

<u>Unit/Concepts</u>	<u>PA Eligible Content</u>	<u>PA Common Core</u>	<u>Resources</u>	<u>Vocab</u>
Unit 1: Number Sets		CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.	Worksheets Graphing Calculator	1.1 set, number sets (Natural, Whole, etc.) 1.2 & 1.3 elements, empty set, set builder notation, interval
Unit 2: Solving Linear Equations Formulas Applications of Linear Equations	A2.1.3.1.4 Write, solve, and/or apply linear or exponential growth or decay (including problem situations). A2.1.3.2.2 Use algebraic processes to solve a formula for a given variable (e.g., solve $d = rt$ for r).	CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. CC.2.2.HS.C.5 Construct and compare linear, quadratic, and exponential models to solve problems. CC.2.2.HS.C.6	Textbook Chapter 2 Worksheets Graphing Calculator	linear equation, algebraic expression, formula diagram algebraic expression, linear equation, inequality, formula, inverse operation

<p>Unit 3:</p> <p>Slope, Intercepts, and Graphs</p> <p>Writing Equations of Lines</p> <p>Linear Inequalities (2- Vars.)</p> <p>Functions (Notation & Composition)</p> <p>Linear Inequalities</p> <p>Solving Absolute Value Equations</p>	<p>A2.1.3.1.4 Write, solve, and/or apply linear or exponential growth or decay (including problem situations).</p> <p>A2.2.1.1.3 Determine the domain, range, or inverse of a relation.</p>	<p>CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.</p> <p>CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</p> <p>CC.2.2.HS.C.2 Graph and analyze functions, and use their properties to make connections between the different representations.</p> <p>CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities</p> <p>CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.</p>	<p>Textbook Chapter 3</p> <p>Worksheets</p> <p>Graphing Calculator</p>	<p>ordered pair, origin, quadrant, x-intercept, slope, y-intercept, point-slope, slope-intercept, dependent variable, independent variable, relation, function, domain, range, vertical line test, composite function, direct variation, inverse variation, joint variation</p>
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<p>Unit 4:</p> <p>Systems of Equations (2- Vars.)</p> <p>Systems of Equations (>2 Vars.)</p> <p>Applications of Systems</p>	<p>A2.1.3.1.4</p> <p>Write, solve, and/or apply linear or exponential growth or decay (including problem situations).</p>	<p>CC.2.2.HS.C.3</p> <p>Write functions or sequences that model relationships between two quantities.</p> <p>CC.2.2.HS.C.5</p> <p>Construct and compare linear, quadratic, and exponential models to solve problems.</p> <p>CC.2.2.HS.C.6</p> <p>Interpret functions in terms of the situations they model.</p> <p>CC.2.2.HS.D.9</p> <p>Use reasoning to solve equations, and justify the solution method.</p> <p>CC.2.2.HS.D.10</p> <p>Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</p>	<p>Textbook Chapter 4</p> <p>Worksheets</p> <p>Graphing Calculator</p>	<p>linear system, elimination, substitution, matrix, column of matrix, row of matrix, size of matrix</p>
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Unit 5: Rules of Exponents Add/Sub. Polynomials Mult. Polynomials Special Products of Polynomials Factoring GCF Factoring by Grouping Factoring Trinomials ($x^2 + bx + c$) Factoring Trinomials ($ax^2 + bx + c$) Special Factoring Solving by Factoring	A2.1.2.2.1 Factor algebraic expressions, including difference of squares and trinomials. Note: Trinomials limited to the form ax^2+bx+c where a is not equal to 0. A2.1.2.1.1 Use exponential expressions to represent rational numbers. A2.1.2.1.2 Simplify/evaluate expressions involving positive and negative exponents and/or roots (may contain all types of real numbers—exponents should not exceed power of 10). A2.1.2.1.3 Simplify/evaluate expressions involving multiplying with exponents(e.g., $x^6 \cdot x^7 = x^{13}$), powers of powers (e.g., $(x^6)^7 = x^{42}$), and powers of products(e.g., $(2x^2)^3 = 8x^6$). Note: Limit to rational exponents. A2.1.3.1.1 Write and/or solve quadratic equations (including factoring and using the Quadratic Formula).	CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents. CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems. CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials. CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. CC.2.2.HS.D.5 Use polynomial identities to solve problems. CC.2.2.HS.D.9 Use reasoning to solve equations, and justify the solution method.	Textbook Chapter 5 Worksheets Graphing Calculator	polynomial, monomial, binomial, trinomial, degree of polynomial, degree of term, factoring, greatest common factor, zero-product property, linear, quadratic, cubic, quartic, quintic, perfect square trinomial
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Unit 6: Discriminant and Quadratic Formula Calculator Skills Quadratic Word Problems Simplify, Mult., Divide Rational Expressions Add, Sub. Rational Expressions Solve Rational Equations	<p>A2.1.1.1.1 Simplify/write square roots in terms of i (e.g., $\sqrt{-24} = 2i\sqrt{6}$).</p> <p>A2.1.3.1.1 Write and/or solve quadratic equations (including factoring and using the Quadratic Formula).</p> <p>A2.2.2.1.1 Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics).</p> <p>A2.2.2.1.3 Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic function.</p> <p>A2.1.2.2.2 Simplify rational algebraic expressions.</p> <p>A2.1.3.1.2 Solve equations involving rational and/or radical expressions (e.g., $10/(x + 3) + 12/(x - 2) = 1$ or $\sqrt{x^2 + 21x} = 14$).</p>	<p>CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.</p> <p>CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.</p> <p>CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.</p> <p>CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.</p> <p>CC.2.2.HS.D.5 Use polynomial identities to solve problems.</p> <p>CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms</p> <p>CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.</p> <p>CC.2.2.HS.D.9</p>	<p>Textbook Chapter 6, 8</p> <p>Worksheets</p> <p>Graphing Calculator</p>	<p>discriminant, quadratic formula, rational expression, least common denominator, proportion, cross-multiplication, extraneous solutions, domain of rational expression</p>
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<p>Unit 7:</p> <p>Exponential Functions</p> <p>Logarithmic Expressions</p> <p>Applications of Exp. And Log.</p> <p>Base 'e' Exp. And Log.</p>	<p>A2.1.2.1.4 Simplify or evaluate expressions involving logarithms and exponents.</p> <p>A2.1.3.1.3 Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms).</p> <p>A2.1.3.1.4 Write, solve, and/or apply linear or exponential growth or decay (including problemsituations).</p> <p>A2.2.2.1.2 Create, interpret, and/or use the equation, graph, or table of an exponential or logarithmic function (including common and natural logarithms).</p>	<p>CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.</p> <p>CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.</p> <p>CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.</p> <p>CC.2.2.HS.D.4 Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.</p> <p>CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.</p> <p>CC.2.2.HS.D.9 Use reasoning to solve equations, and justify the solution method.</p> <p>CC.2.2.HS.D.10 Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</p>	<p>Textbook Chapter 9</p> <p>Worksheets</p> <p>Graphing Calculator</p>	<p>exponential function, logarithmic function, common log, natural log, natural base 'e', inverse of a function, growth, decay, compounding interest</p>
<p>TRIGONOMETRIC FUNCTIONS</p>		<p>Common Core Standard</p>		
		<p>F-TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.</p>		

Extend the domain of trigonometric functions using the unit circle.		F-TF.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.
		F-TF.3 Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x , where x is any real number.
		F-TF.4 Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

<p>Graph six trigonometric functions noting their features and the effects of transformations on the graph.</p>		<p>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.</p>
		<p>F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.</p>
		<p>F.IF.7.e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p>
		<p>F-TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.</p>

<p>Model periodic phenomena with trigonometric functions.</p>		<p>F-TF.7 Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.</p>
<p>Prove and apply trigonometric identities.</p>		<p>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.</p>
		<p>F-TF.9 Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.</p>
<p>GEOMETRY</p>		<p>G-SRT</p>
<p>Define trigonometric</p>		<p>G-SRT.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.</p>

Derive trigonometric ratios and solve problems involving right triangles.		G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.
		G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
Apply trigonometry to general triangles.		G-SRT.9 Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
		G-SRT.10 Prove the Laws of Sines and Cosines and use them to solve problems.
		G-SRT.11 Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Find arc length and area of sectors.

G-C.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.