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.

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.