

Algebra 2
Khan Academy Video Correlations
By SpringBoard Activity

SB Activity	Video(s)
Unit 1: Equations, Inequalities, Functions	
Activity 1 <i>Creating Equations</i> 1-1 Learning Targets: <ul style="list-style-type: none"> • Create an equation in one variable from a real-world context. • Solve an equation in one variable. 1-2 Learning Targets: <ul style="list-style-type: none"> • Create equations in two variables to represent relationships between quantities. • Graph two-variable equations 1-3 Learning Targets: <ul style="list-style-type: none"> • Write, solve, and graph absolute value equations. • Solve and graph absolute value inequalities. 	<i>One-Variable Equations</i>
	Representing a relationship with a simple equation
	Linear equation word problem
	Word problem: solving equations
	Solving equations with the distributive property
	Ex 2: Multi-step equation
	Variables on both sides
	<i>Two-Variable Equations</i>
	Constructing linear equations to solve word problems
	Exploring linear relationships
	Graphs of linear equations
	Application problem with graph
	<i>Absolute Value Equations and Inequalities</i>
Absolute value equations	
Absolute value equations	
Absolute value equations 1	
Absolute value equation example	
Absolute value equations example 1	
Absolute value equation example 2	
Absolute value equation with no solution	
<i>Absolute Value Inequalities</i>	
Absolute value inequalities	
Absolute value inequalities example 1	
Absolute inequalities 2	
Absolute value inequalities example 3	
Activity 2 <i>Graphing to Find Solutions</i> 2-1 Learning Targets: <ul style="list-style-type: none"> • Write equations in two variables to represent relationships between quantities. 	<i>Writing Linear Equations</i>
	Constructing linear equations to solve word problems
	<i>Graphing and Interpreting Two-Variable Equations</i>
	Graphing a line in slope intercept form
	Interpreting intercepts of linear functions

<ul style="list-style-type: none"> Graph equations on coordinate axes with labels and scales. <p>2-2 Learning Targets:</p> <ul style="list-style-type: none"> Represent constraints by equations or inequalities. Use a graph to determine solutions of a system of inequalities. 	<p style="text-align: center;"><i>Graphing Systems of Inequalities</i></p> <p>Graphing systems of inequalities</p> <p>Graphing systems of inequalities 2</p> <p>Visualizing the solution set for a system of inequalities</p>
<p>Activity 3 <i>Systems of Linear Equations</i></p> <p>3-1 Learning Targets:</p> <ul style="list-style-type: none"> Use graphing, substitution, and elimination to solve systems of linear equations in two variables. Formulate systems of linear equations in two variables to model real-world situations. <p>3-2 Learning Targets:</p> <ul style="list-style-type: none"> Solve systems of three linear equations in three variables using substitution and Gaussian elimination. Formulate systems of three linear equations in three variables to model a real-world situation. <p>3-3 Learning Targets:</p> <ul style="list-style-type: none"> Add, subtract, and multiply matrices. Use a graphing calculator to perform operations on matrices. <p>3-4 Learning Targets:</p> <ul style="list-style-type: none"> Solve systems of two linear equations in two variables by using graphing calculators with matrices. Solve systems of three linear equations in three variables by using graphing calculators with matrices. 	<p style="text-align: center;"><i>Solving Systems of Two Equations in Two Variables: Graphing</i></p> <p>Solving linear systems by graphing</p> <p>Solving systems graphically</p> <p>Graphing systems of equations</p> <p>Graphical systems application problem</p> <p>Example 2: Graphically solving systems</p> <p>Example 3: Graphically solving systems</p> <p style="text-align: center;"><i>Solving Systems of Two Equations in Two Variables: Substitution</i></p> <p>Example 1: Solving systems by substitution</p> <p>Example 2: Solving systems by substitution</p> <p>Example 3: Solving systems by substitution</p> <p>The substitution method</p> <p>Substitution method 2</p> <p>Substitution method 3</p> <p>Practice using substitution for systems</p> <p style="text-align: center;"><i>Solving Systems of Two Equations in Two Variables: Elimination</i></p> <p>Example 1: Solving systems by elimination</p> <p>Example 2: Solving systems by elimination</p> <p>Example 3: Solving systems by elimination</p> <p>Addition elimination method 1</p> <p>Addition elimination method 2</p> <p>Addition elimination method 3</p> <p>Addition elimination method 4</p> <p>Simple elimination practice</p> <p>Systems with elimination practice</p> <p style="text-align: center;"><i>Consistent, Inconsistent, Dependent, and Independent Systems</i></p> <p>Consistent and inconsistent systems</p> <p>Independent and dependent systems</p>

	<p style="text-align: center;"><i>Solving Systems of Three Equations in Three Variables</i></p> <p>Systems of three variables</p> <p>Systems of three variables 2</p> <p>Solutions to three variable system</p> <p>Solutions to three variable system 2</p> <p>Three equation application problem</p> <hr/> <p style="text-align: center;"><i>Matrix Operations</i></p> <p>Introduction to the matrix</p> <p>Representing data with matrices</p> <p>Matrix addition and subtraction</p> <p>Matrix multiplication introduction</p> <p>Multiplying a matrix by a matrix</p> <p>Defined and undefined matrix operations</p> <hr/> <p style="text-align: center;"><i>Solving Matrix Equations</i></p> <p>Matrix equations and systems</p>
<p>Activity 4 <i>Piecewise-Defined Functions</i></p> <p>4-1 Learning Targets:</p> <ul style="list-style-type: none"> Graph piecewise-defined functions. Write the domain and range of functions using interval notation, inequalities, and set notation. <p>4-2 Learning Targets:</p> <ul style="list-style-type: none"> Graph step functions and absolute value functions. Describe the attributes of these functions. <p>4-3 Learning Targets:</p> <ul style="list-style-type: none"> Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k \cdot f(x)$, $f(kx)$, and $f(x + k)$. Find the value of k, given these graphs. 	<p style="text-align: center;"><i>Piecewise Defined Functions</i></p> <p>What is a function?</p> <p>Finding a piecewise function definition from graph</p> <hr/> <p style="text-align: center;"><i>Absolute Value Functions</i></p> <p>Graphs of absolute value functions</p> <p>Absolute value graphing exercise example</p>
<p>Activity 5 <i>Function Composition and Operations</i></p> <p>5-1 Learning Targets:</p> <ul style="list-style-type: none"> Combine functions using arithmetic operations. Build functions that model real-world scenarios. <p>5-2 Learning Targets:</p> <ul style="list-style-type: none"> Write functions that describe the relationship between two quantities. Explore the composition of two functions through a real-world scenario. 	<p style="text-align: center;"><i>Operations with Functions</i></p> <p>Sum of functions</p> <p>Difference of functions</p> <p>Product of functions</p> <p>Quotient of functions</p> <hr/> <p style="text-align: center;"><i>Composition of Functions</i></p> <p>Introduction to function composition</p> <p>Creating new function from composition</p> <p>Evaluating composite functions example</p>

<p>5-3 Learning Targets:</p> <ul style="list-style-type: none"> • Write the composition of two functions. • Evaluate the composition of two functions. 	<p>Modeling with function composition</p>
<p>Activity 6 <i>Inverse Functions</i></p> <p>6-1 Learning Targets:</p> <ul style="list-style-type: none"> • Find the inverse of a function. • Write the inverse using the proper notation. <p>6-2 Learning Targets:</p> <ul style="list-style-type: none"> • Use composition of functions to determine if functions are inverses of each other. • Graph inverse functions and identify the symmetry. 	<p><i>Inverse Functions</i></p>
	<p>Introduction to function inverses</p>
	<p>Introduction to the inverse of a function</p>
	<p>Function inverse example 1</p>
<p>Function inverses example 2</p>	
<p>Function inverses example 3</p>	
<p>Unit 2: Quadratic Functions</p>	
<p>Activity 7 <i>Applications of Quadratic Functions</i></p> <p>7-1 Learning Targets:</p> <ul style="list-style-type: none"> • Formulate quadratic functions in a problem-solving situation. • Graph and interpret quadratic functions. <p>7-2 Learning Targets:</p> <ul style="list-style-type: none"> • Factor quadratic expressions of the form $x^2 + bx + c$. • Factor quadratic expressions of the form $ax^2 + bx + c$. <p>7-3 Learning Targets:</p> <ul style="list-style-type: none"> • Solve quadratic equations by factoring. • Interpret solutions of a quadratic equation. • Create quadratic equations from solutions. <p>7-4 Learning Targets:</p> <ul style="list-style-type: none"> • Solve quadratic inequalities. • Graph the solutions to quadratic inequalities. 	<p><i>Analyzing a Quadratic Function</i></p>
	<p>Graphing a parabola with a table of values</p>
	<p>Parabola vertex and axis of symmetry</p>
	<p>Finding the vertex of a parabola example</p>
	<p>Graphing a parabola by finding the roots and vertex</p>
	<p>Graphing a parabola using roots and vertex</p>
	<p>Multiple examples graphing parabolas using roots and vertices</p>
	<p><i>Factoring Quadratic Expressions</i></p>
	<p>Factoring quadratic expressions</p>
	<p>Examples: Factoring simple quadratics</p>
	<p>Example 1: Factoring quadratic expressions</p>
	<p>Example 1: Factoring trinomials with a common factor</p>
<p><i>Solving Quadratic Equations by Factoring</i></p>	
<p>Solving a quadratic equation by factoring</p>	
<p>Dimensions from volume of box</p>	
<p><i>More Uses for Factors</i></p>	
<p>Quadratic inequalities</p>	
<p>Quadratic inequalities (visual explanation)</p>	
<p>Activity 8 <i>Introduction to Complex Numbers</i></p> <p>8-1 Learning Targets:</p> <ul style="list-style-type: none"> • Know the definition of the complex number i. • Know that complex numbers can be written as $a + bi$, where a and b are real numbers. 	<p><i>The Imaginary Unit , i</i></p>
	<p>Introduction to i and imaginary numbers</p>
	<p>Imaginary roots of negative numbers</p>
	<p>i as the principal root of -1 (a little technical)</p>
	<p>Plotting complex numbers on the complex plane</p>
<p><i>Operations with Complex Numbers</i></p>	

<ul style="list-style-type: none"> Graph complex numbers on the complex plane. <p>8-2 Learning Targets:</p> <ul style="list-style-type: none"> Add and subtract complex numbers. Multiply and divide complex numbers. <p>8-3 Learning Targets:</p> <ul style="list-style-type: none"> Factor quadratic expressions using complex conjugates. Solve quadratic equations with complex roots by factoring. 	<p>Calculating i raised to arbitrary exponents</p> <p>Adding complex numbers</p> <p>Subtracting complex numbers</p> <p>Multiplying complex numbers</p> <p>Complex conjugates example</p> <p>Dividing complex numbers</p>
<p>Activity 9 <i>Solving $ax^2 + bx + c = 0$</i></p> <p>9-1 Learning Targets:</p> <ul style="list-style-type: none"> Solve quadratic equations by taking square roots. Solve quadratic equations $ax^2 + bx + c = 0$ by completing the square. <p>9-2 Learning Targets:</p> <ul style="list-style-type: none"> Derive the Quadratic Formula. Solve quadratic equations using the Quadratic Formula. <p>9-3 Learning Targets:</p> <ul style="list-style-type: none"> Solve quadratic equations using the Quadratic Formula. Use the discriminant to determine the nature of the solutions of a quadratic equation. 	<p><i>Completing the Square and Taking Square Roots</i></p> <p>Solve quadratic equations by square roots</p> <p>Solving quadratic equations by completing the square</p> <p>Example 1: Completing the square</p> <p>Example 2: Completing the square</p> <p>Example 3: Completing the square</p> <p><i>The Quadratic Formula</i></p> <p>Proof of quadratic formula</p> <p>How to use the quadratic formula</p> <p><i>Solutions of Quadratic Equations</i></p> <p>Example: Complex roots for a quadratic</p> <p>Discriminant of quadratic equations</p> <p>Discriminant for types of solutions for a quadratic</p>
<p>Activity 10 <i>Writing Quadratic Equations</i></p> <p>10-1 Learning Targets:</p> <ul style="list-style-type: none"> Derive a general equation for a parabola based on the definition of a parabola. Write the equation of a parabola given a graph and key features. <p>10-2 Learning Targets:</p> <ul style="list-style-type: none"> Explain why three points are needed to determine a parabola. Determine the quadratic function that passes through three given points on a plane. <p>10-3 Learning Targets:</p> <ul style="list-style-type: none"> Find a quadratic model for a given table of data. Use a quadratic model to make predictions. 	<p><i>Parabolas and Quadratic Equations</i></p> <p>Parabola intuition example 1</p> <p>Focus and directrix introduction</p> <p><i>Writing the Equation of a Parabola</i></p> <p>Using the focus and directrix to find the equation of a parabola</p> <p>Equation for parabola from focus and directrix</p> <p>Finding focus and directrix from vertex</p>
<p>Activity 11</p>	<p><i>Transformations of $y = x^2$</i></p>

<p><i>Transformations of $y = x^2$</i></p> <p>11-1 Learning Targets:</p> <ul style="list-style-type: none"> Describe translations of the parent function $f(x) = x^2$. Given a translation of the function $f(x) = x^2$, write the equation of the function. <p>11-2 Learning Targets:</p> <ul style="list-style-type: none"> Describe transformations of the parent function $f(x) = x^2$. Given a transformation of the function $f(x) = x^2$, write the equation of the function. <p>11-3 Learning Targets:</p> <ul style="list-style-type: none"> Write a quadratic function in vertex form. Use transformations to graph a quadratic function in vertex form. 	<p>Shifting and scaling parabolas</p> <p>Graphing a parabola in vertex form</p>
<p>Activity 12</p> <p><i>Graphing Quadratics and Quadratic Inequalities</i></p> <p>12-1 Learning Targets:</p> <ul style="list-style-type: none"> Write a quadratic function from a verbal description. Identify and interpret key features of the graph of a quadratic function. <p>12-2 Learning Targets:</p> <ul style="list-style-type: none"> Write a quadratic function from a verbal description. Identify and interpret key features of the graph of a quadratic function. <p>12-3 Learning Targets:</p> <ul style="list-style-type: none"> Identify key features of a quadratic function from an equation written in standard form. Use key features to graph a quadratic function. <p>12-4 Learning Targets:</p> <ul style="list-style-type: none"> Use the discriminant to determine the nature of the solutions of a quadratic equation. Use the discriminant to help graph a quadratic function. <p>12-5 Learning Targets:</p> <ul style="list-style-type: none"> Graph a quadratic inequality in two variables. Determine the solutions to a quadratic inequality by graphing. 	<p><i>Key Features of Quadratic Functions</i></p> <p>Parabola vertex and axis of symmetry</p> <hr/> <p><i>Graphing Quadratic Functions</i></p> <p>Examples: Graphing and interpreting quadratics</p> <p>Graphing a parabola with a table of values</p> <p>Finding the vertex of a parabola example</p> <p>Graphing a parabola by finding the roots and vertex</p> <p>Graphing a parabola using roots and vertex</p> <p>Multiple examples graphing parabolas using roots and vertices</p> <hr/> <p>The Discriminant</p> <p>Discriminant of quadratic equations</p> <p>Discriminant for types of solutions for a quadratic</p>
	<p><i>Systems of Nonlinear Equations</i></p>

<p>Activity 13 <i>Systems of Linear and Nonlinear Equations</i></p> <p>13-1 Learning Targets:</p> <ul style="list-style-type: none"> • Use graphing to solve a system consisting of a linear and a nonlinear equation. • Interpret the solutions of a system of equations. <p>13-2 Learning Targets:</p> <ul style="list-style-type: none"> • Use substitution to solve a system consisting of a linear and nonlinear equation. • Determine when a system consisting of a linear and nonlinear equation has no solution. 	<p>Non-linear systems of equations 1</p> <p>Non-linear systems of equations 2</p> <p>Non-linear systems of equations 3</p> <p>Systems of nonlinear equations 1</p> <p>Systems of nonlinear equations 2</p> <p>Systems of nonlinear equations 3</p>
Unit 3: Polynomials	
<p>Activity 14 <i>Introduction to Polynomials</i></p> <p>14-1 Learning Targets:</p> <ul style="list-style-type: none"> • Write a third-degree equation that represents a real-world situation. • Graph a portion of this equation and evaluate the meaning of a relative maximum. <p>14-2 Learning Targets:</p> <ul style="list-style-type: none"> • Sketch the graphs of cubic functions. • Identify the end behavior of polynomial functions. <p>14-3 Learning Targets:</p> <ul style="list-style-type: none"> • Recognize even and odd functions given an equation or graph. • Distinguish between even and odd functions and even-degree and odd-degree functions. 	<p style="text-align: center;"><i>Polynomial Basics</i></p> <p>Terms coefficients and exponents in a polynomial</p> <hr/> <p style="text-align: center;"><i>End Behavior Of Polynomial Functions</i></p> <p>Polynomial end behavior</p> <p>Polynomial end behavior example</p> <p>Another polynomial end behavior example</p> <p>Polynomial end behavior exercise example</p> <hr/> <p style="text-align: center;"><i>Even and Odd Functions</i></p> <p>Recognizing odd and even functions</p> <p>Connection between even and odd numbers and functions</p>
<p>Activity 15 <i>Polynomial Operations</i></p> <p>15-1 Learning Targets:</p> <ul style="list-style-type: none"> • Use a real-world scenario to introduce polynomial addition and subtraction. • Add and subtract polynomials. <p>15-2 Learning Targets:</p> <ul style="list-style-type: none"> • Add, subtract, and multiply polynomials. • Understand that polynomials are closed under the operations of addition, subtraction, and multiplication. <p>15-3 Learning Targets:</p>	<p style="text-align: center;"><i>Adding and Subtraction Polynomials</i></p> <p>Addition and subtraction of polynomials</p> <hr/> <p style="text-align: center;"><i>Multiplying Polynomials</i></p> <p>Multiplying polynomials example</p> <p>Multiplying polynomials example 2</p> <hr/> <p style="text-align: center;"><i>Dividing Polynomials</i></p> <p>Polynomial division</p> <p>Polynomial divided by monomial</p> <p>Dividing polynomials 1</p> <p>Dividing polynomials with remainders</p>

<ul style="list-style-type: none"> Determine the quotient of two polynomials. Prove a polynomial identity and use it to describe numerical relationships. 	Dividing polynomials with remainders example
<p>Activity 16 <i>Binomial Theorem</i></p> <p>16-1 Learning Targets:</p> <ul style="list-style-type: none"> Find the number of combinations of an event. Create Pascal’s triangle. <p>16-2 Learning Targets:</p> <ul style="list-style-type: none"> Know the Binomial Theorem. Apply the Binomial Theorem to identify the coefficients or terms of any binomial expansion. 	<p style="text-align: center;"><i>Pascal’s Triangle</i></p> <p>Pascal’s triangle for binomial expansion</p> <p style="text-align: center;"><i>Binomial Theorem</i></p> <p>Binomial theorem</p> <p>Determining coefficient in binomial expansion</p> <p>Connecting Pascal’s triangle to binomial combinatorics</p> <p>Algorithm for mentally computing binomial expansion coefficients</p> <p>Binomial theorem combinatorics connection</p>
<p>Activity 17 <i>Factors of Polynomials</i></p> <p>17-1 Learning Targets:</p> <ul style="list-style-type: none"> Determine the linear factors of polynomial functions using algebraic methods. Determine the linear or quadratic factors of polynomials by factoring the sum or difference of two cubes and factoring by grouping. <p>17-2 Learning Targets:</p> <ul style="list-style-type: none"> Know and apply the Fundamental Theorem of Algebra. Write polynomial functions, given their degree and roots. 	<p style="text-align: center;"><i>Factoring Polynomials: Algebraic Methods</i></p> <p>Factor by grouping and factoring completely</p> <p>Example: basic grouping</p> <p>Example 1: Factoring by grouping</p> <p>Example 2: Factoring by grouping</p> <p>Example 3: Factoring by grouping</p> <p>Example 4: Factoring by grouping</p> <p>Example 5: Factoring by grouping</p> <p>Example 6: Factoring by grouping</p> <p>Difference of cubes factoring</p> <p>Factoring sum of cubes</p> <p style="text-align: center;"><i>The Fundamental Theorem of Algebra</i></p> <p>Fundamental theorem of algebra</p> <p>Fundamental theorem of algebra for quadratic</p> <p>Possible number of real roots</p>
<p>Activity 18 <i>Graphs of Polynomials</i></p> <p>18-1 Learning Targets:</p> <ul style="list-style-type: none"> Graph polynomial functions by hand or using technology, identifying zeros when suitable factorizations are available, and showing end behavior. Recognize even and odd functions from their algebraic expressions. <p>18-2 Learning Targets:</p>	<p style="text-align: center;"><i>Graphing Polynomial Functions</i></p> <p>Polynomial end behavior</p> <p>Polynomial end behavior example</p> <p>Another polynomial end behavior example</p> <p>Polynomial end behavior exercise example</p> <p>Recognizing odd and even functions</p> <p>Connection between even and odd numbers and functions</p>

<ul style="list-style-type: none"> • Know and apply the Rational Root Theorem and Descartes' Rule of Signs. • Know and apply the Remainder Theorem and the Factor Theorem. <p>18-3 Learning Targets:</p> <ul style="list-style-type: none"> • Compare properties of two functions each represented in a different way. • Solve polynomial inequalities by graphing. 	<p style="text-align: center;"><i>Finding the Roots of a Polynomial Function</i></p> <p>Synthetic division</p> <p>Synthetic division example 2</p> <p>Why synthetic division works</p> <p>Polynomial remainder theorem</p> <p>Polynomial remainder theorem example</p> <p>Polynomial remainder theorem to test factor</p> <p>Polynomial remainder theorem proof</p> <p style="text-align: center;"><i>Comparing Polynomial Functions</i></p> <p>Recognizing features of functions (example 1)</p> <p>Recognizing features of functions (example 2)</p> <p>Recognizing features of functions (example 3)</p>
Unit 4: Series, Exponential and Logarithmic Functions	
<p>Activity 19 <i>Arithmetic Sequences and Series</i></p> <p>19-1 Learning Targets:</p> <ul style="list-style-type: none"> • Determine whether a given sequence is arithmetic. • Find the common difference of an arithmetic sequence. • Write an expression for an arithmetic sequence, and calculate the nth term. <p>19-2 Learning Targets:</p> <ul style="list-style-type: none"> • Write a formula for the nth partial sum of an arithmetic series. • Calculate partial sums of an arithmetic series. <p>19-3 Learning Targets:</p> <ul style="list-style-type: none"> • Identify the index, lower and upper limits, and general term in sigma notation. • Express the sum of a series using sigma notation. • Find the sum of a series written in sigma notation. 	<p style="text-align: center;"><i>Arithmetic Sequences</i></p> <p>Explicit and recursive definitions of sequences</p> <p>Arithmetic sequences</p> <p>Finding the 100th term in a sequence</p> <p>Equations of sequence patterns</p> <p style="text-align: center;"><i>Arithmetic Series</i></p> <p>Explicitly defining a series</p> <p style="text-align: center;"><i>Sigma Notation</i></p> <p>Sigma notation for sums</p> <p>Writing a series in sigma notation</p>
<p>Activity 20 <i>Geometric Sequences and Series</i></p> <p>20-1 Learning Targets:</p> <ul style="list-style-type: none"> • Identify the index, lower and upper limits, and general term in sigma notation. 	<p style="text-align: center;"><i>Geometric Sequences</i></p> <p>Geometric sequences introduction</p> <p>Geometric sequences</p> <p style="text-align: center;"><i>Geometric Series</i></p> <p>Series as sum of sequence</p>

<ul style="list-style-type: none"> Express the sum of a series using sigma notation. Find the sum of a series written in sigma notation. <p>20-2 Learning Targets:</p> <ul style="list-style-type: none"> Derive the formula for the sum of a finite geometric series. Calculate the partial sums of a geometric series. <p>20-3 Learning Targets:</p> <ul style="list-style-type: none"> Determine if an infinite geometric sum converges. Find the sum of a convergent geometric series. 	<p>Geometric series</p> <p>Formula for a finite geometric series</p> <p>Sum of an infinite geometric series</p> <p>Another derivation of the sum of an infinite geometric series</p> <hr/> <p style="text-align: center;"><i>Convergence and Divergence</i></p> <p>Geometric series convergence and divergence examples</p>
<p>Activity 21 <i>Exponential Functions and Graphs</i></p> <p>21-1 Learning Targets:</p> <ul style="list-style-type: none"> Identify data that grow exponentially. Compare the rates of change of linear and exponential data. <p>21-2 Learning Targets:</p> <ul style="list-style-type: none"> Identify and write exponential functions. Determine the decay factor or growth factor of an exponential function. <p>21-3 Learning Targets:</p> <ul style="list-style-type: none"> Determine when an exponential function is increasing or decreasing. Describe the end behavior of exponential functions. Identify asymptotes of exponential functions. <p>21-4 Learning Targets:</p> <ul style="list-style-type: none"> Explore how changing parameters affects the graph of an exponential function. Graph transformations of exponential functions. <p>21-5 Learning Targets:</p> <ul style="list-style-type: none"> Graph the function $f(x) = e^x$. Graph transformations of $f(x) = e^x$. 	<p style="text-align: center;"><i>Exponential Functions</i></p> <p>Understanding linear and exponential models</p> <p>Exponential growth and decay word problems</p> <p>Decay of cesium 137 example</p> <p>Modeling ticket fines with exponential function</p> <hr/> <p style="text-align: center;"><i>Graphs of Exponential Functions</i></p> <p>Graphing exponential functions</p> <p>Constructing linear and exponential functions from graphs</p>
<p>Activity 22 <i>Logarithms and Their Properties</i></p> <p>22-1 Learning Targets:</p> <ul style="list-style-type: none"> Complete tables and plot points for exponential data. 	<p style="text-align: center;"><i>Exponential Functions</i></p> <p>Graphing exponential functions</p> <p>Constructing linear and exponential functions from data</p> <p>Matching functions to their graphs</p> <hr/> <p style="text-align: center;"><i>Logarithms</i></p>

<ul style="list-style-type: none"> • Write and graph an exponential function for a given context. • Find the domain and range of an exponential function. <p>22-2 Learning Targets:</p> <ul style="list-style-type: none"> • Use technology to graph $y = \log x$. • Evaluate a logarithm using technology. • Rewrite exponential equations as their corresponding logarithmic equations. • Rewrite logarithmic equations as their corresponding exponential equations. <p>22-3 Learning Targets:</p> <ul style="list-style-type: none"> • Make conjectures about properties of logarithms. • Write and apply the Product Property and Quotient Property of Logarithms. • Rewrite logarithmic expressions by using properties. <p>22-4 Learning Targets:</p> <ul style="list-style-type: none"> • Make conjectures about properties of logarithms. • Write and apply the Power Property of Logarithms. • Rewrite logarithmic expressions by using their properties. 	<p>Logarithms</p> <p>Writing in logarithmic and exponential form</p> <p>Introduction to logarithm properties</p> <p>Introduction to logarithm properties (part 2)</p>
<p>Activity 23 <i>Inverse Functions: Exponential and Logarithmic Functions</i></p> <p>23-1 Learning Targets:</p> <ul style="list-style-type: none"> • Use composition to verify two functions as inverse. • Define the logarithm of y with base b. • Write the Inverse Properties for logarithms. <p>23-2 Learning Targets:</p> <ul style="list-style-type: none"> • Apply the properties of logarithms in any base. • Compare and expand logarithmic expressions. • Use the Change of Base Formula. <p>23-3 Learning Targets:</p> <ul style="list-style-type: none"> • Find intercepts and asymptotes of logarithmic functions. • Determine the domain and range of a logarithmic function. 	<p style="text-align: center;"><i>Logarithms in Other Bases</i></p> <p>Change of base formula</p> <p>Change of base formula proof</p> <p style="text-align: center;"><i>Graphing Logarithmic Functions</i></p> <p>Graphing logarithmic functions</p> <p>Graphs of logarithmic functions</p>

<ul style="list-style-type: none"> Write and graph transformations of logarithmic functions. 	
<p>Activity 24 <i>Logarithmic and Exponential Equations and Inequalities</i></p> <p>24-1 Learning Targets:</p> <ul style="list-style-type: none"> Write exponential equations to represent situations. Solve exponential equations. <p>24-2 Learning Targets:</p> <ul style="list-style-type: none"> Solve exponential equations using logarithms. Estimate the solution to an exponential equation. Apply the compounded interest formula. <p>24-3 Learning Targets:</p> <ul style="list-style-type: none"> Solve logarithmic equations. Identify extraneous solutions to logarithmic equations. Use properties of logarithms to rewrite logarithmic expressions. <p>24-4 Learning Targets:</p> <ul style="list-style-type: none"> Solve exponential inequalities. Solve logarithmic inequalities. 	<p style="text-align: center;"><i>Exponential Equations</i></p> <p>Solving exponential equation</p> <p>Solving exponential equation with logarithm</p> <p style="text-align: center;"><i>Logarithmic Equations</i></p> <p>Solving logarithmic equations</p> <p>Solving logarithmic equations</p> <p style="text-align: center;"><i>Application: Compound Interest</i></p> <p>Introduction to compound interest and e</p> <p>Compound interest and e (part 2)</p> <p>Compound interest and e (part 3)</p> <p>Compound interest and e (part 4)</p>
Unit 5: Radical and Rational Functions	
<p>Activity 25 <i>Square Root and Cube Root Functions</i></p> <p>25-1 Learning Targets:</p> <ul style="list-style-type: none"> Graph and describe transformations of the square root function $y=\sqrt{x}$. Interpret key features of a graph that models a relationship between two quantities. <p>25-2 Learning Targets:</p> <ul style="list-style-type: none"> Solve square root equations. Identify extraneous solutions. <p>25-3 Learning Targets:</p> <ul style="list-style-type: none"> Graph transformations of the cube root function $y=3\sqrt[3]{x}$. Identify key features of a graph that models a relationship between two quantities. <p>25-4 Learning Targets:</p> <ul style="list-style-type: none"> Solve cube root equations. 	<p style="text-align: center;"><i>Graphing Radical Functions</i></p> <p>Flipping and shifting radical functions</p> <p>Matching radical functions with graphs exercise example</p> <p style="text-align: center;"><i>Solving Radical Equations</i></p> <p>Equations for radical functions example</p> <p>Solving radical equations</p> <p>Solving radical equations 1</p> <p>Solving radical equations 2</p> <p>Solving radical equations 3</p> <p>Extraneous solutions to radical equations</p> <p style="text-align: center;"><i>Applying Radical Equations</i></p> <p>Applying radical equations 1</p> <p>Applying radical equations 2</p> <p>Applying radical equations 3</p>

<ul style="list-style-type: none"> • Check the reasonableness of solutions. 	
<p>Activity 26 <i>Inverses: Roots, Squares, and Cubes</i></p> <p>26-1 Learning Targets:</p> <ul style="list-style-type: none"> • Graph and write the inverse of square root functions. • Find a square root model for a given table of data. <p>26-2 Learning Targets:</p> <ul style="list-style-type: none"> • Graph and write the inverse of square root functions. • Find the inverse relations of quadratic functions. <p>26-3 Learning Targets:</p> <ul style="list-style-type: none"> • Graph and write the inverse of cube root functions. • Find the inverse relations of cubic functions. 	<p style="text-align: center;"><i>Inverse Functions</i></p> <p>Introduction to function inverses</p> <p>Function inverses example 2</p> <p>Function inverses example 3</p>
<p>Activity 27 <i>Introduction to Rational Functions</i></p> <p>27-1 Learning Targets:</p> <ul style="list-style-type: none"> • Formulate rational equations that model real-world situations. • Graph equations on coordinate axes. <p>27-2 Learning Targets:</p> <ul style="list-style-type: none"> • Formulate rational equations that model real-world situations. • Graph equations on coordinate axes. <p>27-3 Learning Targets:</p> <ul style="list-style-type: none"> • Determine the horizontal and vertical asymptotes of a rational function. • Graph a rational function on the coordinate plane. 	<p style="text-align: center;"><i>Graphs of Rational Functions</i></p> <p>Matching rational functions to their graphs</p> <p>Another rational function graph example</p> <p>A third example of graphing a rational function</p> <p style="text-align: center;"><i>Asymptotes of Rational Functions</i></p> <p>Asymptotes of rational functions</p> <p>Horizontal and vertical asymptotes of function</p>
<p>Activity 28 <i>Inverse Variation and Rational Functions</i></p> <p>28-1 Learning Targets:</p> <ul style="list-style-type: none"> • Create, solve, and graph an equation involving inverse variation. • Solve an equation involving combined variation. <p>28-2 Learning Targets:</p> <ul style="list-style-type: none"> • Describe transformations of the parent function $f(x)=1/x$ and sketch the graphs. 	<p style="text-align: center;"><i>Direct and Inverse Variation</i></p> <p>Direct and inverse variation</p> <p>Recognizing direct and inverse variation</p>

<ul style="list-style-type: none"> Identify the x-intercepts, y-intercepts, and asymptotes of transformations of the parent function $f(x)=1/x$. 	
<p>Activity 29 <i>Simplifying Rational Expressions</i></p> <p>29-1 Learning Targets:</p> <ul style="list-style-type: none"> Simplify rational expressions. Multiply and divide rational expressions. <p>29-2 Learning Targets:</p> <ul style="list-style-type: none"> Add and subtract rational expressions. Simplify complex fractions. <p>29-3 Learning Targets:</p> <ul style="list-style-type: none"> Identify the vertical asymptotes of rational functions by finding the domain values that make the functions undefined. Use the degrees of the numerator and denominator of rational functions to identify the horizontal asymptotes. <p>29-4 Learning Targets:</p> <ul style="list-style-type: none"> Analyze and graph rational functions, identifying any asymptotes, intercepts, and holes. Analyze and graph rational functions representing real-world scenarios. 	<p style="text-align: center;"><i>Multiplying and Dividing Rational Expressions</i></p> <p>Simplifying rational expressions introduction</p> <p>Simplifying rational expressions 1</p> <p>Simplifying rational expressions 2</p> <p>Simplifying rational expressions 2</p> <p>Simplifying rational expressions 3</p> <p>Multiplying and simplifying rational expressions</p> <p>Multiplying and dividing rational expressions 1</p> <p>Multiplying and dividing rational expressions 2</p> <p>Multiplying and dividing rational expressions 3</p> <p style="text-align: center;"><i>Adding and Subtracting Rational Expressions</i></p> <p>Adding and subtracting rational expressions</p> <p>Adding and subtracting rational expressions 2</p> <p>Subtracting rational expressions</p> <p>Simplifying first for subtracting rational expressions</p> <p>Rationalizing denominators of expressions</p> <p style="text-align: center;"><i>Finding Horizontal and Vertical Asymptotes</i></p> <p>Asymptotes of rational functions</p> <p>Horizontal and vertical asymptotes of function</p> <p style="text-align: center;"><i>Graphing Rational Functions</i></p> <p>Matching rational functions to their graphs</p> <p>Another rational function graph example</p> <p>A third example of graphing a rational function</p>
<p>Activity 30 <i>Rational Equations and Inequalities</i></p> <p>30-1 Learning Targets:</p> <ul style="list-style-type: none"> Solve rational equations, identifying any extraneous solutions. Create and solve rational equations that represent work problems. <p>30-2 Learning Targets:</p> <ul style="list-style-type: none"> Solve rational inequalities by graphing. Solve rational inequalities by finding the sign of the inequality on either side of the numerator and denominator zeros. 	<p style="text-align: center;"><i>Solving Rational Equations</i></p> <p>Ex 1: Multi step equation</p> <p>Rational equations</p> <p>Solving rational equations 1</p> <p>Solving rational equations 2</p> <p>Solving rational equations 3</p> <p>Applying rational equations 1</p> <p>Applying rational equations 2</p> <p>Applying rational equations 3</p> <p>Extraneous solutions to rational equations</p> <p style="text-align: center;"><i>Solving Rational Inequalities</i></p>

	Rational inequalities Rational inequalities 2
Unit 6: Trigonometry	
Activity 31 <i>Understanding Radian Measure</i> 31-1 Learning Targets: <ul style="list-style-type: none"> Develop formulas for the length of an arc. Describe radian measure. 31-2 Learning Targets: <ul style="list-style-type: none"> Develop and apply formulas for the length of an arc. Apply radian measure. 	Radian Measure
	Introduction to radians Introduction to the unit circle Rotation by radians and quadrants
	Arc Length
	Arc length as a fraction of circumference Finding arc length from radian angle measure
	Radian and Degree Measure
	Example: Radian measure and arc length Radians and degrees Example: Converting degrees to radians Example: Converting radians to degrees Radian and degree conversion practice
Activity 32 <i>Trigonometric Functions</i> 32-1 Learning Targets: <ul style="list-style-type: none"> Explore angles drawn in standard position on the coordinate plane. Find the sine of θ and the cosine of θ. 32-2 Learning Targets: <ul style="list-style-type: none"> Find the sine of θ and the cosine of θ using special right triangles. Find the tan of θ. 	The Unit Circle
	Introduction to the unit circle Solving triangle in unit circle
	Trigonometric Ratios
	Matching ratios to trig functions
Activity 33 <i>Trigonometric Identities: Pythagorean Connection</i> 33-1 Learning Targets: <ul style="list-style-type: none"> Prove the Pythagorean identity. Use the Pythagorean identity to find $\sin \theta$, $\cos \theta$, or $\tan \theta$, given the value of one of these functions and the quadrant of θ. 33-2 Learning Targets: <ul style="list-style-type: none"> Define the three reciprocal trigonometric functions. Use the Pythagorean identity and the reciprocal trigonometric functions to prove other trigonometric identities. 	Pythagorean Identities
	Pythagorean trig identity from soh cah toa Pythagorean trig identity from unit circle Using the Pythagorean trig identity Examples using pythagorean identities to simplify trigonometric expressions
	Reciprocal Functions
	Secant (sec), cosecant (csc) and cotangent (cot) example Example: Using trig to solve for missing information
Activity 34 <i>Graphs of Trigonometric Functions</i> 34-1 Learning Targets:	Periodic Functions
	Midline, amplitude and period of a function Example: Amplitude and period

<ul style="list-style-type: none"> Identify periodic functions. Find the period, midline, and amplitude of periodic functions. <p>34-2 Learning Targets:</p> <ul style="list-style-type: none"> Graph the sine function, $y = a \sin b x$. Find the period, midline, and amplitude of sine functions. <p>34-3 Learning Targets:</p> <ul style="list-style-type: none"> Graph the cosine function, $y = a \cos b x$. Find the period, midline, and amplitude of cosine functions. <p>34-4 Learning Targets:</p> <ul style="list-style-type: none"> Graph the tangent function, $y = a \tan b x$. Find the period, and midline of tangent functions. <p>34-5 Learning Targets:</p> <ul style="list-style-type: none"> Describe and graph functions of the form $y = a \sin b(x - h) + k$, $y = a \cos b(x - h) + k$, and $y = a \tan b(x - h) + k$. Find the period, amplitude, and midline of these trigonometric functions. 	<p>Plotting maxima, minima and midline intersections of trig function</p> <p><i>Sine Function</i></p> <p>Example: Graph, domain, and range of sine function</p> <p><i>Cosine Function</i></p> <p>Example: Graph of cosine</p> <p>Example: Intersection of sine and cosine</p> <p><i>Transformations</i></p> <p>Example: Amplitude and period transformations</p> <p>Example: Amplitude and period cosine transformations</p> <p><i>Tangent Function</i></p> <p>Tangent graph</p>
<p>Activity 35 <i>Choosing Functions to Model Periodic Phenomena</i></p> <p>35-1 Learning Targets:</p> <ul style="list-style-type: none"> Use trigonometric functions to model real-world periodic phenomena. Identify key features of these functions. 	<p><i>Modeling Periodic Phenomena</i></p> <p>Modeling annual temperature variation with trigonometry</p> <p>Applying inverse trig function with model</p> <p>Modeling temperature through the day</p> <p>Day length in Alaska</p> <p>Example: Figure out the trig function</p> <p>Determining the equation of a trig function</p>
Unit 7: Probability and Statistics	
<p>Activity 36 <i>Normal Distribution</i></p> <p>36-1 Learning Targets:</p> <ul style="list-style-type: none"> Represent distribution with appropriate data plots. Interpret shape of a distribution and relate shape to measures of center and spread. <p>36-2 Learning Targets:</p> <ul style="list-style-type: none"> Recognize characteristics of a normal distribution. Use mean and standard deviation to completely describe a normal distribution. <p>36-3 Learning Targets:</p> <ul style="list-style-type: none"> Estimate probabilities associated with z-scores using normal curve sketches. 	<p><i>Distribution</i></p> <p>Comparing means of distributions</p> <p>Means and medians of different distributions</p> <p><i>Normal Distribution</i></p> <p>Introduction to the normal distribution</p> <p>normal distribution problems: Qualitative sense of normal distributions</p>

<ul style="list-style-type: none"> Determine probabilities for z-scores using a standard normal table. <p>36-4 Learning Targets:</p> <ul style="list-style-type: none"> Determine probabilities for z-scores using technology. Use a normal distribution, when appropriate, as a model for a population from which a sample of numeric data has been drawn. 	
<p>Activity 37 <i>Random Sampling</i></p> <p>37-1 Learning Targets:</p> <ul style="list-style-type: none"> Explain why random sampling is advantageous when conducting a survey <p>37-2 Learning Targets:</p> <ul style="list-style-type: none"> Explain why random allocation of treatments is critical to a good experiment. <p>37-3 Learning Targets:</p> <ul style="list-style-type: none"> Identify a confounding variable in an observational study. 	<p style="text-align: center;"><i>Sampling</i></p> <p>Introduction to random sampling</p> <p>Random sampling intuition</p> <p>Reasonable samples</p> <p>Inferring population mean from sample mean</p>
<p>Activity 38 <i>Simulations</i></p>	<p style="text-align: center;">N/A</p>
<p>Activity 39 <i>Margin of Error</i></p> <p>39-1 Learning Targets:</p> <ul style="list-style-type: none"> Use margin of error in an estimate of a population proportion. Use simulation models for random samples. <p>39-2 Learning Targets:</p> <ul style="list-style-type: none"> Use margin of error in an estimate of a population proportion. Relate margin of error to the population proportion and to the sample size. 	<p style="text-align: center;"><i>Error</i></p> <p>Standard error of the mean</p> <p>Population standard deviation</p> <p>Sample standard deviation and bias</p> <p>Sampling distribution of the sample mean</p> <p>Sampling distribution of the sample mean 2</p> <p>Sampling distribution example problem</p>
<p>Activity 40 <i>Designing and Conducting Simulations</i></p>	<p style="text-align: center;">N/A</p>