Text Book: *BIG JAVA* Computer • 2.1 • 2.2 • 2.4 • 2.9 • 2.5 • 2.5 • 2.3 • 2.4 • 2.9, 2.10 • 2.6	Daily Class Work Quizzes	14
Test - Using Objects				Multiple Choice Test & Hands on Programming Project	2

Instance Variables and Encapsulation Specifying the Public Interface of a Class Providing the Class Implementation Problem Solving: Tracing Objects Local Variables The this reference Shape Classes	CR1 CR2a CR3 CR4	• Become familiar with the process of implementing classes • Be able to implement and test simple methods • Understand the purpose and use of constructors • Understand how to access instance variables and local variables • Be able to write javadoc comments • Implement classes for drawing graphical shapes	Text Book: *BIG JAVA* Computer • 3.1, 3.2, 3.3 • 3.3 • 3.4 • 3.6 • 3.7 • 3.8	Daily Class Work Quizzes	15
Test – Implementing Classes				Multiple Choice Test & Hands on Programming Project	2

Numbers Arithmetic Input and Output Problem Solving: First Do it by Hand Strings	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Understand integer and foating-point numbers • Recognize the limitations of the numeric t types • Become aware of causes for overflow and roundoff errors • Understand the proper use of constants • Write arithmetic expressions in Java • Use the String type to manipulate character strings • Write programs that read input and produce formatted output	Text Book: *BIG JAVA* Computer • 4.1 • 4.2 • 4.2 • 4.1, 4.2 • 4.2 • 4.4, 4.5 • 4.3	Daily Class Work Quizzes	14
Test - Fundamental Data Types				Multiple Choice Test & Hands on Programming Project	2

The if Statement Comparing Values Multiple Alternatives Nested Branches Problem Solving: Flowcharts Problem Solving: Selecting Test Cases Boolean Variables and Operators Application: Input Validation	CR1 CR2a CR3 CR4 CR6	• Implement decisions using if statements • Compare integers, foating-point numbers, and strings • Write statements using the Boolean data type • Develop strategies for testing your programs • Validate user input	Text Book: *BIG JAVA* Computer • 5.1 • 5.2, 5.3 • 5.7 • 5.5, 5.6 • 5.8	Daily Class Work Quizzes	14
Test - Decisions				Multiple Choice Test & Hands on Programming Project	2

The while Loop Problem Solving: Hand-Tracing The for Loop The do Loop Application: Processing Sentinel Values Problem Solving: Storyboards Common Loop Algorithms Nested Loops Application: Random Numbers and Simulations Using a Debugger	CR1 CR2a CR2b CR3 CR4 CR6	• Implement while, for, and do loops • Hand-trace the execution of a program • Learn to use common loop algorithms • Understand nested loops • Implement programs that read and process data sets • Use a computer for simulations • Learn about the debugger	Text Book: *BIG JAVA* Computer • 6.1 • 6.2 • 6.3, 6.4, 6.5 • 6.6, 6.7 • 6.8 • 6.9 • 6.10	Daily Class Work Quizzes	22
Test - Loops				Multiple Choice Test & Hands on Programming Project	2

Arrays The Enhanced for Loop Common Array Algorithms Adapting Algorithms Discovering Algorithms by Manipulating Physical Objects Two-Dimensional Arrays	CR1 CR2a CR3 CR4 CR6	• Collect elements using arrays and array lists • Use the enhanced for loop for traversing arrays and array lists • Learn common algorithms for processing arrays and array lists • Work with two-dimensional arrays • Understand the concept of regression testing	Text Book: *BIG JAVA* Computer • 7.1 • 7.2 • 7.3 • 7.6 • 7.7 • 7.8	Daily Class Work Quizzes	17
Test - Arrays				Multiple Choice Test & Hands on Programming Project	2

Discovering Classes Designing Good Methods Patterns for Object Data Static Variables and Methods Packages	CR1 CR2a CR2b CR3 CR4 CR6	• Learn how to choose appropriate classes for a given problem • Understand the concept of cohesion • Minimize dependencies and side effects • Learn how to find a data representation for a class • Understand static methods and variables • Learn about packages • Learn about unit testing frameworks	Text Book: *BIG JAVA* Computer • 8.1 • 8.1 • 8.2 • 8.3 • 8.4 • 8.5 • 8.6	Daily Class Work Quizzes	14
Test - Classes				Multiple Choice Test & Hands on Programming Project	2

Inheritance Hierarchies Implementing Subclasses Overriding Methods Polymorphism Object: The Cosmic Superclass	CR1 CR2a CR2b CR4 CR6	• Learn about inheritance • Implement subclasses that inherit and override superclass methods • Understand the concept of polymorphism • Be familiar with the common superclass Object and its methods	Text Book: *BIG JAVA* Computer • 9.1 • 9.2, 9.3 • 9.4 • 9.5	Daily Class Work Quizzes	14
Test – Inheritance				Multiple Choice Test & Hands on Programming Project	2

Using Interfaces for Algorithm Reuse Working with Interface Variables The Comparable Interface Using Interfaces for Callbacks Inner Classes Mock Objects Event Handling Building Applications with Buttons Processing Timer Events Mouse Events	CR1 CR2a CR2b CR3 CR4 CR6	• Be able to declare and use interface types • Appreciate how interfaces can be used to decouple classes • Learn how to implement helper classes as inner classes • Implement event listeners in graphical applications	Text Book: *BIG JAVA* Computer • 10.1, 10.2 • 10.3, 10.4 • 10.5, 10.6, 10.7 • 10.8, 10.9, 10.10	Daily Class Work Quizzes	14
Test - Interfaces				Multiple Choice Test & Hands on Programming Project	2

Robocode (optional)		Robocode is a programming game where the goal is to code a robot battle tank to compete against other robots in a battle arena. So the name Robocode is a short for "Robot code". The player is the programmer of the robot, who will have no direct influence on the game. Instead, the player must write the AI of the robot telling it how to behave and react on events occurring in the battle arena. Battles are running in real-time and on-screen.	IBM Robocode, Computer	Daily Class Work Quizzes	15

Computer Science

Curriculum Guide

Scranton School District

Scranton, PA

Computer Science

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Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Computer Science	**Grade Level: 10th – 12th**	**Date Completed: 3-17-15**

1st Quarter

Topic	Resources	AP Standard
Introduction	Text Book: Big Java, Chapter 1, Computer	
Using Objects	Text Book: Big Java, Chapter 2, Computer	
Implementing Classes	Text Book: Big Java, Chapter 3, Computer	

2nd Quarter

Topic	Resources	AP Standard
Fundamental Data Types	Text Book: Big Java, Chapter 4, Computer	
Decisions	Text Book: Big Java, Chapter 5, Computer	
Loops	Text Book: Big Java, Chapter 6, Computer	

3rd Quarter

Topic	Resources	AP Standard
Arrays and Array Lists	Text Book: Big Java, Chapter 7, Computer	
Designing Classes	Text Book: Big Java, Chapter 8, Computer	
Inheritance	Text Book: Big Java, Chapter 9, Computer	

4th Quarter

Topic	Resources	AP Standard
Interfaces	Text Book: Big Java, Chapter 10, Computer	
Robocode (optional)	IBM developerWorks Robocode, Computer	

Curricular Standards

CR1	The course teaches students to design and implement computer-based solutions to problems.
CR2a	The course teaches students to use and implement commonly used algorithms.
CR2b	The course teaches students to use commonly used data structures.
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CR4	The course teaches students to code fluently in an object-oriented paradigm using the programming language Java.
CR5	The course teaches students to use elements of the standard Java library from the AP Java subset in Appendix A of the AP Computer Science A Course Description.
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Since the content of Computer Science course is beyond the scope of Common Core, the Collegeboard Computer Science Curriculum Standards was used for this course.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Computer Programs The Anatomy of a Computer The Java Programming Language Becoming Familiar with Your Programming Environment Analyzing Your First Program Errors Problem Solving: Algorithm Design	CR1 CR2a CR7	• Describe the relationship between hardware and software. • Define various types of software and how they are used. • Identify basic computer hardware • Explain how the hardware components execute programs and manage data. • Describe how computers are connected together into networks to share information. • Introduce the Java Programming Language. • Describe the steps involved in program compilation and execution. • Identify the different types of compiler errors • Introduce Algorithms: sequence of steps that is unambiguous, executable, and terminating. • Law and Ethics Acceptable User's Policy	Text Book: *BIG JAVA* Computer (Bullets below match previous column) • 1.1 • 1.1 • 1.2 • 1.2 • 1.3 • 1.4 • 1.5 • 1.6 • 1.7 • 1.7	Teacher prepared tests, quizzes, etc. Daily Class Work Quizzes	8
Test – Introduction				Multiple Choice Test	1

Objects and Classes Variables Calling Methods Constructing Objects Accessor and Mutator Methods The API Documentation Implementing a Test Program Object References Graphical Applications	CR1 CR2a CR3 CR4	• Define the difference between primitive data and objects. • Declare and use variables. • Perform mathematical computations. • Create objects and use them. • Create graphical programs that draw shapes. • Understand the concepts of classes and objects. • Be able to call methods. • Learn about arguments and return values. • Write programs that display simple shapes. • Understand how to search and use the API documentation.	Text Book: *BIG JAVA* Computer • 2.1 • 2.2 • 2.4 • 2.9 • 2.5 • 2.5 • 2.3 • 2.4 • 2.9, 2.10 • 2.6	Daily Class Work Quizzes	14
Test - Using Objects				Multiple Choice Test & Hands on Programming Project	2

Instance Variables and Encapsulation Specifying the Public Interface of a Class Providing the Class Implementation Problem Solving: Tracing Objects Local Variables The this reference Shape Classes	CR1 CR2a CR3 CR4	• Become familiar with the process of implementing classes • Be able to implement and test simple methods • Understand the purpose and use of constructors • Understand how to access instance variables and local variables • Be able to write javadoc comments • Implement classes for drawing graphical shapes	Text Book: *BIG JAVA* Computer • 3.1, 3.2, 3.3 • 3.3 • 3.4 • 3.6 • 3.7 • 3.8	Daily Class Work Quizzes	15
Test – Implementing Classes				Multiple Choice Test & Hands on Programming Project	2

Numbers Arithmetic Input and Output Problem Solving: First Do it by Hand Strings	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Understand integer and foating-point numbers • Recognize the limitations of the numeric t types • Become aware of causes for overflow and roundoff errors • Understand the proper use of constants • Write arithmetic expressions in Java • Use the String type to manipulate character strings • Write programs that read input and produce formatted output	Text Book: *BIG JAVA* Computer • 4.1 • 4.2 • 4.2 • 4.1, 4.2 • 4.2 • 4.4, 4.5 • 4.3	Daily Class Work Quizzes	14
Test - Fundamental Data Types				Multiple Choice Test & Hands on Programming Project	2

The if Statement Comparing Values Multiple Alternatives Nested Branches Problem Solving: Flowcharts Problem Solving: Selecting Test Cases Boolean Variables and Operators Application: Input Validation	CR1 CR2a CR3 CR4 CR6	• Implement decisions using if statements • Compare integers, foating-point numbers, and strings • Write statements using the Boolean data type • Develop strategies for testing your programs • Validate user input	Text Book: *BIG JAVA* Computer • 5.1 • 5.2, 5.3 • 5.7 • 5.5, 5.6 • 5.8	Daily Class Work Quizzes	14
Test - Decisions				Multiple Choice Test & Hands on Programming Project	2

The while Loop Problem Solving: Hand-Tracing The for Loop The do Loop Application: Processing Sentinel Values Problem Solving: Storyboards Common Loop Algorithms Nested Loops Application: Random Numbers and Simulations Using a Debugger	CR1 CR2a CR2b CR3 CR4 CR6	• Implement while, for, and do loops • Hand-trace the execution of a program • Learn to use common loop algorithms • Understand nested loops • Implement programs that read and process data sets • Use a computer for simulations • Learn about the debugger	Text Book: *BIG JAVA* Computer • 6.1 • 6.2 • 6.3, 6.4, 6.5 • 6.6, 6.7 • 6.8 • 6.9 • 6.10	Daily Class Work Quizzes	22
Test - Loops				Multiple Choice Test & Hands on Programming Project	2

Arrays The Enhanced for Loop Common Array Algorithms Adapting Algorithms Discovering Algorithms by Manipulating Physical Objects Two-Dimensional Arrays	CR1 CR2a CR3 CR4 CR6	• Collect elements using arrays and array lists • Use the enhanced for loop for traversing arrays and array lists • Learn common algorithms for processing arrays and array lists • Work with two-dimensional arrays • Understand the concept of regression testing	Text Book: *BIG JAVA* Computer • 7.1 • 7.2 • 7.3 • 7.6 • 7.7 • 7.8	Daily Class Work Quizzes	17
Test - Arrays				Multiple Choice Test & Hands on Programming Project	2

Discovering Classes Designing Good Methods Patterns for Object Data Static Variables and Methods Packages	CR1 CR2a CR2b CR3 CR4 CR6	• Learn how to choose appropriate classes for a given problem • Understand the concept of cohesion • Minimize dependencies and side effects • Learn how to find a data representation for a class • Understand static methods and variables • Learn about packages • Learn about unit testing frameworks	Text Book: *BIG JAVA* Computer • 8.1 • 8.1 • 8.2 • 8.3 • 8.4 • 8.5 • 8.6	Daily Class Work Quizzes	14
Test - Classes				Multiple Choice Test & Hands on Programming Project	2

Inheritance Hierarchies Implementing Subclasses Overriding Methods Polymorphism Object: The Cosmic Superclass	CR1 CR2a CR2b CR4 CR6	• Learn about inheritance • Implement subclasses that inherit and override superclass methods • Understand the concept of polymorphism • Be familiar with the common superclass Object and its methods	Text Book: *BIG JAVA* Computer • 9.1 • 9.2, 9.3 • 9.4 • 9.5	Daily Class Work Quizzes	14
Test – Inheritance				Multiple Choice Test & Hands on Programming Project	2

Using Interfaces for Algorithm Reuse Working with Interface Variables The Comparable Interface Using Interfaces for Callbacks Inner Classes Mock Objects Event Handling Building Applications with Buttons Processing Timer Events Mouse Events	CR1 CR2a CR2b CR3 CR4 CR6	• Be able to declare and use interface types • Appreciate how interfaces can be used to decouple classes • Learn how to implement helper classes as inner classes • Implement event listeners in graphical applications	Text Book: *BIG JAVA* Computer • 10.1, 10.2 • 10.3, 10.4 • 10.5, 10.6, 10.7 • 10.8, 10.9, 10.10	Daily Class Work Quizzes	14
Test - Interfaces				Multiple Choice Test & Hands on Programming Project	2

Robocode (optional)		Robocode is a programming game where the goal is to code a robot battle tank to compete against other robots in a battle arena. So the name Robocode is a short for "Robot code". The player is the programmer of the robot, who will have no direct influence on the game. Instead, the player must write the AI of the robot telling it how to behave and react on events occurring in the battle arena. Battles are running in real-time and on-screen.	IBM Robocode, Computer	Daily Class Work Quizzes	15

Computer Science AP

Curriculum Guide

Scranton School District

Scranton, PA

Computer Science AP

Prerequisite :

- Computer Science
- Be in compliance with the SSD Honors and AP Criteria Policy

Intended Audience: This course is designed for the student who has successfully completed Computer Science by the end of the 11th grade.

The Computer Science AP course is an introductory course in computer science. Because the design and implementation of computer programs to solve problems involve skills that are fundamental to the study of computer science, a large part of the course is built around the development of computer programs that correctly solve a given problem. These programs should be understandable, adaptable, and, when appropriate, reusable. At the same time, the design and implementation of computer programs is used as a context for introducing other important aspects of computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, the study of standard algorithms and typical applications, and the use of logic and formal methods. In addition, the responsible use of these systems is an integral part of the course.

The necessary prerequisites for entering the Computer Science AP course include knowledge of basic algebra and experience in problem solving. A student in the Computer Science AP course should be comfortable with functions and the concepts found in the uses of functional notation, such as $f(x) = x + 2$ and f(x) = g(h(x)). It is important that students and their advisers understand that any significant computer science course builds upon a foundation of mathematical reasoning that should be acquired before attempting such a course.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Computer Science AP	**Grade Level: 11th – 12th**	**Date Completed: 2-19-15**

1st Quarter

Topic	Resources	AP Standard
Computer Systems	Text Book: Java Software Solutions, Chapter 1, Computer	
Objects and Primitive Data	Text Book: Java Software Solutions, Chapter 2, Computer	
Program Statements	Text Book: Java Software Solutions, Chapter 3, Computer	

2nd Quarter

Topic	Resources	AP Standard
Writing Classes	Text Book: Java Software Solutions, Chapter 4, Computer	
Enhancing Classes	Text Book: Java Software Solutions, Chapter 5, Computer	

3rd Quarter

Topic	Resources	AP Standard
Inheritance	Text Book: Java Software Solutions, Chapter 7, Computer	
Recursion	Text Book: Java Software Solutions, Chapter 8, Computer	

4th Quarter

Topic	Resources	AP Standard
Linear Data Structures	Text Book: Java Software Solutions, Chapter 9, Computer	
AP Test Preparation	Text Book: Java Software Solutions, Online Resources, Computer	
Robocode (optional)	IBM developerWorks Robocode, Computer	

Curricular Standards

CR1	The course teaches students to design and implement computer-based solutions to problems.
CR2a	The course teaches students to use and implement commonly used algorithms.
CR2b	The course teaches students to use commonly used data structures.
CR3	The course teaches students to select appropriate algorithms and data structures to solve problems.
CR4	The course teaches students to code fluently in an object-oriented paradigm using the programming language Java.
CR5	The course teaches students to use elements of the standard Java library from the AP Java subset in Appendix A of the AP Computer Science A Course Description.
CR6	The course includes a structured lab component comprised of a minimum of 20 hours of hands-on lab experiences.
CR7	The course teaches students to recognize the ethical and social implications of computer use.

Since the content of the Advanced Placement Computer Science AP course is beyond the scope of Common Core, the Collegeboard Computer Science Curriculum Standards was used for this course.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Computer Systems Introduction/Binary Numbers Hardware Components and Networks Programming and Programming Languages Graphics Acceptable User's Policy	CR1, CR7	• Describe the relationship between hardware and software. • Define various types of software and how they are used. • Identify basic computer hardware • Explain how the hardware components execute programs and manage data. • Describe how computers are connected together into networks to share information. • Explain the importance of the Internet and the World Wide Web. • Introduce the Java Programming Language. • Describe the steps involved in program compilation and execution. • Introduce graphics and their representations. • Law and Ethics Acceptable User's Policy	Text Book: *Java Software Solutions* Computer (Bullets below match previous column) • 1.0 • 1.0 • 1.1 • 1.3 • 1.2 • 1.2 • 1.4 • 1.4 • 1.5 • 1.4	Teacher prepared tests, quizzes, etc. Daily Class Work Quizzes	9
Test – Computer Systems				AP Style Multiple Choice Test	1

Intro to objects and using them Variables/Data Types and Arithmetic Using Object Variables	CR1 CR2a CR3 CR4	• Define the difference between primitive data and objects. • Declare and use variables. • Perform mathematical computations. • Create objects and use them. • Explore the difference between a Java application and a Java applet. • Create graphical programs that draw shapes.	Text Book: *Java Software Solutions* Computer • 2.0, 2.1 • 2.2, 2.3 • 2.4, 2.5 • 2.6, 2.7 • 2.10, 2.11 • 2.12	Daily Class Work Quizzes	15
Test - Objects and Primitive Data				AP Style Multiple Choice Test & Hands on Programming Project	2

Boolean Expressions/if Statements Looping Structures Drawing with Loops and Conditionals	CR1 CR2a CR3 CR4	• Discuss basic program development steps. • Define the flow of control through a program. • Learn to use if statements. • Define expressions that let us make complex decisions. • Learn to use while and for statements. • Use conditionals and loops to draw graphics.	Text Book: *Java Software Solutions* Computer • 3.0 • 3.1 • 3.2 • 3.3, 3.4 • 3.5, 3.6 • 3.9	Daily Class Work Quizzes	18
Test - Program Statements				AP Style Multiple Choice Test & Hands on Programming Project	2

Anatomy of Classes and Methods Method Overloading Method Decomposition Object Relationships Applets and Graphics	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Define classes that act like blue-prints for new objects, made of variables and methods. • Explain encapsulation and Java modifiers. • Explore the details of method declarations. • Review method invocation and parameter passing. • Explain and use method overloading. • Learn to divide complicated methods into simpler, supporting methods. • Describe relationships between objects. • Create graphics based objects.	Text Book: *Java Software Solutions* Computer • 4.0 • 4.1 • 4.2 • 4.2 • 4.3 • 4.4 • 4.5 • 4.6, 4.7	Daily Class Work Quizzes	18
Test - Writing Classes				AP Style Multiple Choice Test & Hands on Programming Project	2

References/Passing Parameters Interfaces Dialog Boxes Graphical User Interfaces	CR1 CR2a CR3 CR4 CR5 CR6	• Define reference aliases. • Explore passing object references as parameters. • Learn to use the static modifier. • Define formal interfaces and their class implementations. • Define nested classes and inner classes • Learn about basic graphical user interfaces.	Text Book: *Java Software Solutions* Computer • 5.0 • 5.0 • 5.1, 5.2 • 5.3 • 5.4, 5.5 • 5.6, 5.7	Daily Class Work Quizzes	15
Test - Enhancing Classes				AP Style Multiple Choice Test & Hands on Programming Project	2

One and Two Dimensional Primitive Arrays Arrays of Objects ArrayLists Arrays and Graphics Buttons	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Define and Use Arrays • Describe how arrays and array elements are passed as parameters. • Explore how arrays and other objects can be combined to manage complex information. • Explore searching and sorting with arrays. • Learn to use multidimensional arrays. • Examine the ArrayList class.	Text Book: *Java Software Solutions* Computer • 6.0 • 6.1 • 6.2 • 6.3, 6.4 • 6.6 • 6.7	Daily Class Work Quizzes	22
Test - Arrays				AP Style Multiple Choice Test & Hands on Programming Project	2

Inheritance Designing for Inheritance Interfaces Mouse Events	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Derive new classes from existing ones. • Explain how inheritance supports software reuse. • Add and modify methods in child classes. • Discuss how to design class hierarchies. • Define polymorphism and how it can be done. • Discuss the use of inheritance in Java GUI framework. • Examine and use the GUI component class hierarchy.	Text Book: *Java Software Solutions* Computer • 7.0 • 7.1 • 7.3 • 7.2, 7.4 • 7.5 • 7.8 • 7.9	Daily Class Work Quizzes	18
Test - Inheritance				AP Style Multiple Choice Test & Hands on Programming Project	2

Basic Recursion Classic Problems Recursive Sorting Fractals	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Explain the underlying ideas of recursion. • Examine recursive methods and processing steps. • Define infinite recursion and discuss ways to avoid it. • Explain when recursion should and should not be used. • Demonstrate the use of recursion to solve problems. • Examine the use of recursion in sorting.	Text Book: *Java Software Solutions* Computer • 8.0 • 8.1 • 8.0, 8.1 • 8.2 • 8.3 • 8.3	Daily Class Work Quizzes	14
Test - Recursion				AP Style Multiple Choice Test & Hands on Programming Project	2

Linked Lists Queues Stacks	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Explore the idea of a collection. • Introduce the predefined collection classes in the Java standard class library. • Examine the difference between fixed and dynamic implementations. • Define and use dynamically linked lists.	Text Book: *Java Software Solutions* Computer • 9.0 • 9.0 • 9.1 • 9.2	Daily Class Work Quizzes	14
Test - Linear Data Structures				AP Style Multiple Choice Test & Hands on Programming Project	2

Robocode (optional)	CR1 CR2a CR2b CR3 CR4 CR5 CR6	Robocode is a programming game where the goal is to code a robot battle tank to compete against other robots in a battle arena. So the name Robocode is a short for "Robot code". The player is the programmer of the robot, who will have no direct influence on the game. Instead, the player must write the AI of the robot telling it how to behave and react on events occurring in the battle arena. Battles are running in real-time and on-screen.	IBM Robocode, Computer	Daily Class Work Quizzes	20

Computer Science AP

Curriculum Guide

Scranton School District

Scranton, PA

Computer Science AP

Prerequisite :

- Computer Science
- Be in compliance with the SSD Honors and AP Criteria Policy

Intended Audience: This course is designed for the student who has successfully completed Computer Science by the end of the 11th grade.

The Computer Science AP course is an introductory course in computer science. Because the design and implementation of computer programs to solve problems involve skills that are fundamental to the study of computer science, a large part of the course is built around the development of computer programs that correctly solve a given problem. These programs should be understandable, adaptable, and, when appropriate, reusable. At the same time, the design and implementation of computer programs is used as a context for introducing other important aspects of computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, the study of standard algorithms and typical applications, and the use of logic and formal methods. In addition, the responsible use of these systems is an integral part of the course.

The necessary prerequisites for entering the Computer Science AP course include knowledge of basic algebra and experience in problem solving. A student in the Computer Science AP course should be comfortable with functions and the concepts found in the uses of functional notation, such as $f(x) = x + 2$ and f(x) = g(h(x)). It is important that students and their advisers understand that any significant computer science course builds upon a foundation of mathematical reasoning that should be acquired before attempting such a course.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Computer Science AP	**Grade Level: 11th – 12th**	**Date Completed: 2-19-15**

1st Quarter

Topic	Resources	AP Standard
Computer Systems	Text Book: Java Software Solutions, Chapter 1, Computer	CR1 CR7
Objects and Primitive Data	Text Book: Java Software Solutions, Chapter 2, Computer	CR1 CR2a CR3 CR4
Program Statements	Text Book: Java Software Solutions, Chapter 3, Computer	CR1 CR2a CR3 CR4

2nd Quarter

Topic	Resources	AP Standard
Writing Classes	Text Book: Java Software Solutions, Chapter 4, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6
Enhancing Classes	Text Book: Java Software Solutions, Chapter 5, Computer	CR1 CR2a CR3 CR4 CR5 CR6

3rd Quarter

Topic	Resources	AP Standard
Arrays	Text Book: Java Software Solutions, Chapter 6, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6
Inheritance	Text Book: Java Software Solutions, Chapter 7, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6
Recursion	Text Book: Java Software Solutions, Chapter 8, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6

4th Quarter

Topic	Resources	AP Standard
Linear Data Structures	Text Book: Java Software Solutions, Chapter 9, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6
AP Test Preparation	Text Book: Java Software Solutions, Online Resources, Computer	
Robocode (optional)	IBM developerWorks Robocode, Computer	CR1 CR2a CR2b CR3 CR4 CR5 CR6

Curricular Standards

CR1	The course teaches students to design and implement computer-based solutions to problems.
CR2a	The course teaches students to use and implement commonly used algorithms.
CR2b	The course teaches students to use commonly used data structures.
CR3	The course teaches students to select appropriate algorithms and data structures to solve problems.
CR4	The course teaches students to code fluently in an object-oriented paradigm using the programming language Java.
CR5	The course teaches students to use elements of the standard Java library from the AP Java subset in Appendix A of the AP Computer Science A Course Description.
CR6	The course includes a structured lab component comprised of a minimum of 20 hours of hands-on lab experiences.
CR7	The course teaches students to recognize the ethical and social implications of computer use.

Since the content of the Advanced Placement Computer Science AP course is beyond the scope of Common Core, the Collegeboard Computer Science Curriculum Standards was used for this course.

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Computer Systems Introduction/Binary Numbers Hardware Components and Networks Programming and Programming Languages Graphics Acceptable User's Policy	CR1, CR7	• Describe the relationship between hardware and software. • Define various types of software and how they are used. • Identify basic computer hardware • Explain how the hardware components execute programs and manage data. • Describe how computers are connected together into networks to share information. • Explain the importance of the Internet and the World Wide Web. • Introduce the Java Programming Language. • Describe the steps involved in program compilation and execution. • Introduce graphics and their representations. • Law and Ethics Acceptable User's Policy	Text Book: *Java Software Solutions* Computer (Bullets below match previous column) • 1.0 • 1.0 • 1.1 • 1.3 • 1.2 • 1.2 • 1.4 • 1.4 • 1.5 • 1.4	Teacher prepared tests, quizzes, etc. Daily Class Work Quizzes	9
Test – Computer Systems				AP Style Multiple Choice Test	1

Intro to objects and using them Variables/Data Types and Arithmetic Using Object Variables	CR1 CR2a CR3 CR4	• Define the difference between primitive data and objects. • Declare and use variables. • Perform mathematical computations. • Create objects and use them. • Explore the difference between a Java application and a Java applet. • Create graphical programs that draw shapes.	Text Book: *Java Software Solutions* Computer • 2.0, 2.1 • 2.2, 2.3 • 2.4, 2.5 • 2.6, 2.7 • 2.10, 2.11 • 2.12	Daily Class Work Quizzes	15
Test - Objects and Primitive Data				AP Style Multiple Choice Test & Hands on Programming Project	2

Boolean Expressions/if Statements Looping Structures Drawing with Loops and Conditionals	CR1 CR2a CR3 CR4	• Discuss basic program development steps. • Define the flow of control through a program. • Learn to use if statements. • Define expressions that let us make complex decisions. • Learn to use while and for statements. • Use conditionals and loops to draw graphics.	Text Book: *Java Software Solutions* Computer • 3.0 • 3.1 • 3.2 • 3.3, 3.4 • 3.5, 3.6 • 3.9	Daily Class Work Quizzes	18
Test - Program Statements				AP Style Multiple Choice Test & Hands on Programming Project	2

Anatomy of Classes and Methods Method Overloading Method Decomposition Object Relationships Applets and Graphics	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Define classes that act like blue-prints for new objects, made of variables and methods. • Explain encapsulation and Java modifiers. • Explore the details of method declarations. • Review method invocation and parameter passing. • Explain and use method overloading. • Learn to divide complicated methods into simpler, supporting methods. • Describe relationships between objects. • Create graphics based objects.	Text Book: *Java Software Solutions* Computer • 4.0 • 4.1 • 4.2 • 4.2 • 4.3 • 4.4 • 4.5 • 4.6, 4.7	Daily Class Work Quizzes	18
Test - Writing Classes				AP Style Multiple Choice Test & Hands on Programming Project	2

References/Passing Parameters Interfaces Dialog Boxes Graphical User Interfaces	CR1 CR2a CR3 CR4 CR5 CR6	• Define reference aliases. • Explore passing object references as parameters. • Learn to use the static modifier. • Define formal interfaces and their class implementations. • Define nested classes and inner classes • Learn about basic graphical user interfaces.	Text Book: *Java Software Solutions* Computer • 5.0 • 5.0 • 5.1, 5.2 • 5.3 • 5.4, 5.5 • 5.6, 5.7	Daily Class Work Quizzes	15
Test - Enhancing Classes				AP Style Multiple Choice Test & Hands on Programming Project	2

One and Two Dimensional Primitive Arrays Arrays of Objects ArrayLists Arrays and Graphics Buttons	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Define and Use Arrays • Describe how arrays and array elements are passed as parameters. • Explore how arrays and other objects can be combined to manage complex information. • Explore searching and sorting with arrays. • Learn to use multidimensional arrays. • Examine the ArrayList class.	Text Book: *Java Software Solutions* Computer • 6.0 • 6.1 • 6.2 • 6.3, 6.4 • 6.6 • 6.7	Daily Class Work Quizzes	22
Test - Arrays				AP Style Multiple Choice Test & Hands on Programming Project	2

Inheritance Designing for Inheritance Interfaces Mouse Events	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Derive new classes from existing ones. • Explain how inheritance supports software reuse. • Add and modify methods in child classes. • Discuss how to design class hierarchies. • Define polymorphism and how it can be done. • Discuss the use of inheritance in Java GUI framework. • Examine and use the GUI component class hierarchy.	Text Book: *Java Software Solutions* Computer • 7.0 • 7.1 • 7.3 • 7.2, 7.4 • 7.5 • 7.8 • 7.9	Daily Class Work Quizzes	18
Test - Inheritance				AP Style Multiple Choice Test & Hands on Programming Project	2

Basic Recursion Classic Problems Recursive Sorting Fractals	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Explain the underlying ideas of recursion. • Examine recursive methods and processing steps. • Define infinite recursion and discuss ways to avoid it. • Explain when recursion should and should not be used. • Demonstrate the use of recursion to solve problems. • Examine the use of recursion in sorting.	Text Book: *Java Software Solutions* Computer • 8.0 • 8.1 • 8.0, 8.1 • 8.2 • 8.3 • 8.3	Daily Class Work Quizzes	14
Test - Recursion				AP Style Multiple Choice Test & Hands on Programming Project	2

Linked Lists Queues Stacks	CR1 CR2a CR2b CR3 CR4 CR5 CR6	• Explore the idea of a collection. • Introduce the predefined collection classes in the Java standard class library. • Examine the difference between fixed and dynamic implementations. • Define and use dynamically linked lists.	Text Book: *Java Software Solutions* Computer • 9.0 • 9.0 • 9.1 • 9.2	Daily Class Work Quizzes	14
Test - Linear Data Structures				AP Style Multiple Choice Test & Hands on Programming Project	2

Robocode (optional)	CR1 CR2a CR2b CR3 CR4 CR5 CR6	Robocode is a programming game where the goal is to code a robot battle tank to compete against other robots in a battle arena. So the name Robocode is a short for "Robot code". The player is the programmer of the robot, who will have no direct influence on the game. Instead, the player must write the AI of the robot telling it how to behave and react on events occurring in the battle arena. Battles are running in real-time and on-screen.	IBM Robocode, Computer	Daily Class Work Quizzes	20

Consumer Math

Curriculum Guide

Scranton School District

Scranton, PA

Consumer Math

Prerequisite : Geometry 11 or Applied Geometry 11

Intended Audience: This course is designed for the student who has successfully completed (Geometry 11 or Applied Geometry 11) by the end of the (eleventh) grade.

Course Description: This course is dedicated to real world applications of basic math concepts. This course is designed to expose students to facets of running their own household and prepare them for College Accuplacer and ASVAB tests.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Consumer Math	**Grade Level: 12**	**Date Completed: 2/2015**

1st Quarter

Topic	Resources	CCSS
Time	Consumer Math by Kathleen M. Harmeyer Judy clocks	**HSN.Q.A.1** **HSN.Q.A.2**
Money	Consumer Math by Kathleen M. Harmeyer Trays of play money	**HSN.Q.A.1** **HSN.Q.A.2**
Percents and Decimals	Consumer Math by Kathleen M. Harmeyer Tiles	**HSN.Q.A.1** **HSN.Q.A.2**

2nd Quarter

Topic	Resources	CCSS
Gross pay	Consumer Math by Kathleen M. Harmeyer	**8.F.4, HS.A-SSE.3.c, HS. A-CED.1, HS.A-CED.2, HS.A-CED.3,HS.A-CED.4, HS.A-REI.1HS.A-REI.2,HS.A-REI.3**
Net Pay	Consumer Math by Kathleen M. Harmeyer	**HS.F-BF.1,HS.F-LE.2,HS.F-LE.5**
Benefits	Consumer Math by Kathleen M. Harmeyer	**HS.A-REI.1,HS.A-REI.2, HS.A-REI.3,**
Paying taxes	Consumer Math by Kathleen M. Harmeyer	**HSN.Q.A.1** **HSN.Q.A.2**
Banking	Consumer Math by Kathleen M. Harmeyer Everfi.com	**HSN.Q.A.1** **HSN.Q.A.2**

3rd Quarter

Topic	Resources	CCSS
Owning A home	Consumer Math by Kathleen M. Harmeyer	**HSN.Q.A.1** **HSN.Q.A.2**
Area and Perimeter	Consumer Math by Kathleen M. Harmeyer Geo Boards	**HSN.Q.A.1** **HSN.Q.A.2**
Improving Your Home	Consumer Math by Kathleen M. Harmeyer	**HSG.MG.A.3** **HSN.Q.A.1** **HSN.Q.A.2**

4th Quarter

Topic	Resources	CCSS
Travel	Consumer Math by Kathleen M. Harmeyer	**HSN.Q.A.1** **HSN.Q.A.2**
Proportions And Unit Analysis	Consumer Math by Kathleen M. Harmeyer	**HSN.Q.A.1** **HSN.Q.A.2**
Working with Food	Consumer Math by Kathleen M. Harmeyer	**HSN.Q.A.1** **HSN.Q.A.2**
Review for Final	Consumer Math by Kathleen M. Harmeyer	

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
I. Time **A. Read an analog clock** **B. Elapsed time** **1. Counting** **2. Subtracting** **3. Borrowing Minutes** **4. Parking Expenses (pg 216)** **C. Elapsed time a.m. to p.m.** **1. Counting** **2. Subtracting** **3. Hours worked (pg 4)** **D. Military Time** **E. Food Preparation (pg 149)** **F. Introduction to Time Zones (pg 219)**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Mathematics by Kathleen Harmeyer** **Judy clocks**	**Teacher prepared tests, quizzes, etc.**	**15 Days**

II. Money **A. Value of denominations** **B. Rounding money** **C. Operations with money** **D. Buying Food (all 12 lessons of Chapter 2)** **E. Counting back change (pg 306 and 307)**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer** **Trays of play money**		**18 Days**

III. Percents and Decimals **A. Introduction to percents** **B. Given a percent multiply** **1. Sales tax (pg 304 and 305)** **2. Down Payments (pg 77)** **C. To find a percent divide** **1. Test Scores** **a) given number right** **b) given number wrong** **2. Budget** **a) Using budget guidelines to prepare a budget (pg 232)** **b) Balancing a budget (group effort) (pg239)** **c) What % of your net income was spent? (pg 235)** **d) two ways to make a budget** **3. RDA pg 136** **4. Property tax (pg 295 - 297)** **D. Percent of whole is part**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer** **Tiles**		**12 Days**

IV. Gross Pay (all 13 lessons of Chapter 1) **A. Hourly** **B. Salary** **C. Regular Pay** **D. Overtime pay** **1.Time worked** **2.Overtime** **3.Wages plus overtime** **E. Holiday Pay** **F. Tips** **G. Piecework** **H. Commission** **1. Straight Commission** **2. Graduated Commission** **3. Commission plus salary**	**8.F.4, HS.A-SSE.3.c,**	**Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.** **Use the properties of exponents to transform expressions for exponential functions. *For example the expression* 1.15^t *can be rewritten as* $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%*.**	**Consumer Math by Kathleen M. Harmeyer**		**18 Days (Includes a test for IV, V, and VI)**

	HS. A-CED.1, HS.A-CED.2, HS.A-CED.3, HS.A-CED.4,	**Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions*.** **Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.** **Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*.** **Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R*.**			

	HS.A-REI.1, HS.A-REI.2, HS.A-REI.3,	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.** **Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.** **Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**			

V. Net Pay **A. Federal Withholding Tax** **B. Social Security Tax** **C. Medicare Tax** **D. Total Deductions**	**HS.F-BF.1, HS.F-LE.2, HS.F-LE.5**	**Write a function that describes a relationship between two quantities.* Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). Interpret the parameters in a linear or exponential function in terms of a context.**	**Consumer Math by Kathleen M. Harmeyer**		**1 days**

VI. Benefits **A. Total job Benefits** **B. Net job Benefits** **C. Comparing Jobs**	**HS.A-REI.1, HS.A-REI.2, HS.A-REI.3,**	**Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.** **Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.** **Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**	**Consumer Math by Kathleen M. Harmeyer**		**3 Days**

VII. Paying Taxes (parts of Chapter 11) **A. Flat Income Taxes** **1. Scranton City Tax** **2. PA State Income Tax** **B. Graduated Income Taxes** **1. Federal Tax** **a) Exemptions and deductions (pg 287)** **b) Read the table (pg 289)** **c) Using a Tax Schedule (pg 291)** **C. Refund or Tax Due (pg 293)**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer**		**8 Days**

VIII. Banking (lessons 1 – 6 of Chapter 10) **A. Checking Accounts** **1.Comparing Checking accounts** **2. Deposits** **a) Endorsing Checks** **b) Deposit Slips** **c) Recoding deposits in the register** **3. Writing Checks** **a) Recording checks in the register** **4. (ATM) Electronic Banking** **a) Recording withdrawals in the register** **b) Recording purchases in the register** **5. Online banking** **a) Expected or pending Payments** **6. Reconciling a Register** **B. Savings Accounts** **1. Simple Interest** **2. Compound Interest** **3. Doubling your money**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Everfi.com** **Consumer Math by Kathleen M. Harmeyer**		**15 days**

IX. Owning a Home (lessons 1 – 5 of Chapter 4) **A. Borrowing to buy a home** **1. Bankers Rule (pg 74)** **2. Down Payments (pg 77)** **3. Closing Costs** **4. Mortgage Loan Interest Costs** **a) Finding monthly Payments** **b) Finding the total to be repaid** **c) Finding the Finance Charge** **5. Refinancing a mortgage** **B. Renting to Buy a home** **1. Renters rule (pg 72)** **2. Costs of Property Rental** **C. Comparing Renting and Owning a home**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer**		**15 Days**

X. Area and Perimeter – (Square/Rectangle/Triangle/Circle) **A. Perimeter** **B. Area** **C. Irregular Area** **D. Shaded Area** **E. Surface Area**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer** **Geo boards**		**15 Days**

XI. Improving your home (Chapter 7) **A. Insulation** **B. Covering the floor** **1. Tile** **C. Covering the walls** **1. Paint** **D. Molding** **E. Additions** **F. Furniture** **1. Cash** **2. 90 day same as cash** **a) Using calendars to count days** **3. Lay-A-Way** **4. Credit card** **5. Rent to own** **G. Seeding and Feeding a lawn** **H. Fencing the yard**	**HSG.MG.A.3** **HSN.Q.A.1** **HSN.Q.A.2**	**Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).** **Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer**		**15 Days**

XII. Travel (Chapter 8) **A. By Car** **1. Reading a map** **2. Estimating distances** **3. Map quest** **2. Google Earth** **3. Renting a car** **4. Parking Expenses** **B. Taxi and Limousine Services** **C. By Bus** **1. Reading a Bus schedule** **2. Computing Bus fare** **D. By Subway** **1. Reading a subway schedule** **E. By Airplane** **F. On a Cruise** **G. Staying in a hotel** **1. Cost for season** **a) calendars to tell elapsed time** **2. Concierge and Staff you might meet** **3. Room Service and Wakeup calls** **H. Package Deals**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer**		**20 Days**

XIII. Proportions and Unit analysis **A. Discovering Ratios** **B. Discovering Proportions** **C. Using Unit Analysis**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer**		**5 days**

XIV. Working with Food (parts of Chapter 6) **A. The Key to Ratio** **B. The key to Proportions** **C. Finding Calories with Proportions** **D. Fat grams and Calories** **E. Nutritional Information** **a) reading labels** **b) pg 135** **F. Using Calories** **G. Losing Pounds** **H. Changing Recipe Yields** **I. Timing Food Preparation**	**HSN.Q.A.1** **HSN.Q.A.2**	**Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **Define appropriate quantities for the purpose of descriptive modeling.**	**Consumer Math by Kathleen M. Harmeyer**		**12 Days**
XV. Review for Final Exam					**6 days**

Elementary Analysis

Curriculum Guide

Scranton School District

Scranton, PA

Elementary Analysis

Prerequisite : Algebra II/Trigonometry

Elementary Analysis is an advanced course in mathematics. The major topics in this course are quadratic equations, coordinate geometry, polynomial algebra, theory of equations, inequalities, functions, exponents, advanced graphing techniques, conics, trigonometry and its applications, polar coordinates, vector operations, series, matrices, and probability. After successful completion of this course the students will be allowed to enroll in Calculus or Calculus Honors if the Scranton School District Criteria for enrollment in Honors classes is met.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Elementary Analysis	Grade Level: 11,12	Date Completed: 2/1/15

1st Quarter

Topic	Resources	CCSS
FUNDAMENTALS/REVIEW **Linear Functions**	**Advanced Mathematics Text** **Chapter 1-1, 1-2, 1-3, 1-4, 1-8** **Graphing Calculators**	**A1.2.2.1.3** **HSA.REI.C.5** **HSA.REI.C.6** **HSF.BF.A.1** **HSF.BF.A.1.a**
THE COMPLEX NUMBER SYSTEM **Perform arithmetic operations with complex numbers.**	**Advanced Mathematics Text** **Chapter 1-5** **Graphing Calculators**	**HSN.CN.A.1** **HSN.CN.A.2** **HSN.CN.A.3**
INTERPRETING FUNCTIONS **Analyze functions using different representations.**	**Advanced Mathematics Text** **1-1, 1-4, 1-6, 1-7** **Chapter 2 (excluding 2-7)** **Chapter 3 (excluding 3-4)** **Graphing Calculators**	**HSF.IF.C.7** **HSF.IF.C.7.a** **HSF.IF.C.7.c**

2nd Quarter

Topic	Resources	CCSS
INTERPRETING FUNCTIONS **Analyze functions using different representations.**	**Advanced Mathematics Text** **4-1, 4-7** **Chapter 5** **Glossary (p.882)** **Graphing Calculators**	**HSF.IF.C.7.d** **HSF.IF.C.7.b** **A2.1.2.1.3** **HSF.IF.C.7.e** **HSF.IF.C.8** **HSF.BF.A.1** **HSF.BF.A.1.a** **HSF.BF.A.1.b** **HSF.BF.A.1.c** **HSF.IF.C.8.a** **HSF.IF.C.8.b** **HSF.IF.C.9**
BUILDING FUNCTIONS **Build new functions from existing functions**	**Advanced Mathematics Text** **4-2, 4-3, 4-4, 4-5** **5-3, 5-4, 5-5, 5-6** **Graphing Calculators**	**HSF.BF.B.3** **HSF.BF.B.4** **HSF.BF.B.4.a** **HSF.BF.B.4.b** **HSF.BF.B.4.c** **HSF.BF.B.4.d** **HSF.BF.B.5**

3rd Quarter

Topic	Resources	CCSS
TRIGONOMETRIC FUNCTIONS **Extend the domain of trigonometric functions using the unit circle**	**Advanced Mathematics Text** **Chapter 7** **Graphing Calculators**	**HSF.TF.A.1** **HSF.TF.A.2** **HSF.TF.A.3** **HSF.TF.A.4**
Model periodic phenomena with trigonometric functions	**Advanced Mathematics Text** **8-2, 8-3** **Graphing Calculators**	**HSF.TF.B.5** **HSF.TF.B.6** **HSF.TF.B.7**
Prove and apply trigonometric identities	**Advanced Mathematics Text** **8-1, 8-4, 8-5** **Chapter 9** **10-3** **Graphing Calculators**	**HSF.TF.C.8**
EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS **Translate between the geometric description and the equation for a conic section**	**Advanced Mathematics Text** **6-1 to 6-5** **Graphing Calculators**	**HSG.GPE.A.1** **HSG.GPE.A.2** **HSG.GPE.A.3** **HSA.REI.C.7**

4th Quarter

Topic	Resources	CCSS
SEQUENCES AND SERIES **Build a function that models a relationship between two quantities**	**Advanced Mathematics Text** **13-1, 13-2, 13-3** **Graphing Calculators**	**HSF.BF.A.2**
USING PROBABILITY TO MAKE DECISIONS **Calculate expected values and use them to solve problems**	**Advanced Mathematics Text** **16-1, 16-2, 16-4, 16-6** **Graphing Calculators**	**A2.2.3.2.1** **A2.2.3.2.3** **HSS.MD.A.2** **HSS.MD.B.5.a**
VECTOR QUANTITIES AND MATRICES **Perform operations on vectors**	**Advanced Mathematics Text** **12-1, 12-2** **Graphing Calculators**	**HSN.VM.B.4** **HSN.VM.B.4.a** **HSN.VM.B.4.b** **HSN.VM.B.4.c** **HSN.VM.B.5** **HSN.VM.B.5.a**
Perform operations on matrices and use matrices in applications	**Advanced Mathematics Text** **14-1, 14-2, 14-3, 14-4** **Graphing Calculators**	**HSN.VM.C.6** **HSN.VM.C.7** **HSN.VM.C.8** **HSN.VM.C.9** **HSN.VM.C.10** **HSA.REI.C.8** **HSA.REI.C.9**
REPRESENT COMPLEX NUMBERS AND THEIR OPERATIONS ON THE COMPLEX PLANE	**Advanced Mathematics Text** **11-1, 11-2** **Graphing Calculators**	**HSN.CN.B.4**
Final Exams and Reviews		

******Note: Italicized blue text designates SSD Elementary Analysis topics that are currently covered (and should continue to be) but are NOT listed in the Common Core State Mathematics Standards.***

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
FUNDAMENTALS/ REVIEW **Linear Functions**	**A1.2.2.1.3** **HSA.REI.C.5** **HSA.REI.C.6** **HSF.BF.A.1** **HSF.BF.A.1.a**	**Write or identify a linear equations when given: the graph of a line, two points on a line, the slope and point on the line, and parallel and perpendicular lines** **Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.** **Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.** **Write a function that describes a relationship between two quantities.** **Determine an explicit expression, a recursive process, or steps for calculation from a context.**	**Advanced Mathematics Text Chapter 1-1, 1-2, 1-3, 1-4, 1-8** **Graphing Calculators**	**Teacher prepared tests, quizzes, etc.**	**15 days**
THE COMPLEX NUMBER SYSTEM **Perform arithmetic operations with complex numbers.**	**HSN.CN.A.1** **HSN.CN.A.2** **HSN.CN.A.3**	**Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form *a + bi* with *a* and *b* real.** **Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.** **(+) Find the conjugate of a complex number.**	**Advanced Mathematics Text 1-5** **Graphing Calculators**		**3 days**

INTERPRETING FUNCTIONS **Analyze functions using different representations.**	**HSF.IF.C.7** **HSF.IF.C.7.a** **HSF.IF.C.7.c** **HSF.IF.C.7.d** **HSF.IF.C.7.b** **A2.1.2.1.3** **HSF.IF.C.7.e** **HSF.IF.C.8**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.** **Graph linear and quadratic functions and show intercepts, maxima, and minima.** **Solve and graph polynomial functions/inequalities, identifying zeros when suitable factorizations are available, and showing end behavior.** **(+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.** **Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.** **Simplify/evaluate expressions involving real exponents including multiplying with exponents, powers of powers, and powers of products** **Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.** **Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.**	**Advanced Mathematics Text** **1-1, 1-4, 1-6, 1-7** **Chapter 2 (excluding 2-7)** **Chapter 3 (excluding 3-4)** **4-1, 4-7** **Chapter 5** **Glossary (p.882)** **Graphing Calculators**		**45 days**

Analyze functions using different representations.	**HSF.BF.A.1**	**Write a function that describes a relationship between two quantities.**			
	HSF.BF.A.1.a	**Determine an explicit expression, a recursive process, or steps for calculation from a context.**			
	HSF.BF.A.1.b	**Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model*.**			
	HSF.BF.A.1.c	**(+) Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time*.**			
	HSF.IF.C.8.a	**Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.**			
	HSF.IF.C.8.b	**Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay.**			
	HSF.IF.C.9	**Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum*.**			

BUILDING FUNCTIONS **Build new functions from existing functions**	**HSF.BF.B.3**	**Identify the effect on the graph of replacing *f*(*x*) by *f*(*x*) + *k*, *k f*(*x*), *f*(*kx*), and *f*(*x* + *k*) for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.**	**Advanced Mathematics Text** **4-2, 4-3, 4-4, 4-5** **5-3, 5-4, 5-5, 5-6** **Graphing Calculators**		**30 days**
	HSF.BF.B.4	**Find inverse functions.**			
	HSF.BF.B.4.a	**Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example, f(x) =2 x^3 or f(x) = (x+1)/(x-1) for x ≠ 1*.**			
	HSF.BF.B.4.b	**(+) Verify by composition that one function is the inverse of another.**			
	HSF.BF.B.4.c	**(+) Read values of an inverse function from a graph or a table, given that the function has an inverse.**			
	HSF.BF.B.4.d	**(+) Produce an invertible function from a non-invertible function by restricting the domain.**			
	HSF.BF.B.5	**(+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.**			

TRIGONOMETRIC FUNCTIONS **Extend the domain of trigonometric functions using the unit circle**	**HSF.TF.A.1** **HSF.TF.A.2** **HSF.TF.A.3** **HSF.TF.A.4**	**Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.** **Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.** ***Graph all 6 trigonometric functions including transformations of sine, cosine, and tangent functions.*** **(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for *x*, π + *x*, and 2π - *x* in terms of their values for *x*, where *x* is any real number.** **(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.**	**Advanced Mathematics Text** **Chapter 7** **Graphing Calculators**		**34 days**
Model periodic phenomena with trigonometric functions	**HSF.TF.B.5** **HSF.TF.B.6** **HSF.TF.B.7**	**Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.** **(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.** **(+) Use inverse functions to solve trigonometric equations; evaluate the solutions using technology.**	**Advanced Mathematics Text** **8-2, 8-3** **Graphing Calculators**		

Prove and apply trigonometric identities	**HSF.TF.C.8**	**Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant of the angle.** ***Simplify trigonometric expressions/prove and solve trigonometric equations*** ***Use the Law of Sines and Law of Cosines to find unknown parts of a triangle*** ***Prove the double angle formulas for sine and cosine and use them to solve problems.***	**Advanced Mathematics Text** **8-1, 8-4, 8-5** **Chapter 9** **10-3** **Graphing Calculators**		
EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS **Translate between the geometric description and the equation for a conic section**	**HSG.GPE.A.1** **HSG.GPE.A.2** **HSG.GPE.A.3** **HSA.REI.C.7**	**Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.** **Derive the equation of a parabola given a focus and directrix.** **(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.** **Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.**	**Advanced Mathematics Text** **6-1 to 6-5** **Graphing Calculators**		**10 days**

SEQUENCES AND SERIES **Build a function that models a relationship between two quantities**	**HSF.BF.A.2**	**Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.**	**Advanced Mathematics Text 13-1, 13-2, 13-3 Graphing Calculators**		**5 days**
USING PROBABILITY TO MAKE DECISIONS **Calculate expected values and use them to solve problems**	**A2.2.3.2.1** **A2.2.3.2.3** **HSS.MD.A.2** **HSS.MD.B.5.a**	**Use Combinations, permutations, and The Fundamental Counting Principle to solve problems.** **Use probability for independent, dependent, or compound events to predict outcomes.** **(+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.** **Find the expected payoff for a game of chance. *For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.***	**Advanced Mathematics Text 16-1, 16-2, 16-4, 16-6** **Graphing Calculators**		**10 days**

VECTOR QUANTITIES AND MATRICES **Perform operations on vectors**	**HSN.VM.B.4** **HSN.VM.B.4.a** **HSN.VM.B.4.b** **HSN.VM.B.4.c** **HSN.VM.B.5** **HSN.VM.B.5.a**	**(+) Add and subtract vectors.** **Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.** **Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.** **Understand vector subtraction v - w as v + (-w), where -w is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.** **(+) Multiply a vector by a scalar.** **Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.**	**Advanced Mathematics Text** **12-1, 12-2** **Graphing Calculators**		**13 days**

Perform operations on matrices and use matrices in applications	**HSN.VM.C.6** **HSN.VM.C.7** **HSN.VM.C.8** **HSN.VM.C.9** **HSN.VM.C.10** **HSA.REI.C.8** **HSA.REI.C.9**	**(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.** **(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.** **(+) Add, subtract, and multiply matrices of appropriate dimensions.** **(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.** **(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.** **(+) Represent a system of linear equations as a single matrix equation in a vector variable.** **(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).**	**Advanced Mathematics Text 14-1, 14-2, 14-3, 14-4** **Graphing Calculators**		
REPRESENT COMPLEX NUMBERS AND THEIR OPERATIONS ON THE COMPLEX PLANE	**HSN.CN.B.4**	**(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.**	**Advanced Mathematics Text 11-1, 11-2** **Graphing Calculators**		**5 days**

Final Exams and Reviews					**10 days**

Please note: (+) Indicates content used in additional courses beyond Algebra II.

Geometry 10 and Geometry 11

Curriculum Guide

Scranton School District

Scranton, PA

Geometry 10 and Geometry 11

Prerequisite : Successful completion of Algebra I

Intended Audience: This course is designed for the student who has successfully completed Algebra I by the end of the 9th or 10th grade.

Geometry 10 is the course 10th grade students take after Algebra I, while Geometry 11 is designed for those eleventh grade students who have completed Algebra I at the end of their sophomore year. These courses are designed to emphasize the study of the properties and applications of common two and three dimensional geometric figures. These courses formalize what students have learned about geometry in the middle grades, with a concentration on mathematical reasoning, including exposure to formal proofs. Topics covered focus on the Pennsylvania Common Core Standards and include, but are not limited to: coordinate geometry, perimeter, area, surface area and volume, congruent and similar triangles, right triangles, quadrilaterals, and circles. After successfully completing Geometry 10 or Geometry 11, students will be allowed to enroll in Algebra 2 or Algebra 2/Trigonometry.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Geometry 10 and Geometry 11	**Grade Level: 10th and 11th**	**Date Completed: Oct 2014**

1st Quarter

Topic	Resources	CCSS
Basic Terms and Coordinate Geometry	Big Ideas Geometry 1.1 - 1.3	G.2.1.2.1, G.2.1.2.2, G.2.1.2.3
Perimeter and Area in the Coordinate Plane	Big Ideas Geometry 1.4	G.2.2.2.1, G.2.2.2.2, G.2.2.2.4, G.2.2.2.5, G.2.2.3.1, G.2.2.4.1
Angles	Big Ideas Geometry 1.5 - 1.6, 5.1, 7.1	G.2.2.1.1, G.2.2.1.2, G.1.2.1.4
Parallel and Perpendicular Lines	Big Ideas Geometry 3.1- 3.5	G.2.2.1.2, G.2.1.2.2

2nd Quarter

Topic	Resources	CCSS
Reasoning and Proof	Big Ideas Geometry 2.4 – 2.6	G.1.3.2.1
Congruent Triangles	Big Ideas Geometry 5.2 – 5.7	G.1.2.1.1, G.1.2.1.3, G.1.3.1.1, G.1.3.2.1
Relationships Within Triangles	Big Ideas Geometry 6.1, 6.2 – 6.5	G.1.2.1.1

3rd Quarter

Topic	Resources	CCSS
Similar Triangles	Big Ideas Geometry 8.1 – 8.4	G.1.3.1.2, G.1.3.1.1
Right Triangles and Trigonometry	Big Ideas Geometry 9.1 – 9.5	G.2.1.1.1, G.2.1.1.2
Quadrilaterals and Their Area	Big Ideas Geometry 7.2 – 7.5	G.2.1.2.3, G.1.2.1.2, G.2.2.2.2, G.2.2.2.3,

4th Quarter

Topic	Resources	CCSS
Circles	Big Ideas Geometry 10.1 – 10.6	G.1.1.1.1, G.1.1.1.2, G.1.1.1.3
Circumference, Area, and Volume	Big Ideas Geometry 11.1 – 11.2, 11.4 – 11.8	G.1.1.1.2, G.2.2.2.5, G.1.1.1.4, G.1.2.1.5, G.2.3.1.1, G.2.3.1.2, G.2.3.1.3, G.2.3.2.1, G.2.2.4.1
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Basic Terms And Coordinate Geometry	**G.2.1.2.1**	*Name points, lines, planes, segments, and rays. Use the Ruler and Segment Addition Postulate.* **Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Using the Midpoint and Distance Formula.*	**Big Ideas Geometry 1.1 – 1.2** **Big Ideas Geometry 1.3** **http://departments.jordandistrict.org/curriculum/mathematics/secondary/impact/Algebra/Alg%208%20Geometry%20in%20Algebra/Alg8.4Solving%20for%20the%20midpoint.pdf**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)** **bigideasmath.com (Optional)**	**12 days**

Perimeter and Area in the Coordinate Plane	**G.2.2.2.1** **G.2.2.2.4**	**Estimate area, perimeter or circumference of an irregular figure.** *Using area, perimeter, and circumference formulas in the coordinate plane.* **Develop and/or use strategies to estimate the area of a compound/composite figure.**	**Big Ideas Geometry 1.4** **http://shodor.org/interactivate-java/activities/ShapeBuilder/**		**8 days**
Angles		*Name, measure and classify angles. Identify congruent angles.*	**Big Ideas Geometry 1.5**		**10 days**
	G.2.2.1.1	**Use properties of angles formed by intersecting lines to find the measures of missing angles.** *Complementary, Supplementary, and Vertical Angles.*	**Big Ideas Geometry 1.6** **http://www.palmbeachschools.org/students/Grade12/GeometryActivity2.pdf**		
	G.1.2.1.1	**Identify and/or use properties of triangles.** *Triangle Sum and Exterior Angle Theorems.*	**Big Ideas Geometry 5.1**		

	G.1.2.1.4	**Identify and/or use properties of regular polygons.** *Interior and Exterior Angle Theorems.*	**Big Ideas Geometry 7.1** **http://illuminations.nctm.org/Activity.aspx?id=3546**		
Parallel and Perpendicular Lines	**G.2.2.1.2**	*Review and identify pairs of lines.* **Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.**	**Big Ideas Geometry 3.1** **Big Ideas Geometry 3.2-3.3, 5.1**		**15 days**
	G.2.1.2.2	**Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).** *Identify parallel and perpendicular lines. Write equations of parallel and perpendicular lines.*	**Big Ideas Geometry 3.4-3.5**		

Reasoning and Proofs	**G.1.3.2.1**	*Use Algebraic Properties of Equality to justify the steps in solving an equation in a two-column proof.* **Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction.)** *Use properties of equality involving segment lengths and angle measures to complete two-column proofs.*	**Big Ideas Geometry 2.4** **Big Ideas Geometry 2.5-2.6**		**15 days**
Congruent Triangles	**G.1.3.1.1**	**Identify and/or use properties of congruent polygons or solids.** *Identify and use corresponding parts.*	**Big Ideas Geometry 5.2**		**20 days**
	G.1.2.1.3	**Identify and/or use properties of isosceles and equilateral triangles.** *Use the Base Angles Theorems.*	**Big Ideas Geometry 5.4**		

	G.1.3.2.1	**Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction).** *Proving triangles congruent using the SAS, SSS, HL, ASA and AAS Congruence Theorems.*	**Big Ideas Geometry 5.3, 5.5, 5.6** **http://www.lcps.org/cms/lib4/VA01000195/Centricity/Domain/1445/Geo%20G.6%20Chapter%204%20Congruent%20Triange%20Lab%20WS%20PDF.pdf**		
Relationships Within Triangles	**G.1.2.1.1**	**Identify and/or use properties of triangles.** *Identify and/or use properties of medians, altitudes, and perpendicular bisectors.* *Use midsegments in the coordinate plane and the Triangle Midsegment Theorem to find distance.* *Use Triangle Inequality Theorem.*	**Big Ideas Geometry 6.1, 6.3** **Big Ideas Geometry 6.4** **Big Ideas Geometry 6.5** **http://www.glencoe.com/sites/common_assets/support_pages/MC_Course3/Triangle_Inequality.pdf**		**10 days**

Similar Triangles	**G.1.3.1.1** **G.1.3.1.2**	**Identify and/or use properties of similar polygons or solids.** *Use the Triangle Similarity Theorems to solve real-life problems.* **Identify and/or use proportional relationships in similar figures.**	**Big Ideas Geometry 8.1** **Big Ideas Geometry 8.2-8.3** **Big Ideas Geometry 8.4**		**15 days**
Right Triangles and Trigonometry	**G.2.1.1.1**	**Use the Pythagorean Theorem to write and/or solve problems involving right triangles.** *Find side lengths in special right triangles and solve real-life problems.* *Use the geometric mean to solve problems involving similar right triangles.*	**Big Ideas Geometry 9.1** **http://www.cimt.plymouth.ac.uk/projects/mepres/book8/y8s3act.pdf** **Big Ideas Geometry 9.2** **Big Ideas Geometry 9.3**		**15 days**

	G.2.1.1.2	**Use trigonometric ratios to write and/or solve problems involving right triangles.**	**Big Ideas Geometry 9.4-9.5** **http://en.wikibooks.org/wiki/High_School_Trigonometry/Applications_of_Right_Triangle_Trigonometry** **http://jwilson.coe.uga.edu/emt668/emat6680.folders/brooks/6690stuff/righttriangle/Applications.html**		
Quadrilaterals And Their Areas	**G.1.2.1.2**	**Identify and/or use properties of quadrilaterals.** *Use properties of trapezoids and the Trapezoid Midsegment Theorem to find distances.*	**Big Ideas Geometry 7.2, 7.4, 7.5** **http://illuminations.nctm.org/Lesson.aspx?id=1992** **Big Ideas Geometry 7.5**		**15 days**
	G.2.1.2.3	**Use slope, distance and/or midpoint between 2 points on a coordinate plane to establish properties of a 2-dimensional shape.**	**Big Ideas Geometry 7.3, 7.4**		

	G.2.2.2.2	**Find the measurement of a missing length given the perimeter, circumference, or area. Use formulas for quadrilaterals.**			
	G.2.2.2.3	**Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon.** *Use formulas for quadrilaterals.*	**http://map.mathshell.org/materials/download.php?fileid=1226**		
	G.2.2.3.1	**Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area. (e.g., How does changing the length of the radius of a circle affect the circumference of the circle?).** *Use formulas for quadrilaterals.*	**http://www.ssms.scps.k12.fl.us/Portals/104/assets/pdf/Math%207th%20garde/Change%20in%20geometric%20dimensions.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf**		

Circles	**G.1.1.1.1**	**Identify, determine and/or use the radius, diameter, segment and/or tangent of a circle.**	**Big Ideas Geometry 10.1** **http://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/9-12/PiLine-AS-Slope.pdf**		**15 days**
	G.1.1.1.2	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find arc measures.*	**Big Ideas Geometry 10.2**		

	G.1.1.1.3	**Use chords, tangents, and secants to find missing arc measures or missing segment measures.** *Use Chord Theorems to find lengths and arc measures.* *Use inscribed angles and inscribed polygons to find angle and arc measures.* *Use circumscribed angles to find angle and arc measures.* *Use chords, tangents, and secants to find missing segment measures.*	**Big Ideas Geometry 10.3** **Big Ideas Geometry 10.4** **Big Ideas Geometry 10.5** **Big Ideas Geometry 10.6** **http://www.nsa.gov/academia/_files/collected_learning/high_school/geometry/tangents_scants_chords.pdf** **http://illuminations.nctm.org/Lesson.aspx?id=2417**		

Circumference, Area, and Volume	**G.1.1.1.2**	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find circumference and use arc length to find measures and solve real-life problems.*	**Big Ideas Geometry 11.1**		**20 days**
	G.2.2.2.5	**Find the area of a sector of a circle.**	**Big Ideas Geometry 11.2** **http://www.regentsprep.org/Regents/math/geometry/GP14/CircleSectors.htm**		
	G.1.2.1.5 **G.1.1.1.4**	**Identify and/or use properties of pyramids and prisms.** **Identify and/or use the properties of a sphere or cylinder.** *Include Pythagorean Theorem and Special Right Triangles when finding missing measures.*	**Big Ideas Geometry 11.4**		

	G.2.3.1.2	**Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.5-11.8** **http://intermath.coe.uga.edu/tweb/gwin1-01/luce/SAV/SAVRes.html**		
	G.2.3.1.1	**Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.**	**Big Ideas Geometry 11.7-11.8** **http://www.mybookezzz.org/surface-area-hands-on-activity/**		
	G.2.3.1.3	**Find the measurement of a missing length given the surface area or volume.**	**http://illuminations.nctm.org/Lesson.aspx?id=2911**		
	G.2.3.2.1	**Describe how a change in the linear dimension of a figure affects its surface area or volume. (e.g., How does changing the length of the edge of a cube affect the volume of the cube?).**	**http://www.shodor.org/interactivate/lessons/SurfaceAreaAndVolume/** **http://www.k12.wa.us/mathematics/MathAve/Landscaping/Assessment.pdf**		
	G.2.2.4.1	**Use area models to find probabilities.**			

Final Exam Review					**10 days**

Geometry 9

Curriculum Guide

Scranton School District

Scranton, PA

Geometry 9

Prerequisite:

- Successful completion of Algebra I

Intended Audience: This course is designed for the 9th grade student who has successfully completed Algebra I by the end of 8th grade and does not meet the requirements to enroll in the Honors Geometry course.

Geometry 9 is the course 9th grade students take after Algebra I, if they do not meet the requirements to enroll in the Honors Geometry course. Depth, breadth, and pace of this course is accelerated. This course is designed to emphasize the study of the properties and applications of common two and three dimensional geometric figures. This course formalizes what students have learned about geometry in the middle grades, with a concentration on mathematical reasoning, including exposure to formal proofs. Topics covered focus on the Pennsylvania Core Standards and include, but are not limited to: coordinate geometry, perimeter, area, surface area and volume, congruent and similar triangles, right triangles, quadrilaterals, and circles. After successfully completing the course, students will be allowed to enroll in Algebra II/Trigonometry.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Geometry 9	**Grade Level: 9th**	**Date Completed: Oct 2014**

1st Quarter

Topic	Resources	CCSS
Basic Terms and Coordinate Geometry	Big Ideas Geometry 1.1-1.3	G.2.1.2.1, G.2.1.2.2, G.2.1.2.3
Perimeter and Area in the Coordinate Plane	Big Ideas Geometry 1.4	G.2.2.2.1, G.2.2.2.2, G.2.2.2.4, G.2.2.2.5,
Angles	Big Ideas Geometry 1.5-1.6, 5.1, 7.1	G.2.2.1.1, G.2.2.1.2, G.1.2.1.4
Parallel and Perpendicular Lines	Big Ideas Geometry 3.1-3.5	G.2.2.1.2, G.2.1.2.2

2nd Quarter

Topic	Resources	CCSS
Reasoning and Proof	Big Ideas Geometry 2.4-2.6, 3.3, 3.4	G.1.3.2.1
Congruent Triangles	Big Ideas Geometry 5.2-5.7,	G.1.2.1.1, G.1.2.1.3, G.1.3.1.1, G.1.3.2.1
Relationships Within Triangles	Big Ideas Geometry 6.1, 6.3-6.5, 5.8	G.1.2.1.1

3rd Quarter

Topic	Resources	CCSS
Similar Triangles	Big Ideas Geometry 8.1-8.4	G.1.3.1.2, G.1.3.1.1
Right Triangles and Trigonometry	Big Ideas Geometry 9.1-9.5	G.2.1.1.1, G.2.1.1.2
Quadrilaterals and Their Area	Big Ideas Geometry 7.2-7.5	G.2.1.2.3, G.1.2.1.2, G.2.2.2.2, G.2.2.2.3, G.2.2.3.1

4th Quarter

Topic	Resources	CCSS
Circles	Big Ideas Geometry 10.1-10.6	G.1.1.1.1, G.1.1.1.2, G.1.1.1.3
Circumference, Area, and Volume	Big Ideas Geometry 11.1, 11.2, 11.4-11.8	G.1.1.1.2, G.2.2.2.5, G.1.1.1.4, G.1.2.1.5, G.2.3.1.1, G.2.3.1.2, G.2.3.1.3, G.2.3.2.1, G.2.2.4.1
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Basic Terms And Coordinate Geometry	**G.2.1.2.1**	*Name points, lines, planes, segments, and rays. Use the Ruler and Segment Addition Postulate.* **Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Relate distance formula to Pythagorean Theorem.*	**Big Ideas Geometry 1.1 – 1.2** **Big Ideas Geometry 1.3** **http://departments.jordandistrict.org/curriculum/mathematics/secondary/impact/Algebra/Alg%208%20Geometry%20in%20Algebra/Alg8.4Solving%20for%20the%20midpoint.pdf**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)** **bigideasmath.com (Optional)**	**12 days**
Perimeter and Area in the Coordinate Plane	**G.2.2.2.1** **G.2.2.2.4**	**Estimate area, perimeter or circumference of an irregular figure.** *Using area, perimeter, and circumference formulas.* **Develop and/or use strategies to estimate the area of a compound/composite figure.**	**Big Ideas Geometry 1.4** **http://shodor.org/interactivate-java/activities/ShapeBuilder/**		**8 days**

Angles		*Name, measure and classify angles. Identify congruent angles.*	**Big Ideas Geometry 1.5**		**10 days**
	G.2.2.1.1	**Use properties of angles formed by intersecting lines to find the measures of missing angles.** *Complementary, Supplementary, and Vertical Angles.*	**Big Ideas Geometry 1.6** **http://www.palmbeachschools.org/students/Grade12/GeometryActivity2.pdf**		
	G.1.2.1.1	**Identify and/or use properties of triangles.** *Triangle Sum and Exterior Angle Theorems.*	**Big Ideas Geometry 5.1**		
	G.1.2.1.4	**Identify and/or use properties of regular polygons.** *Interior and Exterior Angle Theorems.*	**Big Ideas Geometry 7.1** **http://illuminations.nctm.org/Activity.aspx?id=3546**		

Parallel and Perpendicular Lines	**G.2.2.1.2**	*Review and identify pairs of lines.* **Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.**	**Big Ideas Geometry 3.1** **Big Ideas Geometry 3.2-3.3**		**15 days**
	G.2.1.2.2	**Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).** *Identify parallel and perpendicular lines.* *Write equations of parallel and perpendicular lines.*	**Big Ideas Geometry 3.4-3.5**		

Reasoning and Proofs	**G.1.3.2.1**	*Use Algebraic Properties of Equality to justify the steps in solving an equation in a two-column proof.* **Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction.)** *Use properties of equality involving segment lengths and angle measures to complete two-column proofs.* *Complete two-column proofs using parallel and perpendicular lines.*	**Big Ideas Geometry 2.4** **Big Ideas Geometry 2.5-2.6** **Big Ideas Geometry 3.3-3.4**		**15 days**
Congruent Triangles	**G.1.3.1.1**	**Identify and/or use properties of congruent polygons or solids.** *Identify and use corresponding parts.*	**Big Ideas Geometry 5.2**		**20 days**

	G.1.2.1.3	**Identify and/or use properties of isosceles and equilateral triangles.** *Use the Base Angles Theorems.*	**Big Ideas Geometry 5.4**		
	G.1.3.2.1	**Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction).** *Proving triangles congruent using the SAS, SSS, HL, ASA and AAS Congruence Theorems.* *Using Congruent Triangles.* ***Increased emphasis on proofs including overlapping triangles, two pairs of congruent triangles, and isosceles/equilateral triangles.*	**Big Ideas Geometry 5.3, 5.5, 5.6** **http://www.lcps.org/cms/lib4/VA01000195/Centricity/Domain/1445/Geo%20G.6%20Chapter%204%20Congruent%20Triange%20Lab%20WS%20PDF.pdf** **Big Ideas Geometry 5.7**		

Relationships Within Triangles	**G.1.2.1.1**	**Identify and/or use properties of triangles.** *Identify and/or use properties of medians, altitudes, and perpendicular bisectors.* *Use midsegments in the coordinate plane and the Triangle Midsegment Theorem to find distance.* *Use Triangle Inequality Theorem.*	**Big Ideas Geometry 6.1, 6.3** **Big Ideas Geometry 6.4** **Big Ideas Geometry 6.5** **http://www.glencoe.com/sites/common_assets/support_pages/MC_Course3/Triangle_Inequality.pdf**		**10 days**
	G.2.1.2.1	**Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Use properties of triangles in coordinate proofs.*	**Big Ideas Geometry 5.8**		

Similar Triangles	**G.1.3.1.1** **G.1.3.1.2**	**Identify and/or use properties of similar polygons or solids.** *Use the Triangle Similarity Theorems to solve real-life problems.* **Identify and/or use proportional relationships in similar figures.**	**Big Ideas Geometry 8.1** **Big Ideas Geometry 8.2-8.3** **Big Ideas Geometry 8.4**		**15 days**
Right Triangles and Trigonometry	**G.2.1.1.1**	**Use the Pythagorean Theorem to write and/or solve problems involving right triangles.** *Find side lengths in special right triangles and solve real-life problems.* *Use the geometric mean to solve problems involving similar right triangles.*	**Big Ideas Geometry 9.1** **http://www.cimt.plymouth.ac.uk/projects/mepres/book8/y8s3act.pdf** **Big Ideas Geometry 9.2** **Big Ideas Geometry 9.3**		**15 days**

	G.2.1.1.2	**Use trigonometric ratios to write and/or solve problems involving right triangles.**	**Big Ideas Geometry 9.4-9.5** **http://en.wikibooks.org/wiki/High_School_Trigonometry/Applications_of_Right_Triangle_Trigonometry** **http://jwilson.coe.uga.edu/emt668/emat6680.folders/brooks/6690stuff/righttriangle/Applications.html**		
Quadrilaterals And Their Areas	**G.1.2.1.2**	**Identify and/or use properties of quadrilaterals.** ***Include proofs using properties of quads and proofs determining type of special quadrilateral.* *Use properties of trapezoids and the Trapezoid Midsegment Theorem to find distances.*	**Big Ideas Geometry 7.2, 7.4, 7.5** **http://illuminations.nctm.org/Lesson.aspx?id=1992** **Big Ideas Geometry 7.5**		**15 days**
	G.2.1.2.3	**Use slope, distance and/or midpoint between 2 points on a coordinate plane to establish properties of a 2-dimensional shape.**	**Big Ideas Geometry 7.3, 7.4**		

	G.2.2.2.2	**Find the measurement of a missing length given the perimeter, circumference, or area.** *Use formulas for quadrilaterals.*			
	G.2.2.2.3	**Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon.** *Use formulas for quadrilaterals.*	**http://map.mathshell.org/materials/download.php?fileid=1226**		
	G.2.2.3.1	**Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area. (e.g., How does changing the length of the radius of a circle affect the circumference of the circle?).** *Use formulas for quadrilaterals.*	**http://www.ssms.scps.k12.fl.us/Portals/104/assets/pdf/Math%207th%20garde/Change%20in%20geometric%20dimensions.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf**		

Circles	**G.1.1.1.1**	**Identify, determine and/or use the radius, diameter, segment and/or tangent of a circle.** ***Include proofs using properties of circles.*	**Big Ideas Geometry 10.1** **http://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/9-12/PiLine-AS-Slope.pdf**		**15 days**
	G.1.1.1.2	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.**	**Big Ideas Geometry 10.2**		

	G.1.1.1.3	**Use chords, tangents, and secants to find missing arc measures or missing segment measures.** *Use Chord Theorems to find lengths and arc measures.* *Use inscribed angles and inscribed polygons to find angle and arc measures.* *Use circumscribed angles to find angle and arc measures.* *Use chords, tangents, and secants to find missing segment measures.*	**Big Ideas Geometry 10.3** **Big Ideas Geometry 10.4** **Big Ideas Geometry 10.5** **Big Ideas Geometry 10.6** **http://www.nsa.gov/academia/_files/collected_learning/high_school/geometry/tangents_scants_chords.pdf**		

Circumference, Area, and Volume	**G.1.1.1.2**	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find circumference and use arc length to find measures and solve real-life problems.*	**Big Ideas Geometry 11.1**		**20 days**
	G.2.2.2.5	**Find the area of a sector of a circle.** *Find the area of a segment of a circle.*	**Big Ideas Geometry 11.2** **http://www.regentsprep.org/Regents/math/geometry/GP14/CircleSectors.htm**		
	G.1.2.1.5 **G.1.1.1.4**	**Identify and/or use properties of pyramids and prisms.** **Identify and/or use the properties of a sphere or cylinder.** *Include Pythagorean Theorem and Special Right Triangles when finding missing measures.*	**Big Ideas Geometry 11.4**		

	G.2.3.1.2	**Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.5-11.8** **http://intermath.coe.uga.edu/tweb/gwin1-01/luce/SAV/SAVRes.html**		
	G.2.3.1.1	**Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.**	**Big Ideas Geometry 11.7-11.8** **http://www.mybookezzz.org/surface-area-hands-on-activity/**		
	G.2.3.1.3	**Find the measurement of a missing length given the surface area or volume.**	**http://illuminations.nctm.org/Lesson.aspx?id=2911**		
	G.2.3.2.1	**Describe how a change in the linear dimension of a figure affects its surface area or volume. (e.g., How does changing the length of the edge of a cube affect the volume of the cube?).**	**http://www.shodor.org/interactivate/lessons/SurfaceAreaAndVolume/** **http://www.k12.wa.us/mathematics/MathAve/Landscaping/Assessment.pdf**		
	G.2.2.4.1	**Use area models to find probabilities.**			

Final Exam Review					**10 days**

Honors Algebra I K/CC

Curriculum Guide

Scranton School District

Scranton, PA

Honors Algebra I K/CC 3213

Prerequisites:

- Successful completion of 8th grade Common Core 8P Concepts of Algebra course
- Be in compliance with the SSD Honors and AP Criteria Policy

Honors Algebra I is intended to challenge the higher performing student. This course parallels the topics covered in Algebra I, but differs from in Algebra I in depth, breadth and pace, in addition to more focus on application problems. Enrichment topics may also be included in this course.

At the culmination of this course, the students will sit for the Keystone Algebra I Exam, a Pennsylvania graduation requirement. After successfully completing this course, students who meet the proper prerequisites will be enrolled in Honors Geometry or Geometry 10 in tenth grade.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Honors Algebra I K/CC 3213	Grade Level: 9th	Date Completed: 10-14-14

1st Quarter

Topic	Resources	CCSS
Represent and/or use numbers in equivalent forms	Keystone Finish Line WB - Unit 1 Lesson 1	A1.1.1.1.1
Use Estimation strategies in problem-solving situations	Keystone Finish Line WB - Unit 2 Lesson 1	A1.1.1.4.1
Linear equations	Big Ideas Algebra I - Chapter 1 Keystone Finish Line WB - Unit 3 Lesson 1	A1.1.2.1.2
Linear Inequalities	Big Ideas Algebra I - Chapter 2 Keystone Finish Line WB - Unit 4 Lesson 1	A1.1.3.1.3, A1.1.3.1.2, A1.1.3.1.1
Functions	Big Ideas Algebra I - Chapter 3.1- 3.5 Keystone Finish Line WB - Unit 5 Lesson 2	A1.2.1.1.3,A1.2.1.1.2, A1.2.2.1.1
Rate of Change	Big Ideas Algebra I - Chapter 3.2-3.5	A1.2.2.1.1, A1.2.2.1.2

2nd Quarter

Topic	Resources	CCSS
Linear Equations with two variables	**Big Ideas Algebra I - Chapter 4.1-4.4**	**A1.2.2.1.3, A1.2.2.1.4, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2 A1.2.2.2.1,**
Systems of Linear Equations	**Big Ideas Algebra I - Chapter 5.1-5.4**	**A1.1.2.2.1**
Interpret solutions to Linear Systems.	**Big Ideas Algebra I - Chapter 5.1-5.4** **Keystone Finish Line WB - Unit 3 Lesson 3**	**A1.1.2.2.2**
Systems of Linear Inequalities	**Big Ideas Algebra I - Chapter 5.6-5.7**	**A1.1.3.2.1**
Interpret solutions to Linear Inequalities	**Big Ideas Algebra I - Chapter 5.6-5.7** **Keystone Finish Line WB - Unit 4 Lesson 3**	**A1.1.3.2.2**

3rd Quarter

Topic	Resources	CCSS
Exponents, Roots and Absolute Value	**Big Ideas Algebra I - Chapter 6.1** **Keystone Finish Line WB - Unit 1 Lesson 4**	**A1.1.1.3.1, A1.1.1.1.2**
Simplify expressions involving polynomials	**Big Ideas Algebra I - Chapter 7.1-7.3** **Keystone Finish Line WB - Unit 2 Lesson 2**	**A1.1.1.5.1**
GCF and LCM for monomials	**Keystone Finish Line WB - Unit 1 Lesson 3**	**A1.1.1.2.1**
Simplify expressions involving polynomials	**Big Ideas Algebra I - Chapter 7.4-7.8** **Keystone Finish Line WB - Unit 2 Lesson 3 - 5** ****Login to site – bigideasmath.com - Common Core 2014 – Purple Infinity Algebra Book Chapter 11, Section 3**	**A1.1.1.5.2, A1.1.1.5.3**

4th Quarter

Topic	Resources	CCSS
Use measures of dispersion to describe a set of data	**Keystone Finish Line WB –** **Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11** **See standards**	**A1.2.3.1.1**
Use data displays in the problem-solving settings and/or to make predictions	**Keystone Finish Line WB** **Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11** **See standards**	**A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3**
Apply Probability to practical situations	**Keystone Finish Line WB –** **Unit 7 Lesson 5**	**A1.2.3.3.1**
Final Review		

***The suggested timeline and curriculum content should be adjusted and revised as needed in correlation with the PA State Standards.**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents).	A1.1.1.1.1	Compare and/or order any real numbers. Rational and irrational may be mixed.	Keystone Finish Line WB - Unit 1 Lesson 1	Teacher prepared tests, quizzes, etc. Series available assessments online. (Optional)	1 day
Use Estimation strategies in problem-solving situations	A1.1.1.4.1	Use estimation to solve problems	Keystone Finish Line WB - Unit 2 Lesson 1 Use throughout when appropriate		1 day

Linear equations	**A1.1.2.1.2**	**Use and/or identify an algebraic property to justify any step in an equation-solving process.** **Note: Linear equations only** **Vocabulary:** • **Additive inverse** • **Multiplicative Inverse** • **Commutative property** • **Associative Property** • **Identity Property** • **Distributive Property** • **Multiplicative Property of Zero** • **Additive Property of Equality** • **Multiplicative Property of Equality**	**Big Ideas Algebra I – Chapter 1** **Keystone Finish Line WB - Unit 3 Lesson 1** **Engage NY Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics**		**12 days**
	A1.1.2.1.1	**Write, solve, and/or apply a linear equation (including problem situations).**	**Occurs in every chapter**		**Use throughout**

Linear Inequalities	**A1.1.3.1.2**	**Identify or graph the solution set to a linear inequality on a number line.**	**Big Ideas Algebra I – Chapter 2** **Keystone Finish Line WB - Unit 4 Lesson 1**		**10 days**
	A1.1.3.1.3	**Interpret solutions to the problems in the context of the problem situations. Note: Linear inequalities only.**	**Big Ideas Algebra I – Chapter 2** **Keystone Finish Line WB - Unit 4 Lesson 1**		
	A1.1.3.1.1	**Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value Inequalities).**	**Big Ideas Algebra I – Chapter 2** **Keystone Finish Line WB - Unit 4 Lesson 2**		
Functions	**A1.2.1.1.3**	**Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Vocabulary:** • **Range** • **Domain**	**Big Ideas Algebra I - Chapter 3.1** **Keystone Finish Line WB - Unit 5 Lesson 2** **Engage NY** Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics		**21 days**

	A1.2.1.1.2	**Determine whether a relation is a function, given a set of points or a graph.**	**Big Ideas Algebra I - Chapter 3.1** **Keystone Finish Line WB Unit 5 Lesson 2** **Engage NY** Module 4 Topic A Lessons 1-9 https://www.engageny.org/resource/grade-8-mathematics		
	A1.2.1.1.1	**Analyze a set of data for the existence of a pattern and represent the pattern Algebraically and/or graphically.**	**Big Ideas Algebra I - Chapter 3.2-3.5** **Engage NY** **Module 4 Topic B 10-14** https://www.engageny.org/resource/grade-8-mathematics		
Rate of Change	**A1.2.2.1.1**	**Identify, describe, and/or use constant rates of change.**	**Big Ideas Algebra I - Chapter 3.2-3.5** **Engage NY** **https://www.engageny.org/resource/grade-8-mathematics-module-4-topic-b-lesson-11**		

	A1.2.2.1.2	**Apply the concept of linear rate of change (slope) to solve problems.**	**Big Ideas Algebra I - Chapter 3.3-3.5** **Engage NY Module 4 Topic C Lesson 15-17** https://www.engageny.org/resource/grade-8-mathematics		
Linear Equations with two variables	**A1.2.2.1.3**	**Write or identify a linear equation when given** • **The graph of the line,** • **Two points on the line, or** • **The slope and a point on the line.** • **Parallel and Perpendicular Lines** **Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.**	**Big Ideas Algebra I - Chapter 4.1-4.3** **Engage NY Module 4 Topic C Lesson 18-23** https://www.engageny.org/resource/grade-8-mathematics		**20 days**
	A1.2.2.1.4	**Determine the slope and/or y-intercept represented by a linear equation or graph.**	**Big Ideas Algebra I - Chapter 4.1**		
	A1.1.2.1.3	**Interpret solutions to problems in the context of the problem situation.** **Note: Linear equations only.**	**Big Ideas Algebra I - Chapter 4.1-4.3** **Used throughout**		

	A1.2.1.2.1	**Create, interpret, and/or use the equation, graph, or table of al linear function.**	**Big Ideas Algebra I - Chapter 4.1-4.3** **Used throughout**		
	A1.2.1.2.2	**Translate from one representation of a linear function to another (i.e., graph, table, and equation).**	**Big Ideas Algebra I - Chapter 4.1-4.3** **Used throughout** **Engage NY** **Module 6 Topic A Lesson 1-5** https://www.engageny.org/resource/grade-8-mathematics		
	A1.2.2.2.1	**Draw, identify, find, and/or write and an equation for a line of best fit for a scatter plot**	**Big Ideas Algebra I - Chapter 4.4** **Engage NY** **Module 6 Topic B & C Lesson 6-9** https://www.engageny.org/resource/grade-8-mathematics		
Systems of Linear Equations	**A1.1.2.2.1**	**Write and/or solve a system of linear equations, including problem, using graphing , substitution, and/or elimination.**	**Big Ideas Algebra I - Chapter 5.1-5.4** **Engage NY** **Module 4 Topic D Lesson 24-30** https://www.engageny.org/resource/grade-8-mathematics		**25 days**

Interpret solutions to Linear Systems.	**A1.1.2.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear equations**	**Big Ideas Algebra I - Chapter 5.1-5.4** **Keystone Finish Line WB - Unit 3 Lesson 3**		
Systems of Linear Inequalities	**A1.1.3.2.1**	**Write and/or solve a system of Linear Inequalities using graphing. Limit to two linear inequalities.**	**Big Ideas Algebra I - Chapter 5.6-5.7**		
Interpret solutions to Linear Inequalities	**A1.1.3.2.2**	**Interpret solutions to problems in the context of the problem situation. Limit systems to two linear inequalities**	**Big Ideas Algebra I - Chapter 5.6-5.7** **Keystone Finish Line WB - Unit 4 Lesson 3**		
Exponents, Roots and Absolute Value	**A1.1.1.3.1**	**Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.**	**Big Ideas Algebra I - Chapter 6.1** **Keystone Finish Line WB - Unit 1 Lesson 4** **Engage NY Module 1 Topic A Lessons 1-6 https://www.engageny.org/resource/grade-8-mathematics-module-1-topic-lesson-1**		**10 days**

	A1.1.1.1.2	**Simplify Square Roots (e.g., $\sqrt{24}$ = $2\sqrt{6}$)**	**Keystone Finish Line WB Unit 1 Lesson 2** ***Supplemental resources will be needed**		**10 days**
Simplify expressions involving polynomials	**A1.1.1.5.1**	**Add, subtract, and/or multiply polynomial expressions (express answer in simplest form.) Nothing larger than a binomial multiplied by a trinomial.**	**Big Ideas Algebra I - Chapter 7.1-7.3** **Keystone Finish Line WB - Unit 2 Lesson 2**		**10 days**
GCF and LCM for monomials	**A1.1.1.2.1**	**Find the Greatest Common Factor and/or Least Common Multiple for sets of monomials**	**Keystone Finish Line WB - Unit 1 Lesson 3** ***Supplemental resources will be needed**		**5 days**

Simplify expressions involving polynomials	**A1.1.1.52**	**Factor Algebraic expressions, including difference of two squares and trinomials. Trinomials limited to the form $ax^2 + bx + c$, where a is equal to 1 after factoring out all monomials factors.**	**Big Ideas Algebra I - Chapter 7.4-7.8** **Keystone Finish Line WB - Unit 2 Lesson 3 & 4**		**15 days**
	A1.1.1.5.3	**Simplify/reduce a rational algebraic expression.**	**Keystone Finish Line WB - Unit 2 Lesson 5** ****Login to site – bigideasmath.com - Common Core 2014 – Purple Infinity Algebra Book Chapter 11, Section 3**		
Use measures of dispersion to describe a set of data	**A1.2.3.1.1**	**Calculate and/or interpret the range, quartiles, and interquartile range of data**	**Keystone Finish Line WB - Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11.1- 11.2**		**10 days**
Use data displays in the problem-solving settings and/or to make predictions	**A1.2.3.2.1**	**Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.**	**Keystone Finish Line WB Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11.1-11.3**		

	A1.2.3.2.2	**Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measure of central tendency, or other representations)**	**Keystone Finish Line WB - Unit 7 Sections 1-4** ***Big Ideas Algebra I - Chapter 11.1-11.3**		
	A1.2.3.2.3	**Make predictions using the equations or graphs of best-fit lines of scatter plots**	**Keystone Finish Line WB - Unit 7 Sections 1-4**		
Apply Probability to practical situations	**A1.2.3.3.1**	**Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent.**	**Keystone Finish Line WB - Unit 7 Lesson 5**		
Keystone Review and Exam					**10 days**

Selected Topics		**-Solving quadratic equations** **-Completing the square** **- Solving the quadratic formula** **- Graphing quadratics with table of values.** **-Solving radical equations**	**Big Ideas Algebra I - Chapters 9 & 10**		**10 days**
Final Review/ Exam					**10 days**

Honors/AP Prerequisites – <u>Grades 10 → 11 → 12</u>

Board Approved Policy – 5-5-14

Criteria for Admission to Honors and AP Courses		
Regular to Honors (5 out 6 criteria must be met for placement)	**Honors to Honors (5 out 6 criteria must be met for placement)**	**Honors to AP (5 out 7 criteria must be met for placement)**
• Proper Prerequisites – all preceding courses in the curriculum pathway have been successfully met • Scores of Advanced or top one-third of the Proficient on the *subject related* Keystone Exams • Course grade of 95 or better • Teacher Recommendation (In the case of Honors Chemistry or Physics, the recommendation of both the science and mathematics teacher is necessary.) • Counselor Recommendation • Parent Signature	• Proper Prerequisites – all preceding courses in the curriculum pathway have been successfully met - • Scores of Advanced or top one-third of the Proficient on the *subject related* Keystone Exams • Course grade of 92 or better • Teacher Recommendation (In the case of Honors Chemistry or Physics, the recommendation of both the science and mathematics teacher is necessary.) • Counselor Recommendation • Parent Signature	• Proper Prerequisites – all preceding courses in the curriculum pathway have been successfully met • AP Potential in subject area • Scores of Advanced or top one-third of the Proficient on the *subject related* Keystone Exams • Course grade of 93 or better • Teacher Recommendation (In the case of Honors Chemistry or Physics, the recommendation of both the science and mathematics teacher is necessary.) • Counselor Recommendation • Parent Signature

Honors Elementary Analysis

Curriculum Guide

Scranton School District

Scranton, PA

Honors Elementary Analysis

Prerequisite :

- Honors Algebra II/Trigonometry
- Be in compliance with the SSD Honors and AP Criteria Policy

Honors Elementary Analysis is an advanced course in mathematics. The major topics in this course are quadratic equations, coordinate geometry, polynomial algebra, theory of equations, inequalities, functions, exponents, advanced graphing techniques, conics, trigonometry and its applications, polar coordinates, vector operations, series, matrices, and probability. After successful completion of this course the students will be allowed to enroll in Honors Calculus I or AP Calculus if the Scranton School District Criteria for enrollment in Advanced Placement classes is met.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Honors Elementary Analysis	Grade Level: 11,12	Date Completed: 2/5/15

1st Quarter

Topic	Resources	CCSS
FUNDAMENTALS/REVIEW **Linear Functions**	**Advanced Mathematics Text** **Chapter 1-1, 1-2, 1-3, 1-4, 1-8** **Graphing Calculators**	**A1.2.2.1.3** **HSA.REI.C.5** **HSA.REI.C.6** **HSF.BF.A.1** **HSF.BF.A.1.a**
THE COMPLEX NUMBER SYSTEM **Perform arithmetic operations with complex numbers.**	**Advanced Mathematics Text** **Chapter 1-5** **Graphing Calculators**	**HSN.CN.A.1** **HSN.CN.A.2** **HSN.CN.A.3**
INTERPRETING FUNCTIONS **Analyze functions using different representations.**	**Advanced Mathematics Text** **1-1, 1-4, 1-6, 1-7** **Chapter 2 (excluding 2-7)** **Chapter 3 (excluding 3-4)** **Graphing Calculators**	**HSF.IF.C.7** **HSF.IF.C.7.a** **HSF.IF.C.7.c**

2nd Quarter

Topic	Resources	CCSS
INTERPRETING FUNCTIONS **Analyze functions using different representations.**	**Advanced Mathematics Text** **4-1, 4-7** **Chapter 5** **Glossary (p.882)** **Graphing Calculators**	**HSF.IF.C.7.d** **HSF.IF.C.7.b** **A2.1.2.1.3** **HSF.IF.C.7.e** **HSF.IF.C.8** **HSF.BF.A.1** **HSF.BF.A.1.a** **HSF.BF.A.1.b** **HSF.BF.A.1.c** **HSF.IF.C.8.a** **HSF.IF.C.8.b** **HSF.IF.C.9**
BUILDING FUNCTIONS **Build new functions from existing functions**	**Advanced Mathematics Text** **4-2, 4-3, 4-4, 4-5** **5-3, 5-4, 5-5, 5-6** **Graphing Calculators**	**HSF.BF.B.3** **HSF.BF.B.4** **HSF.BF.B.4.a** **HSF.BF.B.4.b** **HSF.BF.B.4.c** **HSF.BF.B.4.d** **HSF.BF.B.5**

3rd Quarter

Topic	Resources	CCSS
TRIGONOMETRIC FUNCTIONS **Extend the domain of trigonometric functions using the unit circle**	**Advanced Mathematics Text** **Chapter 7** **Graphing Calculators**	**HSF.TF.A.1** **HSF.TF.A.2** **HSF.TF.A.3** **HSF.TF.A.4**
Model periodic phenomena with trigonometric functions	**Advanced Mathematics Text** **8-2, 8-3** **Graphing Calculators**	**HSF.TF.B.5** **HSF.TF.B.6** **HSF.TF.B.7**
Prove and apply trigonometric identities	**Advanced Mathematics Text** **8-1, 8-4, 8-5** **Chapter 9** **10-3** **Graphing Calculators**	**HSF.TF.C.8**
EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS **Translate between the geometric description and the equation for a conic section**	**Advanced Mathematics Text** **6-1 to 6-5** **Graphing Calculators**	**HSG.GPE.A.1** **HSG.GPE.A.2** **HSG.GPE.A.3** **HSA.REI.C.7**

4th Quarter

Topic	Resources	CCSS
SEQUENCES AND SERIES **Build a function that models a relationship between two quantities**	**Advanced Mathematics Text** **13-1, 13-2, 13-3** **Graphing Calculators**	**HSF.BF.A.2**
USING PROBABILITY TO MAKE DECISIONS **Calculate expected values and use them to solve problems**	**Advanced Mathematics Text** **16-1, 16-2, 16-4, 16-6** **Graphing Calculators**	**A2.2.3.2.1** **A2.2.3.2.3** **HSS.MD.A.2** **HSS.MD.B.5.a**
VECTOR QUANTITIES AND MATRICES **Perform operations on vectors**	**Advanced Mathematics Text** **12-1, 12-2** **Graphing Calculators**	**HSN.VM.B.4** **HSN.VM.B.4.a** **HSN.VM.B.4.b** **HSN.VM.B.4.c** **HSN.VM.B.5** **HSN.VM.B.5.a**
Perform operations on matrices and use matrices in applications	**Advanced Mathematics Text** **14-1, 14-2, 14-3, 14-4** **Graphing Calculators**	**HSN.VM.C.6** **HSN.VM.C.7** **HSN.VM.C.8** **HSN.VM.C.9** **HSN.VM.C.10** **HSA.REI.C.8** **HSA.REI.C.9**
REPRESENT COMPLEX NUMBERS AND THEIR OPERATIONS ON THE COMPLEX PLANE	**Advanced Mathematics Text** **11-1, 11-2** **Graphing Calculators**	**HSN.CN.B.4**
Final Exams and Reviews		

******Note: Italicized blue text designates SSD Elementary Analysis topics that are currently covered (and should continue to be) but are NOT listed in the Common Core State Mathematics Standards.***

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
FUNDAMENTALS/ REVIEW **Linear Functions**	**A1.2.2.1.3**	**Write or identify a linear equations when given: the graph of a line, two points on a line, the slope and point on the line, and parallel and perpendicular lines** ***Write equations of altitudes, medians, perpendicular bisectors, and find their point of concurrency.*** ***Prove theorems from Geometry by using coordinates (coordinate proofs).*** ***Prove and use formula for distance form a point to a line.***	**Advanced Mathematics Text Chapter 1-1, 1-2, 1-3, 1-4, 1-8, 6-1** **Graphing Calculators**	**Teacher prepared tests, quizzes, etc.**	**15 days**
	HSA.REI.C.5	**Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.**			
	HSA.REI.C.6	**Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.**			
	HSF.BF.A.1	**Write a function that describes a relationship between two quantities.**			
	HSF.BF.A.1.a	**Determine an explicit expression, a recursive process, or steps for calculation from a context.**			

THE COMPLEX NUMBER SYSTEM **Perform arithmetic operations with complex numbers.**	**HSN.CN.A.1** **HSN.CN.A.2** **HSN.CN.A.3**	**Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form *a + bi* with *a* and *b* real.** **Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.** **(+) Find the conjugate of a complex number.**	**Advanced Mathematics Text 1-5** **Graphing Calculators**		**3 days**

INTERPRETING FUNCTIONS **Analyze functions using different representations.**	**HSF.IF.C.7** **HSF.IF.C.7.a** **HSF.IF.C.7.c** **HSF.IF.C.7.d** **HSF.IF.C.7.b** **A2.1.2.1.3** **HSF.IF.C.7.e** **HSF.IF.C.8**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.** **Graph linear and quadratic functions and show intercepts, maxima, and minima.** **Solve and graph polynomial functions/inequalities, identifying zeros when suitable factorizations are available, and showing end behavior.** ***Use synthetic division.*** ***Apply the following theorems: remainder, factor, rational root, fundamental theorem of algebra, and complex conjugates.*** **(+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.** **Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.** **Simplify/evaluate expressions involving real exponents including multiplying with exponents, powers of powers, and powers of products** **Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.** **Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.**	**Advanced Mathematics Text** **1-1, 1-4, 1-6, 1-7** **Chapter 2** **Chapter 3 (excluding 3-4)** **4-1, 4-7** **Chapter 5** **Glossary (p.882)** **Graphing Calculators**		**45 days**

Analyze functions using different representations.	**HSF.BF.A.1**	**Write a function that describes a relationship between two quantities.**			
	HSF.BF.A.1.a	**Determine an explicit expression, a recursive process, or steps for calculation from a context.**			
	HSF.BF.A.1.b	**Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model*.**			
	HSF.BF.A.1.c	**(+) Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time*.**			
	HSF.IF.C.8.a	**Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.**			
	HSF.IF.C.8.b	**Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay.**			
	HSF.IF.C.9	**Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum*.**			

BUILDING FUNCTIONS **Build new functions from existing functions**	**HSF.BF.B.3**	**Identify the effect on the graph of replacing *f*(*x*) by *f*(*x*) + *k*, *k f*(*x*), *f*(*kx*), and *f*(*x* + *k*) for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.**	**Advanced Mathematics Text** **4-2, 4-3, 4-4, 4-5** **5-3, 5-4, 5-5, 5-6** **Graphing Calculators**		**30 days**
	HSF.BF.B.4	**Find inverse functions.**			
	HSF.BF.B.4.a	**Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example, f(x) =2 x^3 or f(x) = (x+1)/(x-1) for x ≠ 1*.**			
	HSF.BF.B.4.b	**(+) Verify by composition that one function is the inverse of another.**			
	HSF.BF.B.4.c	**(+) Read values of an inverse function from a graph or a table, given that the function has an inverse.**			
	HSF.BF.B.4.d	**(+) Produce an invertible function from a non-invertible function by restricting the domain.**			
	HSF.BF.B.5	**(+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.**			

TRIGONOMETRIC FUNCTIONS **Extend the domain of trigonometric functions using the unit circle**	**HSF.TF.A.1** **HSF.TF.A.2** **HSF.TF.A.3** **HSF.TF.A.4**	**Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.** **Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.** ***Graph all 6 trigonometric functions including transformations of sine, cosine, and tangent functions.*** **(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for *x*, π + *x*, and 2π - *x* in terms of their values for *x*, where *x* is any real number.** **(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.**	**Advanced Mathematics Text** **Chapter 7** **Graphing Calculators**		**34 days**
Model periodic phenomena with trigonometric functions	**HSF.TF.B.5** **HSF.TF.B.6** **HSF.TF.B.7**	**Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.** **(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.** **(+) Use inverse functions to solve trigonometric equations; evaluate the solutions using technology.**	**Advanced Mathematics Text** **8-2, 8-3** **Graphing Calculators**		

Prove and apply trigonometric identities	**HSF.TF.C.8**	**Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant of the angle.** ***Simplify trigonometric expressions/prove and solve trigonometric equations*** ***Use the Law of Sines and Law of Cosines to find unknown parts of a triangle*** ***Prove the following formulas for sine and cosine and use them to solve problems: sum and difference, double angle, and half angle.***	**Advanced Mathematics Text** **8-1, 8-4, 8-5** **Chapter 9** **10-1, 10-3** **Graphing Calculators**		
EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS **Translate between the geometric description and the equation for a conic section**	**HSG.GPE.A.1** **HSG.GPE.A.2** **HSG.GPE.A.3** **HSA.REI.C.7**	**Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.** **Derive the equation of a parabola given a focus and directrix.** **(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.** **Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.** ***Solve systems of second degree equations.***	**Advanced Mathematics Text** **6-1 to 6-7** **Graphing Calculators**		**10 days**

SEQUENCES AND SERIES **Build a function that models a relationship between two quantities**	**HSF.BF.A.2**	**Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.**	**Advanced Mathematics Text** **13-1, 13-2, 13-3** **Graphing Calculators**		**5 days**
USING PROBABILITY TO MAKE DECISIONS **Calculate expected values and use them to solve problems**	**A2.2.3.2.1** **A2.2.3.2.3** **HSS.MD.A.2** **HSS.MD.B.5.a**	**Use Combinations, permutations, and The Fundamental Counting Principle to solve problems.** **Use probability for independent, dependent, or compound events to predict outcomes.** **(+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.** **Find the expected payoff for a game of chance. *For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.***	**Advanced Mathematics Text** **16-1, 16-2, 16-4, 16-6** **Graphing Calculators**		**10 days**

VECTOR QUANTITIES AND MATRICES **Perform operations on vectors**	**HSN.VM.B.4** **HSN.VM.B.4.a** **HSN.VM.B.4.b** **HSN.VM.B.4.c** **HSN.VM.B.5** **HSN.VM.B.5.a**	**(+) Add and subtract vectors.** **Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.** **Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.** **Understand vector subtraction v - w as v + (-w), where -w is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.** **(+) Multiply a vector by a scalar.** **Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.**	**Advanced Mathematics Text** **12-1, 12-2** **Graphing Calculators**		**13 days**

Perform operations on matrices and use matrices in applications	**HSN.VM.C.6** **HSN.VM.C.7** **HSN.VM.C.8** **HSN.VM.C.9** **HSN.VM.C.10** **HSA.REI.C.8** **HSA.REI.C.9**	**(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.** **(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.** **(+) Add, subtract, and multiply matrices of appropriate dimensions.** **(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.** **(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.** **(+) Represent a system of linear equations as a single matrix equation in a vector variable.** **(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).**	**Advanced Mathematics Text 14-1, 14-2, 14-3, 14-4** **Graphing Calculators**		
REPRESENT COMPLEX NUMBERS AND THEIR OPERATIONS ON THE COMPLEX PLANE	**HSN.CN.B.4**	**(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.**	**Advanced Mathematics Text 11-1, 11-2** **Graphing Calculators**		**5 days**

Final Exams and Reviews					**10 days**

Please note: (+) Indicates content used in additional courses beyond Algebra II.

Honors Geometry

Curriculum Guide

Scranton School District

Scranton, PA

Honors Geometry

Prerequisite :

- Successful completion of Algebra I, Honors Algebra I, or Algebra I Accelerated
- Be in compliance with the SSD Honors and AP Criteria Policy

Intended Audience: This course is designed for the student who has successfully completed Algebra I by the end of the 8th or 9th grade.

Honors Geometry follows Honors Algebra I, and is designed to emphasize the study of the properties and applications of common two and three dimensional geometric figures. The honors class is taught at a faster pace, thus allowing time for more difficult problems and concepts. This course formalizes what students have learned about geometry in the middle grades, with a concentration on mathematical reasoning and formal proofs. Topics covered focus on the Pennsylvania Core Standards and are parallel to the Geometry 9 and 10 courses, presenting all the same major topics except with more rigor.

After successfully completing the course, students will be allowed to enroll in Honors Algebra II/ Trigonometry or Algebra II/Trigonometry.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Honors Geometry	**Grade Level: 9th and 10th**	**Date Completed: Oct 2014**

1st Quarter

Topic	Resources	CCSS
Basic Terms and Coordinate Geometry	Big Ideas Geometry 1.1-1.3	G.2.1.2.1, G.2.1.2.2, G.2.1.2.3
Perimeter and Area in the Coordinate Plane	Big Ideas Geometry 1.4	G.2.2.2.1, G.2.2.2.2, G.2.2.2.4, G.2.2.2.5,
Angles	Big Ideas Geometry 1.5-1.6, 5.1, 7.1	G.2.2.1.1, G.2.2.1.2, G.1.2.1.4
Parallel and Perpendicular Lines	Big Ideas Geometry 3.1-3.5	G.2.2.1.2, G.2.1.2.2

2nd Quarter

Topic	Resources	CCSS
Reasoning and Proof	Big Ideas Geometry 2.4-2.6, 3.3, 3.4	G.1.3.2.1
Congruent Triangles	Big Ideas Geometry 5.2-5.7, AMSCO Geometry 3.2-3.8	G.1.2.1.1, G.1.2.1.3, G.1.3.1.1, G.1.3.2.1
Relationships Within Triangles	Big Ideas Geometry 6.1, 6.3-6.5, 5.8	G.1.2.1.1

3rd Quarter

Topic	Resources	CCSS
Similar Triangles	Big Ideas Geometry 8.1-8.4	G.1.3.1.2, G.1.3.1.1
Right Triangles and Trigonometry	Big Ideas Geometry 9.1-9.5	G.2.1.1.1, G.2.1.1.2
Quadrilaterals and Their Area	Big Ideas Geometry 7.2-7.5 AMSCO Geometry 4.9-4.13	G.2.1.2.3, G.1.2.1.2, G.2.2.2.2, G.2.2.2.3, G.2.2.3.1

4th Quarter

Topic	Resources	CCSS
Circles	Big Ideas Geometry 10.1-10.6 AMSCO Geometry 5.1, 5.4	G.1.1.1.1, G.1.1.1.2, G.1.1.1.3
Circumference, Area, and Volume	Big Ideas Geometry 11.1, 11.2, 11.4-11.8 AMSCO Geometry 8.6	G.1.1.1.2, G.2.2.2.5, G.1.1.1.4, G.1.2.1.5, G.2.3.1.1, G.2.3.1.2, G.2.3.1.3, G.2.3.2.1, G.2.2.4.1
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Basic Terms And Coordinate Geometry	**G.2.1.2.1**	*Name points, lines, planes, segments, and rays. Use the Ruler and Segment Addition Postulate.* **Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Relate distance formula to Pythagorean Theorem.*	**Big Ideas Geometry 1.1 – 1.2** **Big Ideas Geometry 1.3** **http://departments.jordandistrict.org/curriculum/mathematics/secondary/impact/Algebra/Alg%208%20Geometry%20in%20Algebra/Alg8.4Solving%20for%20the%20midpoint.pdf**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)** **bigideasmath.com (Optional)**	**12 days**
Perimeter and Area in the Coordinate Plane	**G.2.2.2.1** **G.2.2.2.4**	**Estimate area, perimeter or circumference of an irregular figure.** *Using area, perimeter, and circumference formulas.* **Develop and/or use strategies to estimate the area of a compound/composite figure.**	**Big Ideas Geometry 1.4** **http://shodor.org/interactivate-java/activities/ShapeBuilder/**		**8 days**

Angles		*Name, measure and classify angles. Identify congruent angles.*	**Big Ideas Geometry 1.5**		**10 days**
	G.2.2.1.1	**Use properties of angles formed by intersecting lines to find the measures of missing angles.** *Complementary, Supplementary, and Vertical Angles.*	**Big Ideas Geometry 1.6** **http://www.palmbeachschools.org/students/Grade12/GeometryActivity2.pdf**		
	G.1.2.1.1	**Identify and/or use properties of triangles.** *Triangle Sum and Exterior Angle Theorems.*	**Big Ideas Geometry 5.1**		
	G.1.2.1.4	**Identify and/or use properties of regular polygons.** *Interior and Exterior Angle Theorems.*	**Big Ideas Geometry 7.1** **http://illuminations.nctm.org/Activity.aspx?id=3546**		

Parallel and Perpendicular Lines	**G.2.2.1.2**	*Review and identify pairs of lines.* **Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.**	**Big Ideas Geometry 3.1** **Big Ideas Geometry 3.2-3.3**		**15 days**
	G.2.1.2.2	**Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).** *Identify parallel and perpendicular lines.* *Write equations of parallel and perpendicular lines.*	**Big Ideas Geometry 3.4-3.5**		

Reasoning and Proofs	**G.1.3.2.1**	*Use Algebraic Properties of Equality to justify the steps in solving an equation in a two-column proof.* **Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction.)** *Use properties of equality involving segment lengths and angle measures to complete two-column proofs.* *Complete two-column proofs using parallel and perpendicular lines.*	**Big Ideas Geometry 2.4** **Big Ideas Geometry 2.5-2.6** **Big Ideas Geometry 3.3-3.4**		**15 days**
Congruent Triangles	**G.1.3.1.1**	**Identify and/or use properties of congruent polygons or solids.** *Identify and use corresponding parts.*	**Big Ideas Geometry 5.2**		**20 days**

	G.1.2.1.3	**Identify and/or use properties of isosceles and equilateral triangles.** *Use the Base Angles Theorems.*	**Big Ideas Geometry 5.4**		
	G.1.3.2.1	**Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction).** *Proving triangles congruent using the SAS, SSS, HL, ASA and AAS Congruence Theorems.* *Using Congruent Triangles.* ***Increased emphasis on proofs including overlapping triangles, two pairs of congruent triangles, and isosceles/equilateral triangles.*	**Big Ideas Geometry 5.3, 5.5, 5.6** **http://www.lcps.org/cms/lib4/VA01000195/Centricity/Domain/1445/Geo%20G.6%20Chapter%204%20Congruent%20Triange%20Lab%20WS%20PDF.pdf** **Big Ideas Geometry 5.7** **AMSCO Geometry 3.2-3.8**		

Relationships Within Triangles	**G.1.2.1.1**	**Identify and/or use properties of triangles.** *Identify and/or use properties of medians, altitudes, and perpendicular bisectors.* *Use midsegments in the coordinate plane and the Triangle Midsegment Theorem to find distance.* *Use Triangle Inequality Theorem.*	**Big Ideas Geometry 6.1, 6.3** **Big Ideas Geometry 6.4** **Big Ideas Geometry 6.5** **http://www.glencoe.com/sites/common_assets/support_pages/MC_Course3/Triangle_Inequality.pdf**		**10 days**
	G.2.1.2.1	**Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.** *Use properties of triangles in coordinate proofs.*	**Big Ideas Geometry 5.8**		

Similar Triangles	**G.1.3.1.1** **G.1.3.1.2**	**Identify and/or use properties of similar polygons or solids.** *Use the Triangle Similarity Theorems to solve real-life problems.* **Identify and/or use proportional relationships in similar figures.**	**Big Ideas Geometry 8.1** **Big Ideas Geometry 8.2-8.3** **Big Ideas Geometry 8.4**		**15 days**
Right Triangles and Trigonometry	**G.2.1.1.1**	**Use the Pythagorean Theorem to write and/or solve problems involving right triangles.** *Find side lengths in special right triangles and solve real-life problems.* *Use the geometric mean to solve problems involving similar right triangles.*	**Big Ideas Geometry 9.1** **http://www.cimt.plymouth.ac.uk/projects/mepres/book8/y8s3act.pdf** **Big Ideas Geometry 9.2** **Big Ideas Geometry 9.3**		**15 days**

	G.2.1.1.2	**Use trigonometric ratios to write and/or solve problems involving right triangles.**	**Big Ideas Geometry 9.4-9.5** **http://en.wikibooks.org/wiki/High_School_Trigonometry/Applications_of_Right_Triangle_Trigonometry** **http://jwilson.coe.uga.edu/emt668/emat6680.folders/brooks/6690stuff/righttriangle/Applications.html**		
Quadrilaterals And Their Areas	**G.1.2.1.2**	**Identify and/or use properties of quadrilaterals.** ***Include proofs using properties of quads and proofs determining type of special quadrilateral.* *Use properties of trapezoids and the Trapezoid Midsegment Theorem to find distances.*	**Big Ideas Geometry 7.2, 7.4, 7.5** **http://illuminations.nctm.org/Lesson.aspx?id=1992** **AMSCO Geometry 4.9-4.13** **Big Ideas Geometry 7.5**		**15 days**
	G.2.1.2.3	**Use slope, distance and/or midpoint between 2 points on a coordinate plane to establish properties of a 2-dimensional shape.**	**Big Ideas Geometry 7.3, 7.4**		

	G.2.2.2.2	**Find the measurement of a missing length given the perimeter, circumference, or area.** *Use formulas for quadrilaterals.*			
	G.2.2.2.3	**Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon.** *Use formulas for quadrilaterals.*	**http://map.mathshell.org/materials/download.php?fileid=1226**		
	G.2.2.3.1	**Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area. (e.g., How does changing the length of the radius of a circle affect the circumference of the circle?).** *Use formulas for quadrilaterals.*	**http://www.ssms.scps.k12.fl.us/Portals/104/assets/pdf/Math%207th%20garde/Change%20in%20geometric%20dimensions.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf** **http://www.shawnee.edu/acad/ms/ENABLdocs/Summer08pdfs/Geoboards%20Lesson%20Plan.pdf**		

Circles	**G.1.1.1.1**	**Identify, determine and/or use the radius, diameter, segment and/or tangent of a circle.** ***Include proofs using properties of circles.*	**Big Ideas Geometry 10.1** **http://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/9-12/PiLine-AS-Slope.pdf** **AMSCO Geometry 5.1, 5.4**		**15 days**
	G.1.1.1.2	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.**	**Big Ideas Geometry 10.2**		

	G.1.1.1.3	**Use chords, tangents, and secants to find missing arc measures or missing segment measures.** *Use Chord Theorems to find lengths and arc measures.* *Use inscribed angles and inscribed polygons to find angle and arc measures.* *Use circumscribed angles to find angle and arc measures.* *Use chords, tangents, and secants to find missing segment measures.*	**Big Ideas Geometry 10.3** **Big Ideas Geometry 10.4** **Big Ideas Geometry 10.5** **Big Ideas Geometry 10.6** **http://www.nsa.gov/academia/_files/collected_learning/high_school/geometry/tangents_scants_chords.pdf**		

Circumference, Area, and Volume	**G.1.1.1.2**	**Identify, determine and/or use the arcs, semicircles, sectors, and/or angles of a circle.** *Find circumference and use arc length to find measures and solve real-life problems.*	**Big Ideas Geometry 11.1**		**20 days**
	G.2.2.2.5	**Find the area of a sector of a circle.** *Find the area of a segment of a circle.*	**Big Ideas Geometry 11.2** **http://www.regentsprep.org/Regents/math/geometry/GP14/CircleSectors.htm** **AMSCO Geometry 8.6**		
	G.1.2.1.5 **G.1.1.1.4**	**Identify and/or use properties of pyramids and prisms.** **Identify and/or use the properties of a sphere or cylinder.** *Include Pythagorean Theorem and Special Right Triangles when finding missing measures.*	**Big Ideas Geometry 11.4**		

	G.2.3.1.2	**Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres.** *Formulas are provided on the reference sheet.*	**Big Ideas Geometry 11.5-11.8** **http://intermath.coe.uga.edu/tweb/gwin1-01/luce/SAV/SAVRes.html**		
	G.2.3.1.1	**Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.**	**Big Ideas Geometry 11.7-11.8** **http://www.mybookezzz.org/surface-area-hands-on-activity/**		
	G.2.3.1.3	**Find the measurement of a missing length given the surface area or volume.**	**http://illuminations.nctm.org/Lesson.aspx?id=2911**		
	G.2.3.2.1	**Describe how a change in the linear dimension of a figure affects its surface area or volume. (e.g., How does changing the length of the edge of a cube affect the volume of the cube?).**	**http://www.shodor.org/interactivate/lessons/SurfaceAreaAndVolume/** **http://www.k12.wa.us/mathematics/MathAve/Landscaping/Assessment.pdf**		
	G.2.2.4.1	**Use area models to find probabilities.**			

Final Exam Review					**10 days**

Honors Algebra II/Trigonometry

Curriculum Guide

Scranton School District

Scranton, PA

Honors Algebra II/Trigonometry

Prerequisite:

- Successful completion of Geometry or Honors Geometry
- Be in compliance with the SSD Honors and AP Criteria Policy

Building on their work with linear and quadratic functions, students will extend their repertoire of functions to include polynomial, rational, radical, exponential, and logarithmic functions. Students will work closely with the expressions that define the functions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. Other topics that are included in this course are arithmetic and geometric sequences, probability, permutations, and combinations. A study of the conic sections and their graphs will also be included.

Building on their previous work with functions, and on their work with trigonometric ratios and circles in Geometry, students now use the coordinate plane to study angles in standard position and understand radian measure. The trigonometric functions, their graphs, and identities will be explored.

This course is part of an accelerated curriculum in mathematics beginning with Algebra I in eighth grade so that the students, after successful completion of this course, will have the opportunity to progress to Honors Elementary Analysis and Advanced Placement Calculus.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Honors Algebra II/Trigonometry	**Grade Level:** 10th and 11th	**Date Completed:** 2/5/2015

1st Quarter

Topic	Resources	CCSS
Linear Equations and Inequalities in one variable	Textbook: McDougall-Littell Algebra and Trigonometry Structure and Method – Book 2 Sections: 1.2, 1.7, 2.1, 2.2, 2.4	A1.1.2.1.1 A1.1.3.1.2 A1.1.3.1.1
Exponents	Textbook: McDougall-Littell Algebra and Trigonometry Structure and Method – Book 2 Sections: 4.2, 5.1, 5.2, 10.1, 10.2	A2.1.2.1.1 A2.1.2.1.3
Relations/Linear Equations in 2 Variables	Textbook: McDougall-Littell Algebra and Trigonometry Structure and Method – Book 2 Sections: 3.2, 3.3, 3.4, 3.7, 3.8, 3.10	A1.2.1.1.3 A1.2.1.1.2 A1.2.2.1.3
Correlation	Textbook: McDougall-Littell Algebra and Trigonometry Structure and Method – Book 2 Sections: 3.9	A2.2.1.1.1 A2.2.3.1.1 A2.2.3.1.2
Systems of Linear Equations/Inequalities	Textbook: McDougall-Littell Algebra and Trigonometry Structure and Method – Book 2 Sections: 3.5, 3.6, 3.7, 9.9	A1.1.2.2.1 A1.1.3.2.1

2nd Quarter

Topic	Resources	CCSS
Polynomials	Textbook: McDougall-Littell Algebra and Trigonometry Structure and Method – Book 2 Sections: 4.1, 4.3, 4.4, 4.5, 4.6, Honors Algebra II/Trig Factoring Packet	A1.1.1.5.1 A1.1.1.5.2 A2.1.2.2.1
Quadratic Functions	Big Ideas Algebra 2 Chapter 2 and accompanying resources Honors Algebra II/Trigonometry Conic Sections Packet	A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1 A2.2.3.1.1
Quadratic Equations AND Imaginary and Complex Numbers	Big Ideas Algebra 2 Chapter 3 and accompanying resources EXCLUDING SECTION 3.5 AND 3.6 Supplemental materials/worksheets for powers of *i* and dividing complex numbers.	A2.1.3.1.1 A2.1.1.1.1 A2.1.1.2.1 A2.1.1.1.2 A2.1.1.2.2

3rd Quarter

Topic	Resources	CCSS
Polynomial Functions	Big Ideas Algebra 2 Chapter 4 and accompanying resources EXCLUDING 4.9	A2.2.2.1.1 A2.2.2.1.3 A2.2.1.1.4 A2.2.2.1.4
Rational Exponents and Radical Functions	Big Ideas Algebra 2 Chapter 5 and accompanying resources. EXCLUDING 5.5	A2.1.2.1.2 A2.1.3.1.2 A2.2.1.1.3
Exponential and Logarithmic Functions	Big Ideas Algebra 2 Chapter 6 and accompanying resources.	A2.2.2.1.3 A2.2.1.1.4 A2.2.2.1.2 A2.2.2.1.4 A2.1.2.1.4
Rational Functions/Expressions and Variation	Big Ideas Algebra 2 Chapter 7 and accompanying resources. EXCLUDING 7.2	A2.1.3.2.1 A2.1.2.2.2 A2.1.3.1.2
Solving Formulas	Supplemental Materials and worksheets.	A2.1.3.2.2

4th Quarter

Topic	Resources	CCSS
Trigonometry	Big Ideas Algebra 2 Chapter 9 and accompanying resources. EXCLUDING 9.6 and 9.8 and Supplemental materials	HSG.SRT.C.6 HSG.SRT.C.7 HSG.SRT.C.8 HSF.TF.A.2 HSF.TF.A.2 HSF.TF.A.3 HSF.TF.A.4 HSF.TF.A.5 HSF.TF.A.4 HSF.TF.A.5 HSF.TF.C.8 HSG.SRT.D.10 HSG.SRT.D.11
Probability	Big Ideas Algebra 2 Chapter 10 and accompanying resources. EXCLUDING 10.3 and 10.6	A2.2.3.2.1 A2.2.3.2.3 A2.2.3.2.2
Series and Sequence	Big Ideas Algebra 2 Chapter 8 and accompanying resources. EXCLUDING 8.5	A2.2.1.1.2
Final Exam Review	Teacher Prepared Final Exam Review Packet	

* **Note:** ***Italicized standards and topics are currently classified as Algebra I CC/Geometry CC. These will eventually be phased out as the Common Core is completely implemented.***

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Linear Equations in one variable	***A1.1.2.1.1***	***Write, solve, and/or apply linear equations (including problem situations)*** ***a. Evaluate expressions*** ***b. Collect like terms*** ***c. Solving multi-step equations*** ***d. Application to real life situations***	**MacDougal-Littell Text** **1.2** **1.7**	**Teacher prepared tests, quizzes, etc.** **Series available assessments online. (Optional)**	**5 days**
Inequalities in one variable	***A1.1.3.1.2*** ***A1.1.3.1.1***	***Identify or graph the solution set to a linear inequality on a number line*** ***Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities)***	**MacDougal-Littell Text** **2.1** **2.2** **2.4**		**5 days**

Exponents	**A2.1.2.1.1** **A2.1.2.1.3**	**Using exponential expressions to represent rational numbers** **Simplify/evaluate expressions involving multiplying with exponents, powers of powers, and powers of products. Note: limit to rational exponents** **Simplifying real number exponents.**	**MacDougal-Littell Text** **5.2** **4.2** **5.1** **5.2** **10.1** **10.2**		**5 days**
Relations	***A1.2.1.1.3*** ***A1.2.1.1.2***	***Identify the domain or range of a relation (may be presented as ordered pairs, graph, or, a table.)*** ***Determine whether a relation is a function, given a set of points or a graph.*** ***Include function notation, finding function values, and composition of functions.***	**MacDougal-Littell Text** **3.10** **3.10** **3.8**		**3 days**

Linear Equations in 2 Variables	*A1.2.2.1.3*	*Write, identify, and/or graph a linear equation given:* *a. The graph of a line* *b. Two points on the line* *c. The slope and a point on the line* *d. Parallel and Perpendicular lines* *Note: Linear equation may be in point-slope, standard, and/or slope intercept form*	**MacDougal-Littell Text** **3.2** **3.3** **3.4**		**5 days**
Correlation	**A2.2.1.1.1** **A2.2.3.1.1** **A2.2.3.1.2**	**Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically** **Draw, identify, find, interpret, and/or write an equation for a regression model (lines of best fit) for a scatter plot** **Make predictions using the equations or graphs of regression models (lines of best fit) of scatter plots**	**MacDougal-Littell Text** **3.9** **3.9** **3.9**		**3 days**

Systems of Linear Equations	*A1.1.2.2.1*	*Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations* **Systems of three equations/three variables**	**MacDougal-Littell Text** **3.5** **3.6** **9.9** **Big Ideas Algebra 2 Section 1.4 as supplemental material)**		**7 days**
Systems of Linear Inequalities	*A1.1.3.2.1*	*Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear equalities* *Systems of three or more inequalities*	**MacDougal-Littell Text** **3.7** **3.7**		**3 days**

Polynomials	*A1.1.1.5.1*	*Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Including Multiplying two trinomials.* *(Be sure to cover special products such as squares and cubes of binomials)*	**MacDougal-Littell Text** **4.1** **4.3**		**9 days**
	A2.1.2.2.1	**Factor algebraic expressions, including difference of squares and trinomials. Note: trinomials are limited to the form of ax^2+bx+c where a does not equal zero. Includes factoring by grouping, sum and difference of 2 cubes, and equations in quadratic form.**	**4.4** **4.5** **4.6** **Algebra II/Trig Honors Factoring Packet**		

QUADRATIC FUNCTIONS	**A2.2.2.1.1**	**Create, interpret, and/or use the equation, graph, or table of a quadratic function**	**Big Ideas Algebra 2 Text Chapter 2**		**10 days**
	A2.2.2.1.3	**Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a quadratic function**			
	A2.2.1.1.4	**Identify and/or determine the characteristics of a quadratic function (e.g. intervals of increase/decrease, intercepts, zeros)**			

		Identify or describe the effect of changing parameters within a family of functions **Draw, identify, find, interpret, and/or write an equation for a regression model (curve of best fit) for a scatter plot**			
Quadratic Equations	**A2.1.3.1.1**	**Write and/or solve quadratic equations (including factoring and using the quadratic formula)** **a. By factoring** **b. Completing the square** **c. Quadratic formula** **d. Equations in Quadratic form** **e. Word problems by factoring and using quadratic formula**	**Big Ideas Algebra 2 Text** **3.1** **3.3** **3.4** **Supplemental materials/worksheets**		**18 days**

		Graph circles (non-functions) in detail (5 steps). Write equations. **Graph parabolas (functions and non-functions) in detail (11 steps). Write equations.** **Graph ellipses (non-functions) in detail (10 steps).** **Graph hyperbolas (functions and non-functions) in detail (9 steps).**	**Algebra II/Trig Honors Conic Section Packet**		
Imaginary and Complex Numbers	**A2.1.1.1.1** **A2.1.1.2.1** **A2.1.1.1.2** **A2.1.1.2.2**	**Simplify/write square roots in terms of *'i'*** **Add and subtract complex numbers** **Simplify/evaluate expressions involving powers of 'i'** **Multiply and divide complex numbers**	**Big Ideas Algebra 2 Text 3.2** **Supplemental material needed**		**6 days**

POLYNOMIAL FUNCTIONS	**A2.2.2.1.1**	**Create, interpret, and/or use the equation, graph, or table of a polynomial function** **A. Remainder and factor theorems** **B. Theorems about roots/rational root theorem**	**Big Ideas Algebra 2 Text Chapter 4 excluding 4.9**		**13 days**
	A2.2.2.1.3	**Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial function**			
	A2.2.1.1.4	**Identify and/or determine the characteristics of a polynomial function (e.g. intervals of increase/decrease, intercepts, zeros)**			

	A2.2.1.1.4	**Translate a polynomial function from one representation of a function to another (graph, table, and equation)**			
Rational Exponents	**A2.1.2.1.2**	**Simplify/evaluate expressions involving positive and negative exponents and/or roots (may contain all types of real numbers – exponents should not exceed power of 10)** **a. Simplify radical expressions** **b. Multiply /Divide radicals expressions** **c. Add/Subtract radical expressions** **d. Rationalizing the denominator** **e. Rational exponents**	**Big Ideas Algebra 2 Text** **5.1** **5.2**		**6 days**

Radical Functions	**A2.1.3.1.2**	**Solve equations involving radical expressions**	**Big Ideas Algebra 2 Text** **5.3** **5.4**		**3 days**
EXPONENTIAL AND LOGARITHMIC FUNCTIONS	**A2.2.1.1.3** **A2.2.2.1.3** **A2.2.1.1.4**	**Determine the domain, range, or inverse of a relation** **Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of an exponential and logarithmic function** **Identify and/or determine the characteristics of a exponential and logarithmic functions (e.g. intervals of increase/decrease, intercepts, zeros)**	**Big Ideas Algebra 2 Text Chapter 6**		**13 days**

	A2.2.2.1.2	**Create, interpret, and/or use the equation, graph, or table of an exponential or logarithmic function (including common and natural logarithms)**			
	A2.2.2.1.4	**Translate an exponential or logarithmic function from one representation of a function to another (graph, table, and equation)**			
	A2.1.2.1.4	**Simplify or evaluate expressions involving logarithms and exponents**			
	A2.1.3.1.3	**Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms)**			

	A2.1.3.1.4	**Write, solve, and/or apply exponential growth or decay (including problem situations)**			
Variation	**A2.1.3.2.1**	**Determine how a change in one variable relates to a change in a second variable** **a. direct variation** **b. inverse variation** **c. joint variation**	**Big Ideas Algebra 2 Text 7.1** **Supplemental materials needed**		**3 days**
Rational Expressions	**A2.1.2.2.2**	**Simplify rational algebraic expressions** **a. Reduce** **b. Multiply** **c. Divide** **d. Add** **e. Subtract** **f. Complex Fractions**	**Big Ideas Algebra 2 Text 7.3** **7.4** **Supplemental materials needed**		**7 days**
Rational Equations	**A2.1.3.1.2**	**Solve equations involving rational expressions.**	**Big Ideas Algebra 2 Text 7.5**		**2 days**
Solving Formulas	**A2.1.3.2.2**	**Use algebraic processes to solve a formula for a given variable**	**Supplemental materials needed**		**2 days**

Trigonometry	**HSG.SRT.C.6** **HSG.SRT.C.7** **HSG.SRT.C.8**	**Evaluate trigonometric functions of acute angles. Find unknown side lengths and angle measures of right triangles. Use trigonometric functions to solve real-life problems.**	**Big Ideas Algebra 2 Text** **9.1**		**24 days**
	HSF.TF.A.2	**Draw angles in standard in standard position and use radian measure.**	**9.2**		
	HSF.TF.A.2 **HSF.TF.A.3**	**Evaluate trigonometric functions of any angle. Find and use reference angles to evaluate trigonometric functions.**	**9.3**		
	HSF.TF.A.4 **HSF.TF.A.5**	**Graph sine and cosine functions including stretches and shrinks, translations, and reflections.**	**9.4**		
	HSF.TF.A.4 **HSF.TF.A.5**	**Graph tangent, cosecant, secant, and cotangent functions.**	**9.5**		
	HSF.TF.C.8	**Using trigonometric identities.**	**9.7**		
	HSG.SRT.D.10 **HSG.SRT.D.11**	**Law of Sines and Cosines**	**Supplemental materials**		

PROBABILITY	**A2.2.3.2.1** **A2.2.3.2.3** **A2.2.3.2.2**	**Use combinations, permutations, and the fundamental counting principle to solve problems involving probability** **Use probability for independent, dependent, or compound events to predict outcomes.** **Use odds to find probability and/or use probability to find odds**	**Big Ideas Algebra 2 Text Chapter 10, excluding 10.3 and 10.6**		**9 days**
SERIES AND SEQUENCES	**A2.2.1.1.2**	**Identify and/or extend the pattern as either an arithmetic or geometric sequence**	**Big Ideas Algebra 2 Text Chapter 8, excluding 8.5**		**9 days**
Final Exam and Review					**10 days**

Math Survey

Curriculum Guide

Scranton School District

Scranton, PA

Math Survey

Prerequisite : Successful completion of Geometry or Applied Geometry

Survey of Mathematics provides a review of the students' previous years of mathematics along with real-world applications of mathematics for both personal and vocational use. Topics include, but are not limited to, the following: sets, logic, systems of numeration, number theory and the real number system, algebra, graphs, functions, systems of linear equations and inequalities, the metric system, geometry, mathematical systems, consumer mathematics, probability, statistics, graph theory, and voting and apportionment. As with all mathematics courses, varied problem solving strategies will be emphasized.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Math Survey	Grade Level: 12	Date Completed: 2/5/15

1st Quarter

Topic	Resources	CCSS
Unit 1 – Critical Thinking Skills **A – Inductive Reasoning** **B – Estimation** **C – Problem Solving**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSS.IC.A.1** **HSN.QA.3**
Unit 2 – Sets **A – Set Concepts** **B – Subsets** **C – Venn Diagrams and Set Operations** **D – Applications of Sets**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSS.CP.A.1**

2nd Quarter

Topic	Resources	CCSS
Unit 3 – Logic **A – Statements and Logical Connectives** **B – Truth Tables** **C – Symbolic Arguments** **D – Syllogistic Arguments**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSS.IC.B.6** **HSS.CP.A.1**
Unit 4 – Systems of Numeration **A – Additive, Multiplicative, and Ciphered Systems of Numeration** **B – Place-Value Numeration** **C – Other Bases and Computations in Other Bases**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSN.Q.A.2**

3rd Quarter

Topic	Resources	CCSS
Unit 5 – Number Theory **A – Integers** **B – Rational Numbers** **C – Irrational Numbers** **D – Exponents and Scientific Notation** **E – Sequences (Arithmetic, Geometric, Fibonacci)**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSA.SSE.A.1** **HSA.SSE.A.1.A** **HSA.SSE.A.1.B** **HSA.SSE.B.3** **HSF.BF.A.2** **HSN.RN.B.3**
Unit 6 – Systems of Linear Equations **A – Systems of Linear Equations** **B – Matrices and Operations** **C – Solving Systems using Matrices**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSA.REI.C.5** **HSA.REI.C.6** **HSN.VM.C.8** **HSN.VM.C.9** **HSN.VM.C.10**

4th Quarter

Topic	Resources	CCSS
Unit 7 – Consumer Mathematics **A – Percent** **B – Personal Loans and Simple Interest** **C – Compound Interest** **D – Installment Buying**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Online Website EVERFI.com***	**HSN.Q.A.2**
Unit 8 – Probability **A – Empirical Probability** **B – Theoretical Probability** **C – Odds** **D – Compound Probability** **E – Conditional Probability** **F – Permutations** **G – Combinations**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde**	**HSS.MD.B.6** **HSS.CP.A.2** **HSS.CP.A.3** **HSS.CP.B.9**
Review and administration of Final Exam		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Use Inductive Reasoning to reach a general conclusion through observations of specific cases.	**HSS.IC.A.1**	**Understand statistics as process for making inferences about population parameters. This is based on a random sample from the population.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 1 Section 1**	**Teacher prepared tests, quizzes, etc.**	**4 days**
Use Deductive Reasoning to reach a specific conclusion from a general statement.	**HSS.IC.A.1**	**Understand statistics as process for making inferences about population parameters. This is based on a random sample from the population.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 1 Section 3**		**4 days**
Use Estimation strategies in problem-solving situations.	**HSN.QA.3**	**Choose a level of accuracy appropriate to limitations on measurement when reporting results.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 1 Section 2**		**5 days**

Define and list sets as a list of elements. Represent and/or use the properties of sets.	**HSS.CP.A.1**	**Describe events as a set of outcomes using characteristics of the outcomes as unions, intersections, or complements of other events.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 2 Section 1**		**5 days**
Define and determine subsets of a set. Identify the type of subset.	**HSS.CP.A.1**	**Describe and identify events as subsets of a sample space.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 2 Section 2**		**5 days**
Create and use a Venn Diagram to picture set relationships and evaluate set operations.	**HSS.CP.A.1**	**Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 2 Section 3**		**5 days**

Apply and analyze data using set theory and properties.	**HSS.CP.A.1**	**Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 2 Sections 4 and 5**		**10 days**
Represent and/or use the properties of infinite sets.	**HSS.CP.A.1**	**Describe events as an infinite set of outcomes using characteristics of the outcomes as unions, intersections, or complements of other events.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 2 Section 6**		**10 days**
Translate simple and compound sentences into logic statements using connectives.	**HSS.IC.B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Translate data into statements using quantifiers, conjunctions, disjunctions, not statements, and if-then statements.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 1**		**3 days**

Create and analyze truth tables for negation, conjunction, and disjunction.	**HSS.IC. B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Transfer data onto truth tables to convey conjunctions, disjunctions.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 2**		**3 days**
Create and analyze truth tables for conditional and biconditional statements.	**HSS.IC.B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Transfer data onto truth tables to convey if-then statements and if-and-only-if statements.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 3**		**3 days**
Create equivalence statements. Use a truth table to verify equivalence.	**HSS.IC.B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Transfer data onto truth tables to convey equivalence of statements. Use DeMorgan's laws to justify equivalence statements.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 4**		**3 days**

Test the validity of an argument as valid or fallacy.	**HSS.IC.B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Transfer data onto a truth table to prove validity of a statement.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 5**		**3 days**
Examine Symbolic Arguments versus Syllogistic Arguments using the Euler Diagram.	**HSS.IC.B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Create Euler Diagrams to prove validity of arguments.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 6**		**3 days**
Represent a symbolic statement as a switching circuit.	**HSS.IC.B.6** **HSS.CP.A.1**	**Evaluate reports based on data. Use various circuits to convey conjunctions, disjunctions.**	**Powerpoint Presentation from Next Edition of Textbook** **Title - *A Survey of Mathematics with Applications*, 8th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 3 Section 7**		**3 days**

Define and describe the various systems of numeration.	**HSN.Q.A.2**	**Define appropriate quantities to understand the relationship between numbers and quantities.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 4 Section 1**		**3 days**
Use the place- value system to write numbers in expanded form.	**HSN.Q.A.2**	**Define appropriate quantities to read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 4 Section 2**		**4 days**
Convert base 10 numerations to another base.	**HSN.Q.A.2**	**Define appropriate quantities to read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 4 Section 3**		**5 days**

Solve mathematical operations in bases other than 10.	**HSN.Q.A.2**	**Define appropriate quantities to fluently add, subtract, multiply, and divide numbers in bases other than 10 using the standard algorithm.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 4 Section 4**		**6 days**
Relate methods used by early civilizations to multiply and divide.	**HSN.Q.A.2**	**Define appropriate quantities to fluently add, subtract, multiply, and divide numbers using duplation and mediation.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 4 Section 5**		**6 days**
Identify types of numbers. Incorporate divisibility rules to find GCF and LCM.	**HSA.SSE.A.1.A**	**Interpret parts of an expression, such as terms, factors, and coefficients to find the Greatest Common Factor and the Least Common Multiple of two numbers.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 1**		**2 days**

Define Integers as part of the Real Number System. Use mathematical operations to evaluate integer expressions.	**HSA.SSE.A.1**	**Interpret expressions that represent a quantity in terms of its context. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 2**		**3 days**
Define Rational Numbers as part of the Real Number System. Simplify Rational expressions. Use mathematical operations to evaluate rational expressions.	**HSN.RN.B.3**	**Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 3**		**4 days**

Define Irrational Numbers as part of the Real Number System. Simplify Irrational expressions. Use mathematical operations to evaluate irrational expressions.	**HSN.RN.B.3**	**Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 4**		**3 days**
Define all of the properties of Real Numbers. Apply these properties to solve expressions.	**HSA.SSE.A.1** **HSA.SSE.A.1.A** **HSA.SSE.A.1.B**	**Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 5**		**2 days**

Use the Exponent Laws to evaluation expressions and convert decimal forms to scientific notation.	**HSA.SSE.B.3**	**Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 6**		**3 days**
Define and write algebraic and geometric sequences. **Use these sequences to understand the Fibonacci Sequence.**	**HSF.BF.A.2**	**Write arithmetic and geometric sequences both recursively and with an explicit formula.** **Identify apparent features of the pattern that were not explicit in the rule itself.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 5 Section 7** **Chapter 5 Section 8**		**3 days**

Solve a System of Linear Equations by the graphing method. Identify the solutions as consistent, inconsistent, or dependent.	**HSA.REI.C.6**	**Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 7 Section 1**		**2 days**
Solve a System of Linear Equations by the addition and substitution method. Identify the solutions as consistent, inconsistent, or dependent.	**HSA.REI.C.5**	**Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 7 Section 2**		**4 days**

Define and evaluate Matrices through Addition, Subtraction, and Multiplication.	**HSN.VM.C.8** **HSN.VM.C.9**	**Add, subtract, and multiply matrices of appropriate dimensions. Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 7 Section 3**		**9 days**
Solve systems of linear equations using matrices.	**HSN.VM.C.10**	**Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 7 Section 4**		**10 days**

Convert decimals and fractions to percents. Apply the percent change of real world examples.	**HSN.Q.A.2**	**Define appropriate quantities for the purpose of descriptive modeling. Use proportional relationships to solve multistep ratio and percent problems. Examples: percent increase and decrease, percent error.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 11 Section 1** **Online Resource: EVERFI.com***		**5 days**
Compute simple interest and relate it to personal loans.	**HSN.Q.A.2**	**Define appropriate quantities for the purpose of descriptive modeling. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, fees.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 11 Section 2** **Online Resource: EVERFI.com***		**5 days**
Compute compound interest and relate it to installment buying.	**HSN.Q.A.2**	**Define appropriate quantities for the purpose of descriptive modeling. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, fees, and compound interest.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 11 Sections and 4** **Online Resource: EVERFI.com***		**5 days**

Define and calculate Empirical Probability using real world examples.	**HSS.MD.B.6**	**Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 12 Section 1**		**2 days**
Define and calculate Theoretical Probability using real world examples.	**HSS.MD.B.6**	**Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 12 Section 2**		**3 days**
Define and calculate Theoretical Probability using real world examples.	**HSS.MD.B.6**	**Use odds to make fair decisions (e.g., drawing by lots, using a random number generator).**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 12 Section 3**		**3 days**

Define and calculate Compound Probability using real world examples.	**HSS.CP.A.2**	**Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 12 Section 6**		**3 days**
Define and calculate Conditional Probability using real world examples.	**HSS.CP.A.3**	**Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 12 Section 7**		**3 days**

Define and evaluate the Permutations and Combinations of sets of elements.	**HSS.CP.B.9**	**Use permutations and combinations to compute probabilities of compound events and solve problems.**	**Textbook** **Title - *A Survey of Mathematics with Applications*, 7th Edition** **Authors - Angel, Abbott, and Runde** **Chapter 12 Sections 8 and 9**		**3 days**
Review and administration of Final Exam					**10 days**

***Online program that teaches students how to handle topics such as banking, taxes, everyday expenses, and college loans.**

Overview

With the onset of the adoption of the Common Core State Standards and the development of the Pennsylvania Core Standards, including the Keystone Anchors, the Scranton School District commissioned a process to update, align and reorganize the content within the various mathematics subject areas to be in compliance with the current goals and trends in mathematics education and the previously mentioned standards. The results are curriculum guides that will meet the educational needs of all our students in an ever changing society.

These guides contain the course content recommended by state and national committees. However, by design, these guides allow the teachers maximum opportunity to exercise their judgment and planning in the interest of their students.

A student studying mathematics must have a base knowledge of concepts and generalizations that allows the student to move forward to more advanced concepts. In other words, mathematics is cumulative, and new learning depends entirely on the understanding of concepts previously learned.

A "Suggested Time" column (listing suggested times spent on each concept) is included in these curriculum guides. This column represents a suggestion of times. The teachers developing these curriculum guides used their professional judgment to complete this column. The Mathematics Committee strongly believes that as the district's students move through common core, these timelines must be revisited and adjusted wherever necessary because of the shift in subject area content. Also note, that the days for all types of assessments (including both teacher prepared as well as standardized assessments) are included in the suggested times. These timelines may be modified to take into account unforeseen schedule changes.

Although only listed once under the "Assessments" column, teacher prepared tests, quizzes, etc. are to be used for evaluation throughout the entire curriculum guide. Online assessments (ancillary materials accompanying new textbooks) may also be used as optional resources.

These curriculum guides must be continually revised to meet any new situations and/or conditions. We believe these guides will benefit both the experienced and inexperienced teacher.

Pre-Algebra Grade 9

Curriculum Guide

Scranton School District

Scranton, PA

Pre-Algebra

Pre-Requisites

- Grade of 75 or below in Common Core Math 8
- Teacher recommendation

Intended Audience: This course is designed for the student who has successfully completed 8th grade math by the end of the 8th grade.

The 9th grade Pre-Algebra course will develop an understanding of real numbers, recognizing fractions, decimals, percents, and different representations of rational numbers. Students develop an extended knowledge of relationships between positive and negative numbers and the operations of integers and order of operations. They extend their mastery of the properties of operations to develop and understanding of integer exponents, and to work with numbers written in scientific notation. Students will use linear equations to represent, analyze and solve a variety of problems. Students will strategically chose and efficiently implement procedures to solve linear equations in one variable.

After successfully completing this course, students will be allowed to enroll in Algebra I Part 10A.

Scranton School District

Curriculum Guide

Year-at-a-glance

Subject: Pre-Algebra	**Grade Level: 9th**	**Date Completed: 10-22-14**

1st Quarter

Topic	Resources	CCSS
Simplifying and evaluating expressions	**Glencoe Math Accelerated Chapter 1** **Larson Pre Algebra Chapter 1**	7.EE.1, 8.EE.1, 8.EE.7
Properties of real numbers and the real number system	**Glencoe Math Accelerated Chapter 1** **Larson Pre Algebra Chapter 1**	7.EE.1, 8.EE.2, 8.EE.7
Operations with integers	**Glencoe Math Accelerated Chapter 1** **Larson Pre Algebra Chapter 2.1**	7.NS.1b, 7.NS.1c, 7.NS.1d, 7.NS.2, 7.NS.3, 7.EE.3

2nd Quarter

Topic	Resources	CCSS
Operations with rational numbers	**Glencoe Math Accelerated Chapter 3** **Larson Pre Algebra Chapter 5**	7.NS.1b, 7.NS.1c, 7.NS.1d, 7.NS.2, 7.NS.2d, 7.NS.3, 8.NS.1, 7.EE.3
Finding unit rates and simplifying complex fractions	**Glencoe Math Accelerated Chapter 5** **Larson Pre Algebra Chapter 6**	7.RP.1, 7.RP.2a
Writing and simplifying ratios	**Glencoe Math Accelerated Chapter 5** **Larson Pre Algebra Chapter 6**	7.RP.1, 7.RP.2a
Writing and solving proportions	**Glencoe Math Accelerated Chapter 5** **Larson Pre Algebra Chapter 6**	7.RP.1, 7.RP.2a

3rd Quarter

Topic	Resources	CCSS
Solving percent problems	**Glencoe Math Accelerated Chapter 3** **Larson Pre Algebra Chapter 5**	7.RP.2c
Properties of exponents and scientific notation	**Glencoe Math Accelerated Chapter 4** **Larson Pre Algebra Chapter 4**	8.EE.1, 8.EE.2, 8.EE.3, 8.EE.4
Solving equations-1 step, two step, with like terms, and the distributive property	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8** **Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**	7.EE.3, 7.EE.2, 7.EE.4, 7.EE.4a, 8.EE.7, 8.EE.7b, 8.EE.7
Solving linear inequalities	**Glencoe Math Accelerated Chapter 8** **Larson Pre Algebra Chapter 9**	7.EE.4b

4th Quarter

Topic	Resources	CCSS
Concepts of functions-domain, range, evaluating for a given value	**Glencoe Math Accelerated Chapter 1.6 and Glencoe Math Accelerated Chapter 9 Larson Pre Algebra Chapter 8**	8.F.1
Graphing linear equations/functions	**Glencoe Math Accelerated Chapter 1.6 and Glencoe Math Accelerated Chapter 9 Larson Pre Algebra Chapter 8**	8.EE.5, 8.F.3
Finding the slope of a line from two points	**Glencoe Math Accelerated Chapter 1.6 and Glencoe Math Accelerated Chapter 9 Larson Pre Algebra Chapter 8**	8.EE.6
Data analysis and probability-data distributions, find simple probabilities	**Glencoe Math Accelerated Chapter 10 Larson Pre Algebra Chapter 11**	7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.8, 8.SP.1, 8.SP.4
Final Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Expressions	**7.EE.1**	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients a. Write numeric expressions b. Write algebraic expressions c. Evaluate expressions d. Simplify expressions using order of operations Use properties of numbers to rewrite expressions **a.** Commutative properties of addition and multiplication **b.** Associative properties addition and multiplication **c.** Additive identity **d.** Multiplicative identity **e.** Multiplication property of zero	**Glencoe Math Accelerated Chapter 1** **Larson Pre Algebra Chapter 1**		**20 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Integers and Rational Numbers	**7.NS.1b**	Understand p + q as the number located a distance |q| from p in the positive direction depending on whether p is positive or negative. Interpret sums in real world contexts. a. Absolute value b. Adding integers c. Adding rationals	**Glencoe Math Accelerated Chapter 1** **Larson Pre Algebra Chapter 2.1**		**5 days**
Integers and Rational Numbers	**7.NS.1c**	Understand subtraction of rational numbers as adding the additive inverse p – q = p + (-q) Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this to real world contexts. a. Subtracting integers b. Subtracting Rationals	**Glencoe Math Accelerated Chapter 2** **Larson Pre Algebra Chapter 2**		**5 days**

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Integers and Rational Numbers	**7.NS.1d**	Apply properties of operations as strategies to add and subtract rational numbers.	**Glencoe Math Accelerated Chapter 2** **Larson Pre Algebra Chapter 2**		**5 days**
Integers and Rational Numbers	**7.NS.2**	Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers a. Multiplying integers b. Dividing integers c. Multiplying Rationals d. Reciprocals e. Dividing Rationals	**Glencoe Math Accelerated Chapter 2** **Larson Pre Algebra Chapter 2**		**5 days**
Integers and Rational Numbers	**7.NS.2D**	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0's or repeats.	**Glencoe Math Accelerated Chapter 3** **Larson Pre Algebra Chapter 5**		**5 days**

Integers and Rational Numbers	**7.NS.3**	Solve real world and mathematical problems involving the four operations with rational numbers	**Glencoe Math Accelerated Chapter 3** **Larson Pre Algebra Chapter 5**		**5 days**
Integers and Rational Numbers	**8.NS.1**	Know that the numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion, which repeats eventually into a rational number.	**Glencoe Math Accelerated Chapter 3** **Larson Pre Algebra Chapter 5**		**5 days**
Integers and Rational Numbers	**7.EE.3**	Solve real-life mathematical problems using numerical and algebraic expressions and equations a. multiplying rationals b. dividing rationals c. adding and subtracting rationals	**Glencoe Math Accelerated Chapter 3** **Larson Pre Algebra Chapter 5**		**5 days**

Exponents	**8.EE.1**	Know and apply the properties of integer exponents to generate equivalent numerical expressions.	**Glencoe Math Accelerated Chapter 4** **Larson Pre Algebra Chapter 4**		**5 days**
Exponents	**8.EE.2**	Use square root and cube roots to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes	**Glencoe Math Accelerated Chapter 4** **Larson Pre Algebra Chapter 4**		**5 days**
Exponents	**8.EE.3**	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.	**Glencoe Math Accelerated Chapter 4** **Larson Pre Algebra Chapter 4**		**2 days**
Exponents	**8.EE.4**	Perform operations with numbers expressed in scientific notation, including where both decimal and scientific notation are used.	**Glencoe Math Accelerated Chapter 4** **Larson Pre Algebra Chapter 4**		**3 days**

Ratio and Proportion	**7.RP.1**	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units	**Glencoe Math Accelerated Chapter 5** **Larson Pre Algebra Chapter 6**		**3 days**
Ratio and Proportion	**7.RP.2a**	Decide whether two quantities are in a proportional relationship.	**Glencoe Math Accelerated Chapter 5** **Larson Pre Algebra Chapter 6**		**2 days**
Ratio and Proportion	**7.RP.2c**	Represent proportional relationships by equations. a. percent of a number b. percent change c. discount and mark-up	**Glencoe Math Accelerated Chapter 5** **Larson Pre Algebra Chapter 6**		**5 days**
Linear Expressions	**7.EE.3**	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8** **Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		**8 days**

Linear Expressions	**8.EE.7**	Use properties of operations to generate equivalent expressions a. distributive property b. simplifying linear expressions c. combining like terms d. adding and subtracting expressions	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8** **Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		**7 days**
Linear Equations in One Variable	**7.EE.2**	Understand that rewriting an expression in different forms in a problem can shed light on the problem and how the quantities in it are related.	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8** **Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		
Linear Equations in One Variable	**8.EE.7**	To solve linear equations in one variable a. solve one step equations b. solve two step equations c. solve equations with variables on each side	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8** **Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		**8 days**

Linear Equations in One Variable	**7.EE.4**	Use variables to represent quantities in real-world or mathematical problem and construct simple equations and inequalities to solve by reasoning about the quantities.	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		**5 days**
Linear Equations in One Variable	**7.EE.4a**	Solve word problems leading to equations of the form px+q = r and p(x+q)=r where p,q, and r are specific rational numbers. Solve equations of this form fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8 Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		**5 days**
Linear Equations in One Variable	**8.EE.7b**	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	**Glencoe Math Accelerated Chapter 7 and Glencoe Math Accelerated 8 Larson Pre Algebra Chapter 2.2-2.6 and Larson Pre Algebra Chapter 3**		**5 days**

Linear Equations in One Variable	**8.EE.7**	Use properties of operations to generate equivalent expressions a. distributive property b. simplifying linear expressions c. combining like terms d. adding and subtracting expressions	**Glencoe Math Accelerated Chapter 8** **Larson Pre Algebra Chapter 9**		**5 days**
Linear Inequalities in One Variable	**7.EE.4b**	Solve word problems leading to inequalities of the form $px + q > r$ or $px+ q < r$ where p, q and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.	**Glencoe Math Accelerated Chapter 8** **Larson Pre Algebra Chapter 9**		**5 days**
Linear Functions	**8.F.1**	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output	**Glencoe Chapter Math Accelerated 1.6 and Glencoe Math Accelerated Chapter 9** **Larson Pre Algebra Chapter 8**		**5 days**

Linear Functions	**8.EE.5**	Graph proportional relationships interpreting the unit rate as the slope of the graph. Compare two different proportional relationships in different ways.	**Glencoe Math Accelerated Chapter 1.6 and Glencoe Math Accelerated Chapter 9 Larson Pre Algebra Chapter 8**		**5 days**
Linear Functions	**8.EE.6**	Use similar triangles to explain why the slope m is the same between any two distinct points on a non vertical line in the coordinate plane; derive the equation y=mx+b for a line through the origin and the equation y=mx+b for a line intercepting the vertical axis at b.	**Glencoe Math Accelerated Chapter 1.6 and Glencoe Math Accelerated Chapter 9 Larson Pre Algebra Chapter 8**		**2 days**
Linear Functions	**8.F.3**	Interpret the equation y=mx+b as defining a linear function whose graph is a straight line; give examples of functions that are not linear.	**Glencoe Math Accelerated Chapter 1.6 and Glencoe Math Accelerated Chapter 9 Larson Pre Algebra Chapter 8**		**5 days**

Data Analysis and Probability	**7.Sp.1**	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**5 days**
Data Analysis Probability	**7.SP.2**	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**5 days**

Data Analysis and Probability	**7.SP.3**	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**2 days**
Data Analysis and Probability	**7.SP.4**	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**3 days**
Data Analysis and Probability	**7.SP.8**	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**5 days**

Data Analysis and Probability	**8.SP.1**	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**5 days**
Data Analysis and Probability	**8.SP.1**	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**Glencoe Math Accelerated Chapter 10** **Larson Pre Algebra Chapter 11**		**5 days**
Final Exam Review					**10 Days**

Scranton School District Secondary Mathematics Curriculum Guides

Intermediate School Courses*

1. Common Core 7th Grade Accelerated (Grade 7)
2. Common Core Math 7P (Grade 7)
3. Common Core Math 7 (Grade 7)
4. Algebra I Accelerated K/CC (Grade 8)
5. Common Core 8P Concepts of Algebra (Grade 8)
6. Common Core Math 8 (Grade 8)

High School Courses *

1. Algebra I K/CC (Grade 9)
2. Algebra I Part 9A (Grade 9)
3. Algebra I Part 10A (Grade 10)
4. Algebra I Part 10B/K (Grade 10)
5. Algebra I Part 11B/K (Grade 11)
6. Honors Algebra I K/CC (Grade 9)
7. AP Computer Science (Grade 12)
8. Computer Science (Grades 11 or 12)
9. Algebra II (Grades 11 or 12)
10. Algebra II/Trigonometry (Grades 10 or 11)
11. Honors Algebra II/Trigonometry (Grades 10 or 11)
12. Business Math (Grade 12)
13. AP Calculus (Grade 12)
14. Honors Calculus I (Grade 12)
15. Calculus I (Grade 12)
16. Consumer Related Math (Grade 12)
17. Elementary Analysis (Grades 11 or 12)
18. Honors Elementary Analysis (Grades 11 or 12)
19. Applied Geometry 11 (Grade 11)
20. Applied Geometry 12 (Grade 12)
21. Geometry 9 (Grade 9)
22. Geometry 10 (Grade 10)
23. Geometry 11 (Grade 11)
24. Honors Geometry (Grades 9 and 10)
25. Pre Algebra (Grade 9)
26. Math Survey (Grade 12)
27. Statistics (Grade 12)
28. Trigonometry (Grade 12)

*There may be a rare grade level exception for a very few students as indicated on the Scranton School District Secondary Mathematics Curriculum Pathways document.

Course Title Here

Curriculum Guide

Scranton School District

Scranton, PA

Course Title Here

Prerequisite :

Course Description Here

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject:	**Grade Level**	**Date Completed:**

1st Quarter

Topic	**Resources**	**CCSS**

2nd Quarter

Topic	Resources	CCSS

3rd Quarter

Topic	Resources	CCSS

4th Quarter

Topic	Resources	CCSS

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
				Teacher prepared tests, quizzes, etc. **Series available assessments online. (Optional)**	

Honors/AP Prerequisites – <u>Grades 10 → 11 → 12</u>

Board Approved Policy – 5-5-14

Criteria for Admission to Honors and AP Courses		
Regular to Honors (5 out 6 criteria must be met for placement)	**Honors to Honors (5 out 6 criteria must be met for placement)**	**Honors to AP (5 out 7 criteria must be met for placement)**
• Proper Prerequisites – all preceding courses in the curriculum pathway have been successfully met • Scores of Advanced or top one-third of the Proficient on the *subject related* Keystone Exams • Course grade of 95 or better • Teacher Recommendation (In the case of Honors Chemistry or Physics, the recommendation of both the science and mathematics teacher is necessary.) • Counselor Recommendation • Parent Signature	• Proper Prerequisites – all preceding courses in the curriculum pathway have been successfully met - • Scores of Advanced or top one-third of the Proficient on the *subject related* Keystone Exams • Course grade of 92 or better • Teacher Recommendation (In the case of Honors Chemistry or Physics, the recommendation of both the science and mathematics teacher is necessary.) • Counselor Recommendation • Parent Signature	• Proper Prerequisites – all preceding courses in the curriculum pathway have been successfully met • AP Potential in subject area • Scores of Advanced or top one-third of the Proficient on the *subject related* Keystone Exams • Course grade of 93 or better • Teacher Recommendation (In the case of Honors Chemistry or Physics, the recommendation of both the science and mathematics teacher is necessary.) • Counselor Recommendation • Parent Signature

Statistics

Curriculum Guide

Scranton School District

Scranton, PA

Statistics

Prerequisite : Algebra II

Intended Audience: This course is designed for the student who has successfully completed Algebra I, Geometry and Algebra II by the end of the 11th grade.

Statistics is a course designed to provide students with the fundamental principles of probability and statistics with applications. Topics covered include probability models, combinations, discrete and continuous probability, estimating and testing, and confidence intervals. Students who plan to pursue a non-technical or liberal arts course of study will find this course useful.

Scranton School District
Curriculum Guide

Subject: Statistics	Grade Level: 12	Date Completed: Feb. 5, 2015

1st Quarter

Topic	Resources	CCSS
Data Classifications and Experimental Design	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 1	HSS.IC.A.1 HSS.IC.A.2 HSS.IC.A.3
Frequency Distributions and Displays	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 2	HSS.IC.B.5 HSS.IC.B.6 HSS.ID.A.1 HSS.ID.B.5 HSS.ID.B.6
Measures of Variation and Position (Central Tendencies)	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 2	HSS.ID.A.1 HSS.ID.A.2 HSS.ID.A.3 HSS.ID.A.4

2nd Quarter

Topic	Resources	CCSS
Probability	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 3	HSS.MD.A.1 HSS.MD.B.5 HSS.MD.B.6 HSS.MD.B.7 HSS.CP.A.1 HSS.CP.A.2 HSS.CP.A.3 HSS.CP.A.4 HSS.CP.A.5 HSS.CP.B.6 HSS.CP.B.7 HSS.CP.B.8 HSS.CP.B.9
Discrete Probability Distributions	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 4	HSS.MD.A.2 HSS.MD.A.3 HSS.MD.A.4
Normal Probability Distributions	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 5	HSS.MD.A.1 HSS.ID.A.4

3rd Quarter

Topic	Resources	CCSS
Confidence Intervals	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 6	HSS.MD.B.7 HSS.IC.B.4
Hypothesis Testing: (One Sample)	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 7	HSS.IC.A.1 HSS.IC.A.2 HSS.IC.B.3 HSS.IC.B.4

4th Quarter

Topic	Resources	CCSS
Hypothesis Testing (Two Samples)	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 8	HSS.IC.B.4 HSS.IC.B.5
Correlation and Regression	Pearson/Prentice Hall, Elementary Statistics, by Larson & Farber: Chapter 9	HSS.ID.B.6 HSS.ID.C.7 HSS.ID.C.8 HSS.ID.C.9
Final Exam Review		

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Data Classification and Experimental Design	**HSS.IC.A.1** **HSS.IC.A.2** **HSS.IC.B.3**	**-Sample and Population** **-Descriptive and Inferential Statistics** **-Qualitative and Quantitative** **-Levels of Measurement** **-Sampling Techniques**	**Elementary Statistics** **Chapter 1** **Sections: 1, 2, 3**	**Teacher prepared tests, quizzes, etc.**	**10 days**
Frequency Distributions	**HSS.IC.B.5** **HSS.IC.B.6** **HSS.ID.A.1** **HSS.ID.B.5** **HSS.ID.B.6**	*** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies) Recognize possible associations and trends in the data.** *** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.-Designing distributions** **-Histograms, Polygons, Ogive** **-Scatter Plot**	**Elementary Statistics** **Chapter 2** **Sections: 1, 2**		**15 days**

Central Tendencies and Variation	**HSS.ID.A.1** **HSS.ID.A.2** **HSS.ID.A.3** **HSS.ID.A.4**	*** Represent data with plots on the real number line (dot plots, histograms, and box plots)** *** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.** *** Interpret differences in shape, center, and spread in the context of the data sets,** **accounting for possible effects of extreme data points (outliers).-Mean, median and mode** **-Variance and Standard Deviation (sample and population)** **- Empirical Rule** **- Box-and-Whisker** **- z- score**	**Elementary Statistics** **Chapter 2** **Sections: 3, 4,5**		**10 days**

Probability	**HSS.MD.A.1** **HSS.MD.B.5** **HSS.MD.B.6** **HSS.MD.B.7** **HSS.CP.A.1** **HSS.CP.A.2** **HSS.CP.A.3** **HSS.CP.A.4** **HSS.CP.A.5** **HSS.CP.B.6** **HSS.CP.B.7** **HSS.CP.B.8** **HSS.CP.B.9**	*** Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.** *** Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.** **-Independent/Dependent events** **-Counting Principles** **-Multiplication/Addition Rule**	**Elementary Statistics** **Chapter 3** **Sections : 1, 2, 3, 4**		**18 days**
Discrete Probability Distributions	**HSS.MD.A.2** **HSS.MD.A.3** **HSS.MD.A.4**	**Use the concepts of independence and conditional probability to interpret data.** **-Discrete/ Continuous** **-Binomial, Geometric, Poisson Distributions**	**Elementary Statistics** **Chapter 4** **Sections: 1, 2, 3**		**18 days**

Normal Probability Distributions	**HSS.MD.A.1** **HSS.ID.A.4**	**Use the concepts of independence and conditional probability to interpret data.** **-Normal distributions and Probability** **-Specific data values for probability** **-Binomial distributions** **-Central Limit Theorem**	**Elementary Statistics** **Chapter 5** **Sections: 1, 2, 3, 4, 5**		**23 days**
Confidence Intervals	**HSS.MD.B.7** **HSS.IC.B.4**	**Recognize and evaluate random processes underlying statistical experiments.** **-Confidence intervals (Small & large samples, Variance, Standard Deviation)** **-Margin of Error** **-Chi-Square Distribution** **- Minimum Sample Size**	**Elementary Statistics** **Chapter 6** **Sections: 1, 2, 3, 4**		**21 days**

Hypothesis Testing (One Sample)	**HSS.IC.A.1** **HSS.IC.A.2** **HSS.IC.B.3** **HSS.IC.B.4**	**Make inferences and justify conclusions based on sample surveys, experiments, and observational studies** **-Hypothesis testing: Mean, Proportions, Variance and Standard Deviation** **-Finding P-values** **-Making and interpreting decisions on testing**	**Elementary Statistics** **Chapter 7** **Sections: 1, 2, 3, 4, 5**		**22 days**
Hypothesis Testing (Two Samples)	**HSS.IC.B.4** **HSS.IC.B.5**	**Make inferences and justify conclusions based on sample surveys, experiments and observational studies.** **-Two sample tests: z –test and t- test** **-Independent and Dependent samples** **-Difference between Population Proportions**	**Elementary Statistics** **Chapter 8** **Sections: 1, 2, 3, 4**		**21 days**

Correlations and Regression	**HSS.ID.B.6** **HSS.ID.C.7** **HSS.ID.C.8** **HSS.ID.C.9**	*** Compute (using technology) and interpret the correlation coefficient of a linear fit.** *** Distinguish between correlation and causation.** **-Correlation** **- Regression**	**Elementary Statistics** **Chapter 9** **Sections: 1, 2, 3**		**12 days**
Final Review and Exams					**10 days**

Textbooks and Workbooks

This is a listing of the textbooks and workbooks referenced in the SSD Secondary Mathematics Curriculum Guides.

Textbooks: Textbooks are listed in order (7-12) based on the Scranton School District Secondary Mathematics Curriculum Pathways.

Intermediate Schools:

Larson, Ron and Laurie Boswell. *Big Ideas Math Red A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2014. Print.

Larson, Ron and Laurie Boswell. *Big Ideas Math Red Accelerated A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2014. Print.

Larson, Ron and Laurie Boswell. *Big Ideas Math Blue A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2014. Print.

Larson, Ron and Laurie Boswell. *Big Ideas Math Algebra I A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2015. Print.

High Schools:

Larson, Ron, Laurie Boswell, Timothy D. Kanold, and Lee Stiff. *Larson Pre-Algebra*. Orlando: Holt McDougal, 2012. Print.

Carter, Cuevas, Day, Malloy, Molix-Bailey, Price, and Willard. *Math Accelerated.* Bothell: McGraw Hill, 2014. Print.

Larson, Ron and Laurie Boswell. *Big Ideas Math Algebra I A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2015. Print.

Larson, Ron and Laurie Boswell. *Big Ideas Math Geometry A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2015. Print.

Larson, Ron and Laurie Boswell. *Big Ideas Math Algebra II A Common Core Curriculum*. Erie: Big Ideas Learning, LLC, 2015. Print.

Smith, Stanley A., Randall I. Charles, John A. Dossey, and Marvin L. Bittenger. *Algebra 2 with Trigonometry.* Upper Saddle River: Prentice-Hall, Inc., 2001. Print.

Brown, Richard G. *Advanced Mathematics Precalculus*. Evanston: McDougal Littell Inc., 2003. Print.

Larson, Ron, Robert P. Hostettler, and Bruce H. Edwards. *Calculus of a Single Variable – 8th Edition*. Boston: Houghton Mifflin Company, 2006. Print.

Lewis, John, William Loftus and Cara Cocking. *Java software solutions 2nd Edition.* Boston: Pearson Addison Wesley, 2007. Print.

Horstmann, Cay. Big JAVA Early Objects Fifth Edition. Danvers: John Wiley & Sons, Inc., 2014. Print.

Larson, Ron and Betsy Farber. *Elementary Statistics Third Edition*. Upper Saddle River: Pearson Prentice Hall, 2006. Print.

Sullivan, Michael and Michael Sullivan, III. *Trigonometry Enhanced with Graphing Utilities A Right Triangle Approach*. Fourth Edition, Upper Saddle River: Pearson Prentice Hall, 2006. Print.

Angel, Angel R., Christine D. Abbott, Dennis C. Runde. *A Survey of Mathematics with Applications.* Boston: Pearson Prentice Hall, 2005. Print.

Cleaves, Cheryl, and Margie Hobbs, *Business Math 6th Edition,* Upper Saddle River: Prentice Hall, 2002. Print.

Schultheis, Robert and Raymond Kaczmarski. *Business Math 16th Edition*. Mason: Thomson Southwestern, 2006. Print.

Harmeyer, Kathleen. *Consumer Math*. Circle Pines: American Guidance Services, Inc., 2001. Print.

Workbooks

Grade 7:

Kaplan, Dr. Jerry. Common Core Coach Mathematics 7. NY: Triumph Learning LLC, 2013. Print.

Petroni-McMullen, Ann. *Crosswalk Coach for the Common Core State Standards. Mathematics, Grade 7*, NY: Triumph Learning LLC, 2011. Print.

Grade 8:

Kaplan, Dr. Jerr. *Common Core Support Coach Foundational Mathematics*. NY: Triumph Learning LLC, 2014. Print.

Kaplan, Dr. Jerry. *Common Core Coach Mathematics 8*. NY: Triumph Learning LLC, 2013. Print.

Oppenzato, Colleen O'Donnell. *Crosswalk Coach for the Common Core State Standards*, Mathematics, Grade 8. NY: Triumph Learning LLC, 2011. Print.

Grade 9:

Keystone Finish Line, Algebra I. Elizabethtown: The Continental Press, Inc. , 2013. Print.

	A	B	C	D
1	Timesheet	Judy Chickillo		
2				
3	Date:	Description:	Hours:	
4	8/13/2014	Math Curr Meeting at SHS	4.00	
5	9/16/2014	Meeting with John Marichak, Susan Burns, and Lori Stetzar. Conference room SHS	1.50	
6	9/19/2014	Formatting and revising original template	1.00	
7	10/1/2214	Math Curr Meeting at SHS	5.00	
8	10/27/2014	Curriculum Council Meeting Ad Bldg	1.00	
9	10/27/2014	Reviewing/Formatting	2.00	
10	10/28/2014	Math Curr Meeting at SHS	5.00	
11	11/30/2014	Formatting	2.50	
12	1/30/2015	Acknowledgement/Overview/Textbooks	1.00	
13	2/4/2014	Formatting	2.00	
14	2/5/2015	Math Curr Meeting at SHS	4.00	
15	2/18/2015	Math Curr Meeting at SHS	5.00	
16	3/7/2017	Formatting	1.00	
17	3/16/2015	Preparing Binder/ Format Checking	3.00	
18	3/17/2015	Math Curr Meeting at SHS	5.00	
19	3/20/2015	Formatting	2.00	
20				
21				
22	**Total:**		**45.00**	
23				
24				

Trigonometry

Curriculum Guide

Scranton School District

Scranton, PA

Trigonometry

Prerequisite: Algebra II, Geometry, Algebra I

Intended Audience: This course is designed for the student who has successfully completed Algebra II by the end of 11th grade.

This course enables students to understand trigonometric principles and to be able to apply then in various fields of mathematics. The topics include a study of functions of angles of any size, radian measure, trigonometric equations, identities, graphing of trigonometric functions, solution of triangles, and the use of various trigonometric formulas.

Scranton School District
Curriculum Guide

Year-at-a-glance

Subject: Trigonometry	**Grade Level: 12**	**Date Completed: 2/9/15**

1st Quarter

Topic	Resources	CCSS
1. Algebra Review Evaluate Algebraic Expressions Determine the Domain Graph Inequalities Laws of Exponents Evaluate Square Roots	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A1.1.2.1.1 A1.1.3.1.2 A1.1.3.1.1 A2.1.2.1.1 A2.1.2.1.3
2. Geometry Review Pythagorean Theorem Geometric Formulas	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	G2.1.1.1 G2.1.2.1 G2.2.2.1 G1.2.1.2 G2.2.2.2 G2.2.3.1
3. Solving Equations With Algebra Solve Linear Equations Factoring Quadratics	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A1.1.2.1.1 A2.2.2.1.1 A2.2.2..1.3
4. Complex Numbers +,-, x,/ Complex Numbers Powers of i	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A2.1.3.1.1 A2.1.1.1.1 A2.1.1.2.1 A2.1.1.2.2

5. Roots, Rational Exponents, Radical Equations Work with Roots Simplify Radicals Rationalize Denominators Solve Radical Equations Simplify Expressions with Rational Exponents	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A2.1.3.1.2 A2.2.1.1.3
6. Lines Using Slope, Point Slope, Slope Intercept Graph Lines Write Equations of Lines Parallel and Perpendicular	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A1.2.2.1.3

2nd Quarter

Topic	Resources	CCSS
1. Functions and Graphs Use Distance and Midpoint Formulas Graphing Points and Lines by Hand and Graphing Utility	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	G2.2.1.2.1 A1.1.2.1.1 A1.1.3.2.2
2. Circles Standard Form Graphing Circles by Hand and Graphing Utility	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	G.1.3.1.1 G.1.3.1.2
3. Functions Relations – Vertical Line Test Values of Functions Domain of Functions +,-, x,/ of 2 functions	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A1.1.3.2.2 A2.1.3.1.1 A2.1.3.1.2 A2.1.3.1.3 A2.1.3.1.4
4. Graphing Techniques Using Vertical and Horizontal Shifts Using Compressions and Stretching	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A1.2.1.2.1 A1.2.1.2.2 A2.1.3.1.3 A2.1.3.1.4 A2.1.3.2.1
5. Use of Functions Composite Functions 1 to 1 Functions Inverse Functions	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook	A2.2.1.1.2 A2.2.1.1.3 A2.2.1.1.4 A2.2.2.1.1

3rd Quarter

Topic	Resources	CCSS
1. Angles and their Measure Converting DMS to Decimal, vice versa Arc Length Degrees to Radians, vice versa Area of a sector of a circle Linear Speed	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	G.2.2.2.2 G.2.2.2.3 G.2.2.2.5 G.2.2.3.1 HSF.TF.A.1
2. Right Triangle Trigonometry Values of Acute Angles Complementary Angle Theorem	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSG.SRT.C.8 HSF.TF.C.8
3. Computing Values of Trig Functions Exacts Values of 45,30, 60, Use a Calculator to Approximate	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSG.SRT.C.8 HSF.TF.C.8
4. Trig Functions Of General Angles Quadrant Values Terminal Sides Reference Angle Unit Circle	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSF.TF.C.8 HSF.TF.A.1 HSF.TF.A.3
5. Graphs of Trig Functions Sine, Cos, Tan, Csc, Sec, Cot Phase Shifts Curve Fitting	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSF.TF.B.5 HSF.TF.C.8

4th Quarter

Topic	Resources	CCSS
1. Inverses Sine, Cos, Tan	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSG.SRT.C.8 HSF.TF.B.5
2. Trigonometric Identities Quotient Identity Reciprocal Identity Pythagorean Identity Sum and Difference Double Angle Half Angle	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSF.TF.A.1 HSF.TF.C.8 HSF.TF.C.9
3. Applications of Right Triangles Law of Sine and Cosines Area of Triangle	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSF.TF.B.5
4. Polar Coordinates Polar to Rectangular, vice versa Graphing Vectors	• Worksheets • Kuta Software* • Trigonometry: Enhanced with Graphing Utilities Textbook • Graphing Calculators	HSN.CN.B.4

General Topic	Academic Standard(s)	Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time
Algebra Review	**A1.1.2.1.1** **A1.1.3.1.2** **A1.1.3.1.1** **A2.1.2.1.1** **A2.1.2.1.3**	• **Write, solve and/or apply a linear equation (including problem situations).** • **Identify or graph the solution set to a linear inequality on a number line.** • **Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities).** • **Use exponential expressions to represent rational numbers.** • **Simplify/evaluate expressions involving multiplying with exponents, powers of powers and powers of products (limit to rational exponents).**	**Trigonometry: Enhanced with Graphing Utilities Textbook: A-1** **Worksheets** **Kuta Software***	**Teacher prepared tests, quizzes, etc.**	**5 Days**

Geometry Review	**G2.1.1.1** **G2.1.2.1** **G2.2.2.1** **G1.2.1.2** **G2.2.2.2** **G2.2.3.1**	• **Verify and apply geometric theorems as they relate to geometric figures.** • **Apply trigonometric ratios to solve problems involving right triangles.** • **Estimate area, perimeter, or circumference of an irregular figure** • **Identify and/or use properties of quadrilaterals.** • **Find the measurement of a missing length given the area, perimeter, or circumference.** • **Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: A-2** **Worksheets** **Kuta Software Geometry *** **Trigonometry: Enhanced with Graphing Utilities Textbook**		**5 Days**

Solving Equations with One Variable, Inequalities	**A1.1.2.1.1** **A2.2.2.1.1** **A2.2.2..1.3**	• **Write, solve and/or apply a linear equation.** • **Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics).** • **Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic function.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: A-3, A-5** **Worksheets** **Kuta Software***		**10 Days**

Complex Numbers	**A2.1.3.1.1** **A2.1.1.1.1** **A2.1.1.2.1** **A2.1.1.2.2**	• **Write and/or solve quadratic equations (including factoring and using the Quadratic Formula).** • **Simplify/write square roots in terms of *i* (e.g., $\sqrt{-24} = 2i\sqrt{6}$).** • **Add and subtract complex numbers (e.g., $(7 - 3i) - (2 + i) = 5 - 4i$).** • **Multiply and divide complex numbers (e.g., $(7 - 3i)(2 + i) = 17 + i$).**	**Trigonometry: Enhanced with Graphing Utilities Textbook: A-3, A-5** **Worksheets** **Kuta Software***		**10 Days**
Nth Roots, Radicals	**A2.1.3.1.2** **A2.2.1.1.3**	• **Solve equations involving rational and/or radical expressions (e.g., $10/(x + 3) + 12/(x - 2) = 1$ or $x^2 + 21x = 14$).** • **Determine the domain, range, or inverse of a relation.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: A-6** **Worksheets** **Practice**		**10 Days**

Lines	**A1.2.2.1.3**	• **Write or identify a linear equation when given** · **the graph of the line** · **two points on the line** · **the slope and a point on the line.** **Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: A-7** **Practice Worksheets** **Graphing Calculators** **Graph Paper**		**7 Days**

Functions/Graphs	**G2.2.1.2.1** **A1.1.2.1.1** **A1.1.3.2.2**	• **Use properties of angles formed by intersecting lines to find the measures of missing angles.** • **Write, solve, and/or apply a linear equation (including problem situations).** • **Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear inequalities.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 1.1,1.2** **Graph Paper** **Graphing Calculators**		**5 Days**
Circles	**G.1.3.1.1** **G.1.3.1.2**	• **Identify and/or use properties of congruent and similar polygons or solids.** • **Identify and/or use proportional relationships in** • **similar figures.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 1.3** **Graphing Calculators** **Graph Paper**		**7 Days**

Functions	**A1.1.3.2.2** **A2.1.3.1.1** **A2.1.3.1.2** **A2.1.3.1.3** **A2.1.3.1.4**	• **Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear inequalities.** • **Write and/or solve quadratic equations (including factoring and using the Quadratic Formula).** • **Solve equations involving rational and/or radical expressions (e.g., $10/(x + 3) + 12/(x – 2) = 1$ or $x^2 + 21x = 14$).** • **Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms).** • **Write, solve, and/or apply linear or exponential growth or decay.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 1.4** **Graphing Calculators**		**7 Days**

Graphing Techniques	**A1.2.1.2.1** **A1.2.1.2.2** **A2.1.3.1.3** **A2.1.3.1.4** **A2.1.3.2.1**	• **Create, interpret, and/or use the equation, graph, or table of a linear function.** • **Translate from one representation of a linear function to another (i.e., graph, table, and equation).** • **Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms).** • **Write, solve, and/or apply linear or exponential growth or decay (including problem situations).** • **Determine how a change in one variable relates to a change in a second variable (e.g., $y = 4/x$; if x doubles, what happens to y?).**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 1.5, 1.6, 1.7** **Graphing Calculators** **Graph Paper**		**5 Days**

Use of Functions	**A2.2.1.1.2** **A2.2.1.1.3** **A2.2.1.1.4** **A2.2.2.1.1**	• **Identify and/or extend a pattern as either an arithmetic or geometric sequence (e.g., given a geometric sequence, find the 20th term).** • **Determine the domain, range, or inverse of a relation.** • **Identify and/or determine the characteristics of an exponential, quadratic, or polynomial function (e.g., intervals of increase/decrease, intercepts, zeros, and asymptotes).** • **Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics).**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 1.8**		**5 Days**

Angles and Their Measure	**G.2.2.2.2** **G.2.2.2.3** **G.2.2.2.5** **G.2.2.3.1** **HSF.TF.A.1**	• **Find the measurement of a missing length, given the perimeter, circumference, or area.** • **Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon.** • **Find the area of a sector of a circle.** • **Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area.** • **Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 2.1** **Graphing Calculators**		**10 Days**

Right Triangle Trigonometry	**HSF.TF.A.3** **HSG.SRT.C.8** **HSF.TF.C.8**	• **Use special angles to determine geometrically the values of sine, cosine, tangent for 30,45, and 60 and use the unit circle to express the values of sine, cosine, and tangent for x, x + π and 2π - x in terms of their values for x, where x is any real number** • **Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems** • **Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant of the angle.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 2.2, 2.3** **Graphing Calculators**		**20 Days**

Trigonometric Functions	**HSG.SRT.C.8** **HSF.TF.B.5** **HSF.TF.C.8** **HSF.TF.A.1**	• **Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems** • **Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.** • **Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.** • **Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 2.4-2.7** **Graphing Calculators** **Unit Circle** **Computer Graphing Programs**		**20 Days**

Inverses	**HSG.SRT.C.8** **HSF.TF.B.5**	• **Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems** • **Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 3.1, 3.2** **Graphing Calculators**		**10 Days**

Trigonometric Identities	**HSF.TF.A.1** **HSF.TF.C.8** **HSF.TF.C.9**	• **Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.** • **Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.** • **Prove the addition and subtraction formulas for sine, cosine, and tangent and use them solve problems**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 3.3, 3.4, 3.8** **Formulas in Trigonometry: Enhanced with Graphing Utilities Textbook**		**10 Days**

Applications of Trigonometric Functions with Triangles	**HSF.TF.B.5**	• **Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 4.1-4.4** **Calculators** **Formulas Of Laws of Sines, Cosines** **Areas Formulas (Heron's)**		**10 Days**
Polar Coordinates	**HSN.CN.B.4**	• **Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.**	**Trigonometry: Enhanced with Graphing Utilities Textbook: 5.1-5.2** **Graphing Calculators** **Graph Paper**		**10 Days**
Final Exam Preparation					**14 Days**

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