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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
	Algebra 1	
CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.	N.RN. 1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5. 2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	2.1.A1.A Model and compare values of irrational numbers. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.
CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.	N.RN. 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.	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of binomial times a trinomial; solve and graph linear equations and inequalities.
CC.2.1.HS.F.3 Apply quantitative reasoning to choose and Interpret units and scales in formulas, graphs and data displays.	N.Q. 1. 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. 2. Define appropriate quantities for the purpose of descriptive modeling. 3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.8.A1.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations, and inequalities, and functional relationships that model problem situations.

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CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.	N.Q. 1. 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. 2. Define appropriate quantities for the purpose of descriptive modeling.	2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.8.A1.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations, and inequalities, and functional relationships that model problem situations. 2.8.A1.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situations that motivated the model.
CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	N.Q. 3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.8.A1.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations, and inequalities, and functional relationships that model problem situations. 2.8.A1.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model.
CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.	Intentionally Blank	2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.
CC.2.1.HS.F.7 Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.	Intentionally Blank	2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.

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CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.	A.SSE. 1. Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P. 2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.
CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.	A.SSE. 3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. 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%.	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.

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CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.	A.APR. 1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.
CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.5 Use polynomial identities to solve problems.	Intentionally Blank	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.2.A1.C Evaluate numerical expression that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times trinomial; solve and graph linear equations and inequalities.

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CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.	Intentionally Blank	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, product/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.
CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.	A.CED. 1. 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. 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. 3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. 4. 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. *Linear, quadratic, and exponential (integer inputs only); for A.CED.3 linear only.*	2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.8.A1.B Evaluate and simplify complex algebraic expressions, for example: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities.

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CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.	A.REI. 1. 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. 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.8.A1.E Use combination of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations, and inequalities and functional relationships that model problem situations. 2.8.A1.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model.
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.	A.REI. 1. 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. 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	2.1.A1.A Model and compare values of irrational numbers. 2.1.A1.B Use factoring to create equivalent forms of polynomials. 2.1.A1.E Apply the concepts of prime and composite monomials to determine GCFs (Greatest Common Factor) and LCMs (Least Common Multiple) of monomials. 2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.2.A1.C Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values. 2.8.A1.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations, and inequalities, and functional relationships that model problem situations. 2.8.A1.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model.

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CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	A.REI. 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. 4. Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. 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. 6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. 7. 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 $x^2 + y^2 = 3$. 10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). 11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. 12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	2.1.A1.F Extend the concept and use of inverse operations to determine unknown quantities in linear and polynomial equations. 2.8.A1.B Evaluate and simplify algebraic expressions, for examples: sums of polynomials, products/quotients of exponential terms and product of a binomial times a trinomial; solve and graph linear equations and inequalities. 2.8.A1.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations, and inequalities, and functional relationships that model problem situations. 2.8.A1.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model.
CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.	F.IF. 1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x). 2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. 3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n≥ 1. *Learn as general principle; focus on linear and exponential and on arithmetic and geometric sequences.*	2.6.A1.C Select or calculate the appropriate measure of central tendency, calculate and apply the interquartile range for one-variable data, and construct a line of best fit and calculate its equation for two variable data. 2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions. 2.9.A1.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.A1.B Describe rates of change as modeled by linear equations.

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CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.	F.IF. 4. 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. 5. 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. 6. 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. 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 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. 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)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay	2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions.

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CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.	F.BF. 1. Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. 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. 2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	2.6.A1.C Select or calculate the appropriate measure of central tendency, calculate and apply the interquartile range for one-variable data, and construct a line of best fit and calculate its equation for two variable data. 2.8.A1.C Identify and represent patterns algebraically and/or graphically. 2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions. 2.8.A1.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model. 2.9.A1.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.A1.B Describe rates of change as modeled by linear equations.
CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.	F.BF. 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. 4. Find inverse functions. 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 x3 or f(x) = (x+1)/(x–1) for x ≠ 1.	2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions.

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CC.2.2.HS.C.5 Construct and compare linear, quadratic and exponential models to solve problems.	F.LE. 1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another 2. 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). 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratic ally, or (more generally) as a polynomial function.	2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions. 2.9.A1.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.A1.B Describe rates of change as modeled by linear equations.
CC.2.2.HS.C.6 Interpret functions in terms of the situation they model.	F.LE. 5. Interpret the parameters in a linear or exponential function in terms of a context.	2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions. 2.9.A1.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.A1 Describe rates of change as modeled by linear equations.
CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.2 Apply rigid transformations to determine and explain congruence.	Intentionally Blank	Intentionally Blank

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CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.4 Apply the concept of congruence to create geometric constructions.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.5 Create justifications based on transformations to establish similarity of plane figures.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.10 Translate between the geometric description and the equation for a conic section.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.12 Explain volume formulas and use them to solve problems.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.	Intentionally Blank	Intentionally Blank

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CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.	S.ID. 1. Represent data with plots on the real number line (dot plots, histograms, and box plots). 2. 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. 3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	2.6.A1.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A1.A Calculate probabilities for independent, dependent, or compound events.
CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.	S.ID. 5. 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. 6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	2.8.A1.D Demonstrate an understanding and apply properties of functions (domain, range) and characteristics of linear functions. 2.9.A1.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.A1 Describe rates of change as modeled by linear equations.
CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.	S.ID. 7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. 8. Compute (using technology) and interpret the correlation coefficient of a linear fit. 9. Distinguish between correlation and causation.	2.6.A1.C Select or calculate the appropriate measure of central tendency, calculate and apply the interquartile range for one-variable data, and construct a line of best fit and calculate its equation for two variable data. 2.7.A1.A Calculate probabilities for independent, dependent, or compound events. 2.9.A1.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.A1.B Describe rates of change as modeled by linear equations.
CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.	Intentionally Blank	2.7.A1.A Calculate probabilities for independent, dependent, or compound events.
CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.	Intentionally Blank	2.7.A1.A Calculate probabilities for independent, dependent, or compound events.

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CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.	S.CP. 6. 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. 7. 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.	2.7.A1.A Calculate probabilities for independent, dependent, or compound events.
	Algebra 2	
CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.	Intentionally Blank	2.1.A2.A Model and compare values of complex numbers. 2.1.A2.D Use exponential notation to represent any rational number. 2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.2.A2.C Evaluate numerical expressions of complex numbers that include the four basic operations and operations of powers, opposites, conjugates, and absolute values.
CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.	Intentionally Blank	Intentionally Blank

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CC.2.1.HS.F.3 Apply quantitative reasoning to choose and Interpret units and scales in formulas, graphs and data displays.	Intentionally Blank	2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.6A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes. 2.8.A2.B Evaluate and simplify algebraic expressions: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph, linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.D Demonstrate and understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.8.A2.E Us combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.11A2.A Determine and interpret maximum and minimum values of a function over a specified interval

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CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.	Intentionally Blank	2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.D Demonstrate an understanding and apply properties of functional (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.11.A2.A Determine and interpret maximum and minimum values of a function over a specified interval.
CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Intentionally Blank	2.6.A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes.
CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.	N.CN. 1. Know there is a complex number i such that i2 = –1, and every complex number has the form a + bi with a and b real. 2. Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	2.1.A2.A Model and compare values of complex numbers. 2.2.A2.C Evaluate numerical expressions of complex numbers that include the four basic operations and operations of powers, opposites, conjugates, and absolute values.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.1.HS.F.7 Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.	N.CN. 7. Solve quadratic equations with real coefficients that have complex solutions. 8. (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as (x + 2i)(x – 2i). 9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	Intentionally Blank
CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.	A.SSE. 1. Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P. 2. Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).	2.1.A2.B Use factoring to create equivalent forms of polynomials. 2.1.A2.D Use exponential notation to represent any rational number. 2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.2.A2.C Evaluate numerical expressions of complex numbers that include the four basic operations and operations of powers, opposites, conjugates, and absolute values.
CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.	A.SSE. 4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.	2.1.A2.B Use factoring to create equivalent forms of polynomials. 2.1.A2.D Use exponential notation to represent any rational number. 2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential, and logarithmic expression to determine unknown quantities in equations. 2.2.A2.C Evaluate numerical expressions of complex numbers that include four basic operations and operations of powers, opposites, conjugates, and absolute values.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.	A.APR. 1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	2.1.A2.B Use factoring to create equivalent forms of polynomials. 2.1.A2.D Use exponential notation to represent any rational number. 2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.2.A2.C Evaluate numerical expressions of complex numbers that include the four basic operations and operations of powers, opposites, conjugates, and absolute values.
CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.	A.APR. 2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x). 3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	2.1.A2.B Use factoring to create equivalent forms of polynomials. 2.1.A2.D Use exponential notation to represent any rational number. 2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.2.A2.C Evaluate numerical expressions of complex numbers that include the four basic operations and operations of powers, opposites, conjugates, and absolute values.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.D.5 Use polynomial identities to solve problems.	A.APR. 4. Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x2 + y2)^2 = (x2 – y2)^2 + (2xy)^2$ can be used to generate Pythagorean triples. 5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.1	2.1.A2.B Use factoring to create equivalent forms of polynomials. 2.1.A2.D Use exponential notation to represent any rational number. 2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.2.A2.C Evaluate numerical expressions of complex numbers that include the four basic operations and operations of powers, opposites, conjugates, and absolute values. 2.3.A2.C Solve a formula for a given variable using algebraic processes. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations and inequalities in the context of the situation that motivated the model. 2.11.A2.B Analyze and interpret rates growth/decay

PA Common Core Standards	Common Core State Standards	PA Academic Standards
CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.	A.APR. 6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples a computer algebra system. 7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.3.A2.C Solve a formula for a given variable using algebraic processes. 2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations and inequalities in the context of the situation that motivated the model. 2.11.A2.B Analyze and interpret rates growth/decay.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.	A.CED. 1. 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. 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. 3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. 4. 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.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.3.A2.C Solve a formula for a given variable using algebraic processes. 2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, solve and graph systems of equations and inequalities. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the equations, inequalities, systems of equations and inequalities in the context of the that situation that motivated the model. 2.11.A2.A Determine and interpret maximum and minimum values of a function over a specified interval. 2.11.A2.B Analyze and interpret rates growth/decay.

PA Common Core Standards	Common Core State Standards	PA Academic Standards
CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.	A.REI. 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.3.A2.C Solve a formula for a given variable using algebraic processes. 2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations, and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations and inequalities in the context of the situation that motivated the model. 2.11.A2.B Analyze and interpret rates growth/decay.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.	A.REI. 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.3.A2.C Solve a formula for a given variable using algebraic processes. 2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve linear, quadratic, exponential and logarithmic equations, and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model. 2.11.A2.B Analyze and interpret rates of growth/decay.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	A.REI. 11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.3.A2.C Solve a formula for a given variable using algebraic processes. 2.3.A2.E Describe how a change in the value of one variable in formulas affects the value of the measurement. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations and inequalities in the context of the situation that motivated the model. 2.11.A2.B Analyze and interpret rates growth/decay.
CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.	Intentionally Blank	2.8.A2.C Recognize, describe and generalize patterns using sequences and series to predict long-term outcomes. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic).

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.	F.IF. 4. 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. 5. 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. 6. 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. 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 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. 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)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay	2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.C Recognize, describe and generalize patterns using sequences and series to predict ling-term outcomes. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.2.A2.F Interpret the results solving equations, inequalities, systems of equations and inequalities in the context of the situation that motivated the model.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.	F.BF. 1. Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. 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.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and complex fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.C Recognize, describe and generalize patterns using sequences and series to predict long-term outcomes. 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model. 2.11.A2.A Determine and interpret maximum and minimum values of a function over a specified interval. 2.11.A2.B Analyze and interpret rates growth/decay.

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.	F.BF. 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. 4. Find inverse functions. 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 x3 or f(x) = (x+1)/(x–1) for x ≠ 1.	2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model. 2.11.A2.A Determine and interpret maximum and minimum values of a function over a specified interval. 2.11.A2.B Analyze and interpret rates growth/decay.

PA Common Core Standards	Common Core State Standards	PA Academic Standards
CC.2.2.HS.C.5 Construct and compare linear, quadratic and exponential models to solve problems.	F.LE. 2. 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). 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratic ally, or (more generally) as a polynomial function. 4. For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	2.1.A2.F Understand the concepts of exponential and logarithmic forms and use the inverse relationships between exponential and logarithmic expression to determine unknown quantities in equations. 2.8.A2.B Evaluate and simplify algebraic expressions, for example: products/quotients of polynomials, logarithmic expressions and compels fractions; and solve and graph linear, quadratic, exponential and logarithmic equations and inequalities, and solve and graph systems of equations and inequalities. 2.8.A2.C Recognize, describe and generalize patterns using sequences and series to predict long-term outcomes. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic. 2.8.A2.E Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations. 2.8.A2.F Interpret the results of solving equations, inequalities, systems of equations and inequalities in the context of the situation that motivated the model. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic). 2.11.A2.B Analyze and interpret rates growth/decay.
CC.2.2.HS.C.6 Interpret functions in terms of the situation they model.	Intentionally Blank	2.8.A2.C Recognize, describe and generalize patterns using sequences and series to predict long-term outcomes. 2.8.A2.D Demonstrate an understanding and apply properties of functions (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic).

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.	F.TF. 1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. 2. 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.	Intentionally Blank
CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs	F.TF. 5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	Intentionally Blank
CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.	F.TF. 8. 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.	Intentionally Blank
CC.2.3.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.2 Apply rigid transformations to determine and explain congruence.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.4 Apply the concept of congruence to create geometric constructions.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.5 Create justifications based on transformations to establish similarity of plane figures.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	Intentionally Blank	Intentionally Blank

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CC.2.3.HS.A.10 Translate between the geometric description and the equation for a conic section.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.12 Explain volume formulas and use them to solve problems.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects.	Intentionally Blank	Intentionally Blank
CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.	S.ID.4 4. 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.	Intentionally Blank
CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.	S.ID. 5. 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. 6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	2.6.A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes. 2.8.A2.C Recognize, describe and generalize patterns using sequences and series to predict long-term outcomes. 2.8.A2.D Demonstrate an understanding and apply properties of functional (domain, range, inverses) and characteristics of families of functions (linear, polynomial, rational, exponential, logarithmic).

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PA Common Core Standards	**Common Core State Standards**	**PA Academic Standards**
CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.	Intentionally Blank	2.6.A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes.
CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.	S.IC. 1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population. 2. 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?	2.6.A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of
CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.	S.IC. 3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each 4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. 5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. 6. Evaluate reports based on data.	2.6.A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes.

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CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.	Intentionally Blank	2.6.A2.C Construct a line of best fit and calculate its equation for linear and nonlinear two-variable data. 2.6.A2.E Make predictions based on lines of best fit or draw conclusions on the value of a variable in a population based on the results of a sample. 2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes.
CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.	S.MD. 6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). 7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	2.7.A2.A Use probability to predict the likelihood of an outcome in an experiment. 2.7.A2.C Compare odds and probability. 2.7.A2.E Use probability to make judgments about the likelihood of various outcomes.
	Geometry	
CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.	Intentionally Blank	Intentionally Blank
CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.	Intentionally Blank	Intentionally Blank
CC.2.1.HS.F.3 Apply quantitative reasoning to choose and Interpret units and scales in formulas, graphs and data displays.	Intentionally Blank	Intentionally Blank
CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.	Intentionally Blank	Intentionally Blank
CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Intentionally Blank	Intentionally Blank

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CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.	Intentionally Blank	Intentionally Blank
CC.2.1.HS.F.7 Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.5 Use polynomial identities to solve problems.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	Intentionally Blank	Intentionally Blank

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CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.	Intentionally Blank	2.3.G.C Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and is a transversal). 2.3.G.E Describe how a change in the value of one variable in area and volume formulas affect the value of the measurement. 2.7.G.A Use geometric figures and the concept of area to calculate probability. 2.11.G.A Find the measures of the sides of a polygon with a given perimeter that will maximize the area of the polygon. 2.11.G.C Use sums of areas of standard shapes to estimate the areas of complex shapes.
CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.5 Construct and compare linear, quadratic and exponential models to solve problems.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.6 Interpret functions in terms of the situation they model.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.	Intentionally Blank	Intentionally Blank
CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs	Intentionally Blank	Intentionally Blank

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CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.	Intentionally Blank	2.10.G.A Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.
CC.2.3.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.	G.CO. 1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. 2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). 3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. 4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. 5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	Intentionally Blank
CC.2.3.HS.A.2 Apply rigid transformations to determine and explain congruence.	G.CO. 6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. 7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. 8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	2.1.G.C Use ratio and proportion to model relationships between quantities. 2.4.G.A Write formal proofs (direct proofs, indirect proof/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments. 2.7.G.A Use geometric figures and the concept of area to calculate probability. 2.9.G.B Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.

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CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.	G.CO. 9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. 10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. 11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	2.1.G.C Use ratio and proportion to model relationships between quantities. 2.3.G.C Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and is transversal. 2.3.G.E Describe how a change in the value one variable in area and volume formulas affect the value of the measurement. 2.4.G.A Write formal proofs (direct proofs, indirect proofs/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments. 2.4.G.B Use statements, converses, inverses, and contrapositive to construct valid arguments or to validate arguments relating to geometric theorems. 2.7.G.A Use geometric figures and the concept of area to calculate probability. 2.9.G.B Use arguments based on transformation to establish congruence or similarity of 2 dimensional shapes. 2.11.G.A Find the measures of the sides of a polygon with a given perimeter that will maximize the area of the polygon. 2.11.G.C Use sums of areas of Standard Shapes to estimate the areas of complex shapes.
CC.2.3.HS.A.4 Apply the concept of congruence to create geometric constructions.	G.CO. 12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. 13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Intentionally Blank

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CC.2.3.HS.A.5 Create justifications based on transformations to establish similarity of plane figures.	G.SRT. 1. Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. 2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. 3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	2.1.G.C Use ratio and proportion to model relationships between quantities. 2.4.G.A Write formal proofs (direct proofs, indirect proof/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments. 2.7.G.A Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.
CC.2.3.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.	G.SRT. 4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. 5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	2.1.G.C Use ratio and proportion to model relationships between quantities. 2.4.G.A Write formal proofs (direct proofs, indirect proof/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments. 2.7.G.A Use statements, converse, inverses, and contrapositives to construct valid arguments or to validate arguments relating to geometric theorems. 2.9.G.B Use arguments based on transformation to establish congruence or similarity of 2 dimensional shapes.
CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.	GIST. 6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. 7. Explain and use the relationship between the sine and cosine of complementary angles. 8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	2.8.G.B Use algebraic representations to solve problems using coordinate geometry. 2.9.G.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.10.G.A Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

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CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles.	GM.. 1. Prove that all circles are similar. 2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. 3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. 4. (+) Construct a tangent line from a point outside a given circle to the circle.	2.4.G.A Write formal proofs (direct proofs, indirect proofs/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments. 2.4.G.B Use statements, converses, inverses, and contrapositives to construct valid arguments or to validate arguments relating to geometric theorems. 2.9.G.B Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.
CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	GM.. 5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	2.3.G.C Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and is a transversal).
CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	GM.. 5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	2.4.G.A Write formal proofs (direct proofs, indirect proofs/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments.
CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	GM.. 5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	2.9.G.A Identify and use properties and relations of geometric figures; create justifications for arguments related to geometric relations.
CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	GM.. 5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	2.11.G.A Find the measures of the sides of a polygon with a given perimeter that will maximize the area of the polygon.
CC.2.3.HS.A.10 Translate between the geometric description and the equation for a conic section.	GAGE. 1. 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. 2. Derive the equation of a parabola given a focus and directrix.	2.9.G.C Use techniques from coordinate geometry to establish properties of lines and 2-dimensional shapes and solids. 2.11.G.C Use sums of areas of standard shapes to estimate the areas of complex shapes.

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CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.	G.GPE. 4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1,√3) lies on the circle centered at the origin and containing the point (0, 2). 5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). 6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. 7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	2.4.G.B Use statements, converses, inverses, and contrapositives to construct valid arguments or to validate arguments relating to geometric theorems. 2.8.G.B Use algebraic representations to solve problems using coordinate geometry. 2.10.G.A Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.
CC.2.3.HS.A.12 Explain volume formulas and use them to solve problems.	G.GMD. 1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments. 3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	2.3.G.C Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and is a transversal). 2.3.G.E Describe how a change in the value of one variable in area and volume formulas affect the value of the measurement.
CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects.	G.GMD. 4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	2.3.G.C Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and is a transversal). 2.9.G.A Identify and use properties and relations of geometric figures; create justifications for arguments related to geometric relations.
CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.	G.MG. 1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). 2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). 3. 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).	2.3.G.E Describe how a change in the value of one variable in area and volume formulas affect the value of the measurement. 2.7.G.A Use geometric figures and the concept of area to calculate probability. 2.11.G.A Find the measures of the sides of a polygon with a given perimeter that will maximize the area of the polygon. 2.11.G.C Use sums of areas of standard shapes to estimate the areas of complex shapes.

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CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.	Intentionally Blank	Intentionally Blank
CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.	S.CP. 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”). 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. 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. 4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results. 5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.	Intentionally Blank

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CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.	S.CP. 6. 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. 7. 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. S.MD. 6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). 7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	Intentionally Blank