Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 1: Variables, Expressions, and Integers

Unit Essential Question: **How can properties of integers be applied to simplify algebraic expressions?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Expressions and Variables	**Order of Operations**	**Integers**	**Coordinate Plane**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Numerical Expression, Variable, Variable Expressions, Evaluate, Verbal Model, Total, Plus, More Than, Increased By, Sum, Difference, Less Than, Minus, Decreased By, Of, Multiplied By, Times, Product, Quotient, Divided Into, Divided By, Power, Base, Exponent, Formula	Order of Operations, Grouping Symbols, PEMDAS	Integers, Negative Integers, Positive Integers, Absolute Value, Opposites, Additive Inverse, Additive Inverse Property, Multiplicative Inverse, Multiplicative Inverse Property	Coordinate Plane, x-axis, y-axis, Origin, Quadrant, Ordered Pair, x-coordinate, y-coordinate, Scatter Plot
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know how to write a mathematical sentence from a verbal model	• Know how to simplify expressions containing whole numbers	• Know how to simplify expressions containing integers	• Know how to plot points • Know how to determine the location of an ordered pair
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**	**UNDERSTAND**
• Understand the verbal words/phrases that pertain to each of the four mathematical operations	• Understand the order of operations and how it pertains to simplifying expressions	• Understand how to determine what sign an integer should be pertaining to a real-life application • Understand how to	• Understand how to determine if a relationship exists between points

		apply the order of operations to expressions containing integers	
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to write expressions representing real world scenarios	• Learners will be able to write expressions representing real world scenarios	• Learners will be able to write expressions representing real world scenarios	• Learners will be able to explain what relationship exists between coordinate pairs on a plane

Pa Core Standards:

CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs and data displays.

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

CC.2.2.7.B.1 Apply properties of operations to generate equivalent expressions.

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 1.1-1.3 Quiz, Chapter 1 Exam

Pacing: 14 days (including assessment)

Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 2: Solving Equations

Unit Essential Question: How do you solve equations to relate to real-word applications?

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Properties and Operations	**Simplifying Variable Expressions**	**Solving Equations Using Addition or Subtraction**	**Solving Equations Using Multiplication or Division**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Commutative Property of Addition, Commutative Property of Multiplication, Associative Property of Addition, Associative Property of Multiplication, Identity Property of Addition, Identity Property of Multiplication, Equivalent Numerical Expressions, Equivalent Variable Expressions, Distributive Property	Terms of an Expressions, Coefficient of a Term, Constant Term, Like Terms	Equation, Solution of an Equation, Solving an Equation, Inverse Operations, Equivalent Equations	Equation, Solution of an Equation, Solving an Equation, Inverse Operations, Equivalent Equations
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know the algebraic properties	• Know how to simplify any given expression • Know how to identify terms, coefficients, constants, and like terms	• Know the inverse operations	• Know the inverse operations

UNDERSTAND	UNDERSTAND	UNDERSTAND	UNDERSTAND
• Understand how algebraic properties can be used to change expressions around	• Understand the process of fully simplifying any given algebraic expression	• Understand how to use addition/subtraction to solve a one-step equation	• Understand how to use multiplication/division to solve a one-step equation
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to manipulate algebraic expressions using algebraic properties	• Learners will be able to simplify algebraic expressions completely	• Learners will be apply the solution to a one-step equation to a real-world scenario	• Learners will be apply the solution to a one-step equation to a real-world scenario

Pa Core Standards:

CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

CC.2.2.7.B1 Apply properties of operations to generate equivalent expressions.

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.

CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.

CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: **Unit Assessment, Vocabulary Quizzes, 2.1-2.3 Quiz, Chapter 2 Exam**

Pacing: **15 days (including assessment)**

Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 3: Multi-Step Equations and Inequalities

Unit Essential Question: **How can multi-step equations and inequalities be used to solve problems that occur in the real-world?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Multi-Step Equations	**Equations With Variables on Both Sides**	**Solving One-Step Inequalities**	**Solving Multi-Step Inequalities**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Equation, Solution of an Equation, Solving an Equation, Inverse Operations, Equivalent Equations, Distributive Property, Variable, Constant	Equation, Solution of an Equation, Solving an Equation, Inverse Operations, Equivalent Equations, Distributive Property, Variable, Constant	Inequality, Solution of an Inequality, Equivalent Inequalities, Inverse Operations, Number Line, Shading, Point, Open, Closed	Inequality, Solution of an Inequality, Equivalent Inequalities, Inverse Operations, Number Line, Shading, Point, Open, Closed
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know how to identify the inverse operation	• Know how to identify like terms • Know how to identify inverse operations	• Know how to identify inverse operations • Know how to determine what type of point is needed when graphing an inequality	• Know how to identify inverse operations • Know how to determine what type of point is needed when graphing an inequality
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**	**UNDERSTAND**
• Understand how to go through the order of operations in reverse order to solve an equation	• Understand how to go through the order of operations in reverse order to solve an equation	• Understand what multiplying/dividing both sides of an inequality does to the variable	• Understand what multiplying/dividing both sides of an inequality does to the variable

		• Understand how to determine which side of the point needs to be shaded on the number line	• Understand how to determine which side of the point needs to be shaded on the number line
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to	• Learners will be able to	• Learners will be able to solve an one-step inequality and apply their solution to a real-world problem • Learners will be able to explain why one solution does not suffice with an inequality	• Learners will be able to explain why one solution does not suffice with an inequality • Learners will be able to solve a multi-step inequality and apply their solution to a real-world problem

Pa Core Standards:

CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

CC.2.2.7.B1 Apply properties of operations to generate equivalent expressions.

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.

CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.

CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: **Unit Assessment, Vocabulary Quizzes, 3.1-3.3 Quiz, Chapter 3 Exam**

Pacing: **15 days (including assessment)**

Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 4: Factors, Fractions, and Exponents

Unit Essential Question: **How can factors, multiples, and scientific notation be used in applications of real world scenarios?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Factors, Prime Factorization	**Greatest Common Factor, Least Common Multiple**	**Exponent Rules**	**Scientific Notation**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Prime Number, Composite Number, Prime Factorization, Factor Tree, Monomial, Factors	Common Factor, Greatest Common Factor (GCF), Relatively Prime, Equivalent Fractions, Simplest Form, Multiple, Common Multiple, Least Common Multiple, Least Common Denominator, Numerator	Product of Powers Property, Quotient of Powers Property, Negative Exponent, Zero Exponent, Numerator, Denominator	Power, Scientific Notation, Standard Notation, Product Form, Right, Left, Decimal Point, Positive, Negative
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know how to find factors of any given number • Know what a prime number is	• Know how to find factors of any given number • Know how to identify the GCF • Know how to find multiples of any given number • Know how to identify the LCM	• Know how to simplify algebraic expressions	• Know what standard form is • Know what scientific notation is

UNDERSTAND	UNDERSTAND	UNDERSTAND	UNDERSTAND
• Understand the process for finding the prime factorization for any given number	• Understand the process for determining if two numbers are relatively prime • Understand the difference between the GCF and LCM	• Understand the short cuts for fully simplifying algebraic expressions that may contain fractions	• Understand how to convert from standard form into scientific notation • Understand how to convert from scientific notation into standard form
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to complete a factor tree for any number	• Learners will be able to find the GCF for two or more algebraic expressions • Learners will be able to explain the similarities and differences in the processes used to find the GCF and LCM	• Learners will be able to apply exponent laws to any give algebraic expression so that it can be expressed in its simplest form	• Learners will be able to write any given number in scientific notation and/or standard form • Learners will be able to perform operations on numbers written in scientific notation

Pa Core Standards:

CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.

CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

A1.1.1.1 Represent and/or use numbers in equivalent forms.

A1.1.1.3 Use exponents, roots and/or absolute value to solve problems.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 4.1-4.4 Quiz, Chapter 4 Exam
Pacing: 18 days (including assessment)
Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: **Pre-Algebra** **Grade**: **9**

Unit 5: Rational Numbers and Equations

Unit Essential Question: **How can rational numbers be an integral part of mathematics application?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Rational Numbers	**Adding & Subtracting Fractions**	**Multiplying & Dividing Fractions**	**Solving Equations & Inequalities with Rational Numbers**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Rational Number, Terminating Decimal, Repeating Decimal, Numerator, Denominator	Like, Denominator, Fraction, Least Common Denominator, Least Common Multiple, Simplest Form	Numerator, Denominator, Reciprocal, Simplest Form, Exponent Rules	Numerator, Denominator, Reciprocal, Simplest Form, Exponent Rules, Like, Denominator, Fraction, Least Common Denominator, Least Common Multiple, Simplest Form, Multiplicative Inverse
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know what it means for a number to be rational	• Know how to add/subtract fractions	• Know how to multiply/divide fractions	• Know how to solve equations and/or inequalities containing fractions
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**	**UNDERSTAND**
• Understand how to convert between fractions and decimals	• Understand how to find a common denominator in order to add/subtract fractions	• Understand the process for multiplying and dividing fractions	• Understand how to solve equations/inequalities

LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME
• Learners will be able to convert between decimals and fractions • Learners will be able to determine what form is best for an answer, a decimal or a fraction	• Learners will be able to add and subtract fractions by applying their knowledge of LCM	• Learners will be able to find the product or quotient or two or more fractions and give their answer in complete simplest form	• Learners will be able to apply prior knowledge of solving equations/inequalities and extend that knowledge to solving equations/inequalities that contain fractions

Pa Core Standards:

CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers.

CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties.

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

CC.2.2.7.B1 Apply properties of operations to generate equivalent expressions.

CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.

CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.

CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 5.1-5.4 Quiz, Chapter 5 Exam
Pacing: 15 days (including assessment)
Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 6: Ratio, Proportion, and Probability

Unit Essential Question: How can an accurate scale drawing be made?
How can probability be used to calculate outcomes?

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Ratios & Proportions	**Scale Drawings**	**Probability & Odds**	**Multiplication Principle**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Ratio, Equivalent Ratios, Rate, Unit Rate, Proportion, Inverse Operations, Cross Product (Cross Multiplying)	Ratio, Proportion, Scale Drawing, Scale Model, Scale, 2-Dimensional, 3-Dimensional	Outcomes, Event, Favorable Outcomes, Probability, Theoretical Probability, Experimental Probability, Odds in Favor, Odds Against	Tree Diagram, Multiplication Principle
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know the difference between a rate and a unit rate • Know to include units with their answers	• Know how to solve a proportion	• Know difference between probability and odds	• Know how to make a tree diagram

UNDERSTAND	UNDERSTAND	UNDERSTAND	UNDERSTAND
• Understand how to set up a proportion • Understand how to solve a proportion	• Understand how to set up a proportion to correctly determine the measurements for a scale drawing	• Understand how to find probability • Understand how to find odds	• Understand how to use the multiplication principle to find the probability
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to set up and solve proportions	• Learners will be able to apply proportions to make a scale drawing of any given object	• Learners will be able to determine the probability of an event occuring	• Learners will be able to determine the possible number of outcomes using the multiplication principle

Pa Core Standards:

CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.

CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.
M07.A-R.1 Demonstrate an understanding of proportional relationships.
M07.A-R.1.1 Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.
M07.A.A-R.1.1.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.
M07.A-R.1.1.2 Determine whether two quantities are proportionally related.
A1.1.1.4 Use estimation strategies in problem-solving situations.
M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.
M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 6.1-6.3 Quiz. Chapter 6 Exam
Pacing: 14 days (including assessment)
Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 7: Percents

Unit Essential Question: **How do you use percents to solve real-life problems?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Percents, Fractions, Decimals	**Percent Equation**	**Percent Change**	**Percent Applications**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Percent, Decimal, Fraction, Proportion, Right, Left, Cross Multiply, Inverse Operations	Is, Of, Percent, Inverse Operations, Proportion	Percent of Change, Percent of Increase, Percent of Decrease, Difference, Original,	Markup, Discount, Percent, Difference
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know how to write a proportion	• Know how to write a proportion	• Know how to tell if something is a percent increase or decrease	• Know how markups and discounts are performed
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**	**UNDERSTAND**
• Understand how to convert between decimals, fractions, and percents	• Understand how to set up and solve the percent equation	• Understand the process for finding the percent change	• Understand how to determine a new price for something

LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME
• Learners will be able to determine the best form of a number to express the answer	• Learners will be able to use inverse operations to solve the percent equation and apply their answer to real-life	• Learners will be able to determine by what percent a number is changing	• Learners will be able to use the original price to find the new price after a markup or discount • Learners will be able to use the new price after a markup or discount to find the original price

Pa Core Standards:

A1.1.1.1 Represent and/or use numbers in equivalent forms.
A1.1.1.4 Use estimation strategies in problem-solving situations.
M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.
M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 7.1-7.4 Quiz, Chapter 7 Exam

Pacing: 14 days (including assessment)

Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 8: Linear Functions

Unit Essential Question: **How can you represent functions graphically and interpret them to make sense for a real-world scenario?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Relations & Functions	**Linear Equation in Two Variables**	**Slope-Intercept Form**	**Writing Linear Equations & Function Notation**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Relation, Domain, Range, Input, Output, Function, Vertical Line Test, Interval Notation	Equation in Two Variables, Solution of an Equation in Two Variables, Ordered Pair, Graph of an Equation in Two Variables, Linear Equation, Linear Function, Function Form, Nonlinear Function, Increasing Function, Decreasing Function, X-Intercept, Y-Intercept	Equation in Two Variables, Solution of an Equation in Two Variables, Ordered Pair, Graph of an Equation in Two Variables, Linear Equation, Slope, Rise, Run, Vertical, Horizontal, Undefined, Slope-Intercept Form, Y-Intercept	Best-Fitting Line, Line of Best Fit, Equation in Two Variables, Solution of an Equation in Two Variables, Ordered Pair, Graph of an Equation in Two Variables, Linear Equation
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know difference between domain and range	• Know how to graph a two variable equation	• Know what slope-intercept form is	• Know what line of best fit is

UNDERSTAND	UNDERSTAND	UNDERSTAND	UNDERSTAND
• Understand how to quickly test if a relation displayed on a graph is a function	• Understand how to find the intercepts of a two variable equation	• Understand how to convert a two variable equation into slope-intercept form	• Understand how to use the line of best fit to determine the output for any given input
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to graph any given relation and determine if it is a function or not	• Learners will be able to represent functions on a coordinate plane	• Learners will be able to convert a two variable equation into slope-intercept form, graph the equation, and interpret the solution(s)	• Learners will be able to express a real-life situation as an equation • Learners will be able to offer a solution to a real-life scenario that can be expressed as a linear equation

Pa Core Standards:

CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs and data displays.

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.

CC.2.2.8.C.1 Define, evaluate, and compare functions.

CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.

CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.

CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.

CC.2.2.HS.C.6 Interpret functions in terms of the situation they model.

CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.

CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.

CC.2.4.HS.B.3 Analyze linear models to make interpretations based on data.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 8.1-8.3 Quiz, Chapter 8 Exam

Pacing: 17 days (including assessment)

Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra Grade: 9

Unit 9: Real Numbers and Right Triangles

Unit Essential Question: How do you apply square roots to real life situations?

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Simplifying Square Roots	**Operations with Square Roots**	**Pythagorean Theorem**	**Real Numbers**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Square Root, Perfect Square, Radical Expression, Radical, Radicand	Square Root, Perfect Square, Radical Expression, Radical, Radicand, Simplest Form, Like Terms, Rationalize	Right Triangle, Legs, Hypotenuse, Pythagorean Theorem	Irrational Numbers, Rational Numbers, Real Numbers
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know perfect squares up to and including 15	• Know how to simplify a square root	• Know the difference between a leg and the hypotenuse of a right triangle	• Know difference between rational and irrational
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**	**UNDERSTAND**
• Understand how to apply prime factorization to simplifying a square root	• Understand what needs to be done in order to add/subtract square roots	• Understand the Pythagorean Theorem	• Understand how to order numbers from least to greatest

LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME
• Learners will be able to simplify radical expressions	• Learners will be able to perform operations with radical expressions	• Learners will be able to	• Learners will be able to order rational numbers

Pa Core Standards:

CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties.

CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.

A1.1.1.1.1 Compare and/or order any real numbers (rational and irrational may be mixed).

A1.1.1.1.2 Simplify square roots.

A1.1.1.4 Use estimation strategies in problem-solving situations.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, Square Root Quiz, Chapter 9 Exam
Pacing: 12 days (including assessment)
Resources: Schoology, Holt McDougal Larson Text, ALEKS

Pequea Valley School District
Math

Course: Pre-Algebra **Grade**: 9

Unit 10: Data Analysis and Probability

Unit Essential Question: **How can you use probability and/or data to determine what may happen in the future?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Stem-and-Leaf Plots	**Histograms**	**Box-and-Whisker Plots**	**Permutation & Combination**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
Stem-and-Leaf Plot, Frequency, Frequency Table	Frequency, Frequency Table, Histogram	Box-and-Whisker Plot, Lower Quartile, Upper Quartile, Lower Extreme, Upper Extreme, Interquartile Range	Permutation, n Factorial, 0 Factorial, Combination
KNOW	**KNOW**	**KNOW**	**KNOW**
• Know different ways to represent data • Know how to read a stem-and-leaf plot	• Know different ways to represent data • Know how to read a histogram	• Know different ways to represent data • Know the pieces of data necessary to make a box-and-whisker plot	• Know the difference between a permutation and a combination

UNDERSTAND	UNDERSTAND	UNDERSTAND	UNDERSTAND
• Understand how to find the stem and leaf for each piece of data	• Understand how to find the ranges for each bar on the histogram	• Understand how to find each quartile • Understand how to find the interquartile range	• Understand how to find the number of permutations • Understand how to find the number of combinations
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to construct a stem-and-leaf plot of any data • Learners will be able to interpret any given stem-and-leaf plot	• Learners will be able to construct a histogram of any data set • Learners will be able to read a histogram	• Learners will be able to construct a box-and-whisker plot • Learners will be able to read and interpret any give box-and-whisker plot	• Learners will be able to determine whether a permutation or combination should be used in any given situation

Pa Core Standards:

CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.
CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.
A2.2.3.1 Analyze and/or interpret data on a scatter plot and/or use a scatter plot to make predictions.
A1.1.1.4 Use estimation strategies in problem-solving situations.
M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.
M07.B-E.2.3 Determine the reasonableness of answer(s) in problem-solving situations.

Assessments: Unit Assessment, Vocabulary Quizzes, 11.1-11.2 Quiz, Chapter 11 Exam

Pacing: 14 days (including assessment)

Resources: Schoology, Holt McDougal Larson Text, ALEKS