

# Algebra 2 and Trigonometry Curriculum Map

Month	Content	NYSED Performance Indicators/Skills
September	<b>Chapter 1</b> The Integers	A2.N.3 Perform arithmetic operations with polynomial expressions containing rational coefficients.  A2.A.1 Solve absolute value equations and inequalities involving linear expressions in one variable. A2.A.4 Solve quadratic inequalities in one and two variables, algebraically and graphically. A2.A.7 Factor polynomial expressions completely, using any combination of the following techniques: common factor extraction, difference of two perfect squares, quadratic trinomials.
	<b>Chapter 2</b> The Rational Numbers	A2.A.16 Perform arithmetic operations with rational expressions and rename to lowest terms. A2.A.17 Simplify complex fractional expressions. A2.A.23 Solve rational equations and inequalities.
October	<b>Chapter 3</b> Real Numbers and Radicals	A2.N.2 Perform arithmetic operations (addition, subtraction, multiplication, division) with expressions containing irrational numbers in radical form. A2.N.4 Perform arithmetic operations on irrational expressions. A2.N.5 Rationalize a denominator containing a radical expression.  A2.A.1 Solve absolute value equations and inequalities involving linear expressions in one variable. A2.A.13 Simplify radical expressions. A2.A.14 Perform addition, subtraction, multiplication, and division of radical expressions. A2.A.15 Rationalize denominators involving algebraic radical expressions. A2.A.22 Solve radical equations.
	<b>Chapter 4</b> Relations and Functions	A2.A.5 Use direct and inverse variation to solve for unknown values. A2.A.37 Define a relation and function. A2.A.38 Determine when a relation is a function. A2.A.39 Determine the domain and range of a function from its equation. A2.A.40 Write functions in functional notation. A2.A.41 Use functional notation to evaluate functions for given values in the domain. A2.A.42 Find the composition of functions. A2.A.43 Determine if a function is one-to-one, onto, or both. A2.A.44 Define the inverse of a function. A2.A.45 Determine the inverse of a function and use composition to justify the result. A2.A.46 Perform transformations with functions and relations: $f(x + a)$ , $f(x) + a$ , $f(-x)$ , $-f(x)$ , $af(x)$ . A2.A.47 Determine the center-radius form for the equation of a circle in standard form.

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		<p>A2.A.48 Write the equation of a circle, given its center and a point on the circle.</p> <p>A2.A.49 Write the equation of a circle from its graph.</p> <p>A2.A.50 Approximate the solution to polynomial equations of higher degree by inspecting the graph.</p> <p>A2.A.51 Determine the domain and range of a function from its graph.</p> <p>A2.A.52 Identify relations and functions, using graphs.</p>
November	<b>Chapter 5</b> Quadratic Functions and Complex Numbers	<p>A2.N.6 Write square roots of negative numbers in terms of <math>i</math>.</p> <p>A2.N.7 Simplify powers of <math>i</math>.</p> <p>A2.N.8 Determine the conjugate of a complex number.</p> <p>A2.N.9 Perform arithmetic operations on complex numbers and write the answer in the form <math>a + bi</math> <i>Note: This includes simplifying expressions with complex denominators.</i></p> <p>A2.A.2 Use the discriminant to determine the nature of the roots of a quadratic equation.</p> <p>A2.A.3 Solve systems of equations involving one linear equation and one quadratic equation algebraically. <i>Note: This includes rational equations that result in linear equations with extraneous roots.</i></p> <p>A2.A.4 Solve quadratic inequalities in one and two variables, algebraically and graphically.</p> <p>A2.A.20 Determine the sum and product of the roots of a quadratic equation by examining its coefficients.</p> <p>A2.A.21 Determine the quadratic equation, given the sum and product of its roots.</p> <p>A2.A.24 Know and apply the technique of completing the square.</p> <p>A2.A.25 Solve quadratic equations using the quadratic formula.</p> <p>A2.A.26 Find the solution to polynomial equations of higher degree that can be solved using factoring and/or the quadratic formula.</p>
December	<b>Chapter 6</b> Sequences and Series	<p>A2.N.10 Know and apply sigma notation.</p> <p>A2.A.29 Identify an arithmetic or geometric sequence and find the formula for its <math>n</math>th term.</p> <p>A2.A.30 Determine the common difference in an arithmetic sequence.</p> <p>A2.A.31 Determine the common ratio in a geometric sequence.</p> <p>A2.A.32 Determine a specified term of an arithmetic or geometric sequence.</p> <p>A2.A.33 Specify terms of a sequence, given its recursive definition.</p> <p>A2.A.34 Represent the sum of a series, using sigma notation.</p> <p>A2.A.35 Determine the sum of the first <math>n</math> terms of an arithmetic or geometric series.</p>

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January	<b>Chapter 7</b> Exponential Functions	<p>A2.N.1 Evaluate numerical expressions with negative and/or fractional exponents, without the aid of a calculator (when the answers are rational numbers).</p> <p>A2.A.6 Solve an application which results in an exponential function.</p> <p>A2.A.8 Apply the rules of exponents to simplify expressions involving negative and/or fractional exponents.</p> <p>A2.A.9 Rewrite algebraic expressions that contain negative exponents using only positive exponents.</p> <p>A2.A.10 Rewrite algebraic expressions with fractional exponents as radical expressions.</p> <p>A2.A.11 Rewrite algebraic expressions in radical form as expressions with fractional exponents.</p> <p>A2.A.12 Evaluate exponential expressions, including those with base <math>e</math>.</p> <p>A2.A.27 Solve exponential equations with and without common bases</p> <p>A2.A.53 Graph exponential functions of the form <math>y = bx</math> for positive values of <math>b</math>, including <math>b = e</math>.</p>
	<b>Chapter 8</b> Logarithmic Functions	<p>A2.A.18 Evaluate logarithmic expressions in any base.</p> <p>A2.A.19 Apply the properties of logarithms to rewrite logarithmic expressions in equivalent forms.</p> <p>A2.A.28 Solve a logarithmic equation by rewriting as an exponential equation.</p> <p>A2.A.54 Graph logarithmic functions, using the inverse of the related exponential function.</p>
February	<b>Chapter 9</b> Trigonometric Functions	<p>A2.A.55 Express and apply the six trigonometric functions as ratios of the sides of a right triangle.</p> <p>A2.A.56 Know the exact and approximate values of the sine, cosine, and tangent of <math>0^\circ</math>, <math>30^\circ</math>, <math>45^\circ</math>, <math>60^\circ</math>, <math>90^\circ</math>, <math>180^\circ</math>, and <math>270^\circ</math> angles.</p> <p>A2.A.57 Sketch and use the reference angle for angles in standard position.</p> <p>A2.A.58 Know and apply the co-function and reciprocal relationships between trigonometric ratios.</p> <p>A2.A.59 Use the reciprocal and co-function relationships to find the value of the secant, cosecant, and cotangent of <math>0^\circ</math>, <math>30^\circ</math>, <math>45^\circ</math>, <math>60^\circ</math>, <math>90^\circ</math>, <math>180^\circ</math>, and <math>270^\circ</math> angles.</p> <p>A2.A.60 Sketch the unit circle and represent angles in standard position.</p> <p>A2.A.62 Find the value of trigonometric functions, if given a point on the terminal side of angle <math>\theta</math>.</p> <p>A2.A.64 Use inverse functions to find the measure of an angle, given its sine, cosine, or tangent.</p> <p>A2.A.66 Determine the trigonometric functions of any angle, using technology.</p>
	<b>Chapter 10</b> More Trigonometric Functions	<p>A2.A.57 Sketch and use the reference angle for angles in standard position</p> <p>A2.A.58 Know and apply the co-function and reciprocal relationships between trigonometric ratios.</p> <p>A2.A.59 Use the reciprocal and co-function relationships to find the value of the secant, cosecant, and cotangent of <math>0^\circ</math>, <math>30^\circ</math>, <math>45^\circ</math>, <math>60^\circ</math>, <math>90^\circ</math>, <math>180^\circ</math>, and <math>270^\circ</math> angles.</p> <p>A2.A.60 Sketch the unit circle and represent angles in standard position.</p>

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		<p>A2.A.61 Determine the length of an arc of a circle, given its radius and the measure of its central angle.</p> <p>A2.A.63 Restrict the domain of the sine, cosine, and tangent functions to ensure the existence of an inverse function.</p> <p>A2.A.64 Use inverse functions to find the measure of an angle, given its sine, cosine, or tangent.</p> <p>A2.A.66 Determine the trigonometric functions of any angle, using technology.</p> <p>A2.A.67 Justify the Pythagorean identities.</p> <p>A2.M.1 Define radian measure.</p> <p>A2.M.2 Convert between radian and degree measures.</p>
March	<b>Chapter 11</b> Graphs of Trigonometric Functions	<p>A2.A.63 Restrict the domain of the sine, cosine, and tangent functions to ensure the existence of an inverse function.</p> <p>A2.A.65 Sketch the graph of the inverses of the sine, cosine, and tangent functions.</p> <p>A2.A.69 Determine amplitude, period, frequency, and phase shift, given the graph or equation of a periodic function</p> <p>A2.A.70 Sketch and recognize one cycle of a function of the form <math>y = A \sin Bx</math> or <math>y = A \cos Bx</math>.</p> <p>A2.A.71 Sketch and recognize the graphs of the functions <math>y = \sec(x)</math>, <math>y = \csc(x)</math>, <math>y = \tan(x)</math>, and <math>y = \cot(x)</math>.</p> <p>A2.A.72 Write the trigonometric function that is represented by a given periodic graph.</p>
March/ April	<b>Chapter 12</b> Trigonometric Identities	<p>A2.A.76 Apply the angle sum and difference formulas for trigonometric functions.</p> <p>A2.A.77 Apply the double-angle and half-angle formulas for trigonometric functions.</p>
April	<b>Chapter 13</b> Trigonometric Equations	<p>A2.A.68 Solve trigonometric equations for all values of the variable from <math>0^\circ</math> to <math>360^\circ</math>.</p>
May	<b>Chapter 14</b> Trigonometric Applications	<p>A2.A.73 Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines.</p> <p>A2.A.74 Determine the area of a triangle or a parallelogram, given the measure of two sides and the included angle.</p> <p>A2.A.75 Determine the solution(s) from the SSA situation (ambiguous case).</p>
May	<b>Chapter 15</b> Statistics	<p>A2.S.1 Understand the differences among various kinds of studies (e.g., survey, observation, controlled experiment)</p> <p>A2.S.2 Determine factors which may affect the outcome of a survey</p>

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		<p>A2.S.3 Calculate measures of central tendency with group frequency distributions.</p> <p>A2.S.4 Calculate measures of dispersion (range, quartiles, inter-quartile range, standard deviation, variance) for both samples and populations.</p> <p>A2.S.5 Know and apply the characteristics of the normal distribution.</p> <p>A2.S.6 Determine from a scatter plot whether a linear, logarithmic, exponential, or power regression model is most appropriate.</p> <p>A2.S.7 Determine the function for the regression model, using appropriate technology, and use the regression function to interpolate and extrapolate from the data</p> <p>A2.S.8 Interpret within the linear regression model the value of the correlation coefficient as a measure of the strength of the relationship.</p>
May/June	<b>Chapter 16</b> Probability and the Binomial Theorem	<p>A2.A.36 Apply the binomial theorem to expand a binomial and determine a specific term of a binomial expansion.</p> <p>A2.S.9 Differentiate between situations requiring permutations and those requiring combinations.</p> <p>A2.S.10 Calculate the number of possible permutations of <math>n</math> items taken <math>r</math> at a time.</p> <p>A2.S.11 Calculate the number of possible combinations of <math>n</math> items taken <math>r</math> at a time.</p> <p>A2.S.12 Use permutations, combinations, and the Fundamental Principle of Counting to determine the number of elements in a sample space and a specific subset (event).</p> <p>A2.S.13 Calculate theoretical probabilities, including geometric applications.</p> <p>A2.S.14 Calculate empirical probabilities.</p> <p>A2.S.15 Know and apply the binomial probability formula to events involving the terms <i>exactly</i>, <i>at least</i>, and <i>at most</i>.</p> <p>A2.S.16 Use the normal distribution as an approximation for binomial probabilities.</p>