Algebra 2
Poudre School District
Pacing Overview

Semester One

Chapter 1: Linear Functions
10-11 days HS.A.CED.A.2, HS.A.CED.A.3, HS.A.REI.C.6, HS.F.IF.C.9, HS.F.BF.A.1a, HS.F.BF.B.3, HS.F.LE.A.2, HS.S.ID.B.6a

Chapter 2: Quadratic Functions
7 days HS.A.APR.B.3, HS.A.CED.A.2, HS.F.IF.B.4, HS.F.IF.B.6, HS.F.IF.C.7c, HS.F.IF.C.9, HS.F.BF.A.1a, HS.F.BF.B.3, HS.S.ID.B.6a

Chapter 3: Quadratic Equations and Complex Numbers (Part One)
8 days HS.N.CN.A.1, HS.N.CN.A.2, HS.N.CN.C.7, HS.A.SSE.A.2, HS.A.REI.B.4b, HS.F.IF.C.8a

Chapter 4: Polynomial Functions
9-10 days HS.N.CN.C.8, HS.N.CN.C.9, HS.A.SSE.A.2, HS.A.APR.A.1, HS.A.APR.B.2, HS.A.APR.B.3, HS.A.APR.C.4, HS.A.APR.C.5, HS.A.APR.D.6, HS.A.CED.A.2, HS.F.IF.B.4, HS.F.IF.C.7c, HS.F.BF.A.1a, HS.F.BF.B.3

Chapter 3: Quadratic Equations and Complex Numbers (Part Two)
3-4 days HS.A.CED.A.1, HS.A.CED.A.3, HS.A.REI.C.7, HS.A.REI.D.11

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Chapter 5: Rational Exponents and Radical Functions
11-12 days
HS.N.RN.A.1, HS.N.RN.A.2, HS.A.CED.A.4, HS.A.REI.A.1, HS.A.REI.A.2, HS.F.IF.C.7b, HS.F.BF.A.1b, HS.F.BF.B.3, HS.F.BF.B.4a

Chapter 6: Exponential and Logarithmic Functions
13-14 days
HS.A.SSE.A.2, HS.A.SSE.B.3c, HS.A.CED.A.2, HS.A.REI.A.1, HS.F.IF.C.7e, HS.F.IF.C.8b, HS.F.BF.A.1a, HS.F.BF.B.3, HS.F.BF.B.4a, HS.F.LE.A.2, HS.F.LE.A.4, HS.F.LE.B.5

Chapter 7: Rational Functions
6 days
HS.A.APR.D.6, HS.A.APR.D.7, HS.A.CED.A.4, HS.A.REI.A.1, HS.A.REI.A.2, HS.F.BF.B.3

Chapter 10: Probability and Chapter 11: Data Analysis and Statistics
9-10 days
HS.A.APR.C.5, HS.S.ID.A.4, HS.S.CP.A.1, HS.S.CP.A.2, HS.S.CP.A.3, HS.S.CP.A.4, HS.S.CP.A.5, HS.S.CP.B.6, HS.S.CP.B.7, HS.S.CP.B.8, HS.S.CP.B.9

Chapter 8: Sequences and Series
Time Permitting
HS.A.SSE.B.4, HS.F.IF.A.3, HS.F.BF.A.1a, HS.F.BF.A.2, HS.F.LE.A.2

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Chapter 9: Trigonometric Ratios and Functions
Time Permitting HS.A.CED.A.2, HS.F.IF.C.7e, HS.F.BF.A.1a, HS.F.BF.B.3, HS.F.TF.A.1, HS.F.TF.A.2, HS.F.TF.B.5, HS.F.TF.C.8, HS.F.TF.C.9

Chapter 11: Data Analysis and Statistics
Time Permitting HS.S.ID.A.4, HS.S.IC.A.1, HS.S.IC.A.2, HS.S.IC.B.3, HS.S.IC.B.4, HS.S.IC.B.5, HS.S.IC.B.6

Review & Common Summative Assessment


Major Work of the Grade.
Supporting Work of the Grade.
Additional Work of the Grade.

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Chapter 1: Learning Functions
10-11 days HS.A.CED.A.2, HS.A.CED.A.3, HS.A.REI.C.6, HS.F.IF.C.9, HS.F.BF.A.1a, HS.F.BF.B.3, HS.F.LE.A.2, HS.S.ID.B.6a

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
1.1	Parent Functions and Transformations	Learning	HS.F.BF.B.3	2 days
1.2	Transformations of Linear and Absolute Value Functions	Learning	HS.F.BF.B.3	1 day
1.3	Modeling with Linear Functions	Learning	HS.A.CED.A.2, HS.F.IF.C.9, HS.F.BF.A.1a, HS.F.LE.A.2, HS.S.ID.B.6a	3 days
1.4	Solving Linear Systems	Learning	HS.A.CED.A.3, HS.A.REI.C.6	2 days

Total: 8 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
correlation coefficient	horizontal shrink	horizontal stretch
line of best fit	line of fit	linear equation in three variables
ordered triple	parent function	reflection
solution of a system of three linear equations	system of three linear equations	transformation
translation	vertical shrink	vertical stretch

Standards	
HS.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HS.A.CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*.
HS.A.REI.C.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
HS.F.IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum*.
HS.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.B.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.
HS.F.LE.A.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).

Standards (continued)	
HS.S.ID.B.6a	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.

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Chapter 2: Quadratic Functions
7 days HS.A.APR.B.3, HS.A.CED.A.2, HS.F.IF.B.4, HS.F.IF.B.6, HS.F.IF.C.7c, HS.F.IF.C.9, HS.F.BF.A.1a, HS.F.BF.B.3, HS.S.ID.B.6a

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
2.1	Transformations of Quadratic Functions	Learning	HS.F.IF.C.7c, HS.F.BF.B.3	1 day
2.2	Characteristics of Quadratic Functions	Learning	HS.F.IF.B.4, HS.F.IF.C.7c, HS.F.IF.C.9, HS.A.APR.B.3	1 day
2.4	Modeling with Quadratic Equations	Learning	HS.A.CED.A.2, HS.F.IF.B.6, HS.F.BF.A.1a, HS.S.ID.B.6a	3 days

Total: 5 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
axis of symmetry	intercept form	maximum value
minimum value	parabola	quadratic function
standard form	vertex form	vertex of a parabola

Standards	
HS.A.APR.B.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.
HS.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HS.F.IF.B.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*.
HS.F.IF.B.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.
HS.F.IF.C.7c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
HS.F.IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*
HS.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.B.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.

Standards (continued)	
HS.S.ID.B.6a	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.

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Chapter 3: Quadratic Equations and Complex Numbers (Part One)
8 days HS.N.CN.A.1, HS.N.CN.A.2, HS.N.CN.C.7, HS.A.SSE.A.2, HS.A.REI.B.4b, HS.F.IF.C.8a

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
3.1	Solving Quadratic Equations	Learning	HS.A.SSE.A.2, HS.A.REI.B.4b, HS.F.IF.C.8a	2 days
3.2	Complex Numbers	Learning	HS.N.CN.A.1, HS.N.CN.A.2, HS.N.CN.C.7, HS.A.REI.B.4b	1 day
3.3	Completing the Square	Learning	HS.N.CN.C.7, HS.A.REI.B.4b, HS.F.IF.C.8a	2 days
3.4	Using the Quadratic Formula	Learning	HS.N.CN.C.7, HS.A.REI.B.4b	1 day

Total: 6 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
completing the square	complex number	discriminant
imaginary number	imaginary unit i	pure imaginary number
quadratic equation in one variable	quadratic Formula	root of an equation
zero of a function		

Standards	
HS.N.CN.A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.
HS.N.CN.A.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
HS.N.CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.
HS.A.SSE.A.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 $(x^2 - y^2)(x^2 + y^2)$.*
HS.A.REI.B.4b	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 $a \pm bi$ for real numbers a and b.
HS.F.IF.C.8a	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.

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Chapter 4: Polynomial Functions
9-10 days HS.A.APR.A.1, HS.A.APR.B.2, HS.A.APR.B.3, HS.A.APR.C.4, HS.A.APR.C.5, HS.A.APR.D.6, HS.A.CED.A.2, HS.F.IF.B.4, HS.F.IF.C.7c, HS.F.BF.A.1a, HS.F.BF.B.3

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
4.1	Graphing Polynomial Functions	Learning	HS.F.IF.B.4, HS.F.IF.C.7c	1 day
4.2	Adding, Subtracting, and Multiplying Polynomials	Learning	HS.A.APR.A.1, HS.A.APR.C.4, HS.A.APR.C.5	2 days
4.8	Analyzing Graphs of Polynomials Functions	Learning	HS.A.APR.B.3, HS.F.IF.B.4, HS.F.IF.C.7c, HS.F.BF.B.3	2 days
4.3	Dividing Polynomials	Learning	HS.A.APR.B.2, HS.A.APR.D.6	2 days

Total: 7 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
end behavior	even function	local maximum
local minimum	odd function	Pascal's Triangle
polynomial	polynomial function	polynomial long division
synthetic division		

Standards	
HS.A.APR.A.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.
HS.A.APR.B.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 $p(x)$.
HS.A.APR.B.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.
HS.A.APR.C.4	Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.*
HS.A.APR.C.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.
HS.A.APR.D.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.

Standards (continued)	
HS.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HS.F.IF.B.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*.
HS.F.IF.C.7c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior
HS.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.B.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.

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Chapter 3: Quadratic Equations and Complex Numbers (Part Two)
3-4 days HS.A.CED.A.1, HS.A.CED.A.3, HS.A.REI.C.7, HS.A.REI.D.11

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
3.5	Solving Nonlinear Systems	Learning	HS.A.CED.A.3, HS.A.REI.C.7, HS.A.REI.D.11	1 day
3.6	Quadratic Inequalities	Learning	HS.A.CED.A.1, HS.A.CED.A.3	1 day

Total: 2 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
quadratic inequality in one variable	quadratic inequality in two variables	system of nonlinear equations

Standards	
HS.A.CED.A.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.*
HS.A.CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
HS.A.REI.C.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 $x^2 + y^2 = 3$.
HS.A.REI.D.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.

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Chapter 5: Rational Exponents and Radical Functions
11-12 days HS.N.RN.A.1, HS.N.RN.A.2, HS.A.CED.A.4, HS.A.REI.A.1, HS.A.REI.A.2, HS.F.IF.C.7b, HS.F.BF.A.1b, HS.F.BF.B.3, HS.F.BF.B.4a

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
5.1	n^{th} Roots and Rational Exponents	Learning	HS.N.RN.A.1, HS.N.RN.A.2	2 days
5.2	Properties of Rational Exponents and Radicals	Learning	HS.N.RN.A.2	2 days
5.3	Graphing Radical Functions	Learning	HS.F.IF.C.7b, HS.F.BF.B.3	1 day
5.4	Solving Radical Equations and Inequalities	Learning	HS.A.REI.A.1, HS.A.REI.A.2	2 days
5.5	Performing Function Operations	Learning	HS.F.BF.A.1b	1 day
5.6	Inverse of a Function	Learning	HS.A.CED.A.4, HS.F.BF.B.4a	1 day

Total: 9 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
conjugate	extraneous solutions	index of a radical
inverse functions	like radicals	n^{th} root of a
radical equation	radical function	simplest form

Standards	
HS.N.RN.A.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.*
HS.N.RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
HS.A.CED.A.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.*
HS.A.REI.A.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.
HS.A.REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
HS.F.IF.C.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
HS.F.BF.A.1b	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.B.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.
HS.F.BF.B.4a	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, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.*

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Chapter 6: Exponential and Logarithmic Functions
13-14 days HS.A.SSE.A.2, HS.A.SSE.B.3c, HS.A.CED.A.2, HS.A.REI.A.1, HS.F.IF.C.7e, HS.F.IF.C.8b, HS.F.BF.A.1a, HS.F.BF.B.3, HS.F.BF.B.4a, HS.F.LE.A.2, HS.F.LE.A.4, HS.F.LE.B.5

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
6.1	Exponential Growth and Decay Functions	Learning	HS.A.SSE.B.3c, HS.F.IF.C.7e, HS.F.IF.C.8b, HS.F.LE.A.2, HS.F.LE.B.5	2 days
6.2	The Natural Base *e*	Learning	HS.F.IF.C.7e, HS.F.LE.B.5	2 days
6.3	Logarithms and Logarithmic Functions	Learning	HS.F.IF.C.7e, HS.F.BF.B.4a, HS.F.LE.A.4	2 days
6.4	Transformations of Exponential and Logarithmic Functions	Learning	HS.F.IF.C.7e, HS.F.BF.B.3	1 day
6.5	Properties of Logarithms	Learning	HS.A.SSE.A.2, HS.F.LE.A.4	1.5 days
6.6	Solving Exponential and Logarithmic Equations	Learning	HS.A.REI.A.1, HS.F.LE.A.4	2 days
6.7	Modeling with Exponential and Logarithmic Functions	Learning	HS.A.CED.A.2, HS.F.BF.A.1a, HS.F.LE.A.2	0.5 day

Total: 11 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
asymptote	common logarithm	decay factor
exponential decay function	exponential equations	exponential function
exponential growth function	growth factor	logarithm of y with base b function
logarithmic equations	natural base e	natural logarithm

Standards	
HS.A.SSE.A.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 $(x^2 - y^2)(x^2 + y^2)$.*
HS.A.SSE.B.3c	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%.*
HS.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HS.A.REI.A.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.
HS.F.IF.C.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
HS.F.IF.C.8b	Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay.
HS.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.B.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.

Standards (continued)	
HS.F.BF.B.4a	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, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.*
HS.F.LE.A.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).
HS.F.LE.A.4	For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.
HS.F.LE.B.5	Interpret the parameters in a linear or exponential function in terms of a context.

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Chapter 7: Rational Functions
6 days HS.A.APR.D.6, HS.A.APR.D.7, HS.A.CED.A.4, HS.A.REI.A.1, HS.A.REI.A.2, HS.F.BF.B.3

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
7.2	Graphing Rational Functions	Learning	HS.A.APR.D.6, HS.F.BF.B.3	*optional*
7.3	Multiplying and Dividing Rational Expressions	Learning	HS.A.APR.D.6, HS.A.APR.D.7	1 day
7.4	Adding and Subtracting Rational Expressions	Learning	HS.A.APR.D.6, HS.A.APR.D.7	1.5 days
7.5	Solving Rational Equations	Learning	HS.A.CED.A.4, HS.A.REI.A.1, HS.A.REI.A.2	1.5 days

Total: 4 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
complex fraction	cross multiplying	rational expression
rational function	simplified form of a rational expression	

Standards	
HS.A.APR.D.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.
HS.A.APR.D.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.
HS.A.CED.A.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.*
HS.A.REI.A.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.
HS.A.REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
HS.F.BF.B.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.

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Chapter 10: Probability and Chapter 11: Data Analysis and Statistics
9-10 days HS.A.APR.C.5, HS.S.ID.A.4, HS.S.CP.A.1, HS.S.CP.A.2, HS.S.CP.A.3, HS.S.CP.A.4, HS.S.CP.A.5, HS.S.CP.B.6, HS.S.CP.B.7, HS.S.CP.B.8, HS.S.CP.B.9

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
Chapter 10: Probability				
	Chapter Opener/Mathematical Practices			
10.1	Sample Spaces and Probability	Learning	HS.S.CP.A.1	1 day
10.2	Independent and Dependent Events	Learning	HS.S.CP.A.1, HS.S.CP.A.2, HS.S.CP.A.3, HS.S.CP.A.5, HS.S.CP.B.6, HS.S.CP.B.8	0.5 day
10.3	Two-Way Tables and Probability	Learning	HS.S.CP.A.4, HS.S.CP.A.5	0.5 day
10.4	Probability of Disjoint and Overlapping Events	Learning	HS.S.CP.A.1, HS.S.CP.B.7	1 day
10.5	Permutations and Combinations	Learning	HS.A.APR.C.5, HS.S.CP.B.9	1.5 days
10.6	Binomial Distributions	Learning	HS.S.CP.B.9	1.5 days
Chapter 11: Data Analysis and Statistics				
11.1	Using Normal Distributions	Learning	HS.S.ID.A.4	1 day

Total: 7 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
binomial distribution	binomial experiment	Binomial Theorem
combination	compound event	conditional probability
conditional relative frequency	dependent events	disjoint
event	experimental probability	geometric probability
independent events	join frequency	joint relative frequency
marginal frequency	marginal relative frequency	mutually exclusive events
n factorial	normal curve	normal distribution
outcome	overlapping events	permutation
probability distribution	probability of an event	probability experiment
random variable	sample space	standard normal distribution
theoretical probability	two-way table	z-score

Standards	
HS.A.APR.C.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.
HS.S.ID.A.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate populate 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.
HS.S.CP.A.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").
HS.S.CP.A.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.
HS.S.CP.A.3	Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, 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.

Standards (continued)	
HS.S.CP.A.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.*
HS.S.CP.A.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.*
HS.S.CP.B.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.
HS.S.CP.B.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.
HS.S.CP.B.8	Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
HS.S.CP.B.9	Use permutations and combinations to compute probabilities of compound events and solve problems.

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Chapter 8: Sequences and Series
Time Permitting HS.A.SSE.B.4, HS.F.IF.A.3, HS.F.BF.A.1a, HS.F.BF.A.2, HS.F.LE.A.2

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
8.1	Defining and Using Sequences and Series	Learning	HS.F.IF.A.3	0.5 day
8.2	Analyzing Arithmetic Sequences and Series	Learning	HS.F.IF.A.3, HS.F.BF.A.2, HS.F.LE.A.2	1 day
8.3	Analyzing Geometric Sequences and Series	Learning	HS.A.SSE.B.4, HS.F.IF.A.3, HS.F.BF.A.2, HS.F.LE.A.2	1 day
8.4	Finding Sums of Infinite Geometric Series	Learning	HS.A.SSE.B.4	0.5 day
8.5	Using Recursive Rules with Sequences	Learning	HS.F.IF.A.3, HS.F.BF.A.1a, HS.F.BF.A.2	1 day

Total: 4 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
arithmetic sequence	arithmetic series	common difference common ratio
explicit rule	geometric sequence	geometric series
partial sum	recursive rule	sequence
series	sigma notation	summation notation
terms of a sequence		

Standards	
HS.A.SSE.B.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.*
HS.F.IF.A.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 $n \geq 1$.*
HS.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.A.2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
HS.F.LE.A.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).

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Chapter 9: Trigonometric Ratios and Functions
Time Permitting HS.A.CED.A.2, HS.F.IF.C.7e, HS.F.BF.A.1a, HS.F.BF.B.3, HS.F.TF.A.1, HS.F.TF.A.2, HS.F.TF.B.5, HS.F.TF.C.8, HS.F.TF.C.9

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
9.1	Right Triangle Trigonometry	Preparing	HS.F.TF.A.1, HS.F.TF.A.2, HS.F.TF.B.5, HS.F.TF.C.8	1 day
9.2	Angles and Radian Measure	Learning	HS.F.TF.A.1	0.5 day
9.3	Trigonometric Functions of Any Angle	Learning	HS.F.TF.A.2	1 day
9.4	Graphing Sine and Cosine Functions	Learning	HS.F.IF.C.7e, HS.F.BF.B.3	1 day
9.5	Graphing Other Trigonometric Functions	Learning	HS.F.IF.C.7e, HS.F.BF.B.3	1 day
9.6	Modeling with Trigonometric Functions	Learning	HS.F.TF.B.5, HS.F.BF.A.1a, HS.A.CED.A.2	1 day
9.7	Using Trigonometric Identities	Learning	HS.F.TF.C.8	0.5 day
9.8	Using Sum and Difference Formulas	Learning	HS.F.TF.C.9	1 day

Total: 7 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
amplitude	central angle	cosecant
cosine	cotangent	conterminal
cycle	fluency	initial side
midline	period	periodic function
phase shift	quadrantal angle	radian
reference angle	secant	sector
sine	sinusoid	standard position
tangent	terminal side	trigonometric identity
unit circle		

Standards	
HS.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HS.F.IF.C.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
HS.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
HS.F.BF.B.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.
HS.F.TF.A.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
HS.F.TF.A.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.
HS.F.TF.B.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.
HS.F.TF.C.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.

Standards (continued)	
HS.F.TF.C.9	Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

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Chapter 11: Data Analysis and Statistics
Time Permitting HS.S.IC.A.1, HS.S.IC.A.2, HS.S.IC.B.3, HS.S.IC.B.4, HS.S.IC.B.5, HS.S.IC.B.6

Chapter Summary				
Section	**Title**	**Level of Learning**	**Standard(s)**	**Pacing**
	Chapter Opener/Mathematical Practices			
11.2	Populations, Samples, and Hypotheses	Preparing Learning	HS.S.IC.A.1, HS.S.IC.A.2	0.5 day
11.3	Collecting Data	Learning	HS.S.IC.A.1, HS.S.IC.B.3	1 day
11.4	Experimental Design	Learning	HS.S.IC.A.1, HS.S.IC.B.3, HS.S.IC.B.6	1 day
11.5	Making Inferences from Sample Surveys	Learning	HS.S.IC.A.2, HS.S.IC.B.4	1.5 days
11.6	Making Inferences from Experiments	Learning	HS.S.IC.A.2, HS.S.IC.B.5	1 day

Total: 6 days

Note: Additional days reserved for review and assessment.

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Additional Activities/Resources	
Name	**Location**

Vocabulary		
bias	biased question	biased sample
cluster sample	control group	controlled experiment
convenience sample	descriptive statistics	experiment
hypothesis	inferential statistics	information design
margin of error	observational study	parameter
placebo	population	random sample
randomization	randomized comparative experiment	replication
sample	self-selected sample	simulation
statistic	stratified sample	survey
systematic sample	treatment group	unbiased sample

Standards	
HS.S.IC.A.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
HS.S.IC.A.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*?
HS.S.IC.B.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
HS.S.IC.B.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.
HS.S.IC.B.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
HS.S.IC.B.6	Evaluate reports based on data.