Content Area:	Mathematics	Course:	Algebra 2	Pacing:	10
Domain(s): Algebra, Functions			**Unit**: 1 Linear		

Standard (Student Friendly):	Standard:	Standard:
Find the slope from a graph or set of data.	MAFS.912.F-IF.2.6	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
Find intercepts, slope and equation of a line.	MAFS.912.A.3.9	Determine the slope, x-intercept, and y-intercept of a line given its graph, its equation, or two points on the line.
Solve system of equations graphing, substitution, or elimination	MAFS.912.A-REI.3.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
Students will write system of equations given a real world situation	MAFS.912.A-CED.1.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
1.2Identify parent functions from a graph and an equation. Use parent function in real world situations.	MAFS.912.F-BF.2.3	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.*
12.7 Solving non-linear system of equation.	MAFS.912.A-REI.3.7	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 $x^2 + y^2 = 3$.
12.5 Write an equation of a parabola.	MAFS.912.G-GPE.1.2	Derive the equation of a parabola given a focus and directrix.

Essential Question:	Knowledge: Students will….
• Can you explain the effects of f(x) on a graph when transformed in a positive or negative directions? • Can you use parent functions to model real world data and make estimates for unknown values? • Can you graph linear or quadratic functions by hand or using technology? • Can you graph piecewise functions? • Do you know how to solve systems using substitution or elimination? • Can you find the rate of change from a linear graph. • Can you identify and graph a linear function?	• Students continue to solve real-world problems by writing and solving appropriate linear equations, inequalities, or system of equations. • Students will apply the meaning of the parameters in a linear function to a real world situation. • Students will identify parent functions by name, graph, and equation. • Students will learn how to graph a piecewise function based on each piece with a specific domain. • Students will be able to graph linear and nonlinear parent functions. • Students will be able to identify rate of change and graph linear functions.

Resources (with embedded links):	Assessments:
Rate of change Linear Equations 1.2 Parent Functions Absolute Value Parent Functions System of Equations Systems Algebraically	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**

Essential Vocabulary:	Lesson Activities:
Parent function **Piecewise function** **Linear Function** **Slope** **Solution of a system** **Inconsistent** **Consistent** **Dependent system** **Independent system**	Transforming functions Changing Rates Equation Grapher Substitution Substitution-no solution Substitution-algebraically vs graph Systems-graphically 1 Systems-graphically 2 Elimination Why Elimination works Independent, dependent, inconsistent

Content Area:	Mathematics	**Course:**	Algebra 2	**Pacing:**	24
Domain(s): Functions			**Unit**: 2 Quadratic Functions		

Standard (Student Friendly):	**Standard:**	**Standard:**
2.1Identify the effects of changes in the coefficients of $y=(x-h)^2$ +k and transform them.	MAFS.912.F-BF.2.3	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
2.2Define, identify, graph, and use maximum and minimum to solve problems.	MAFS.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima
MID-QUARTER ASSESSMENT		
2.3Solve quadratic expression by graphing or factoring. Convert from one form to another. Define maximum, minimum, and roots.	MAFS.912.A-SSE.2.3 MAFS.912.F-IF.3.8 MAFS.912.A-APR.2.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
2.5 Define and use imaginary and complex numbers	MAFS.912.N-CN.1.2 MAFS.912.N-CN.1.1 MAFS.912.N-CN.3.7	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. 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. Solve quadratic equations with real coefficients that have complex solutions.
2.6 Solve quadratic equations using quadratic formula	MAFS.912.A-REI.2.4	Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.
2.9 Perform operations with complex numbers	MAFS.912.N.CN.1.2	
FIRST 9 WEEKS ASSESSMENT		

Essential Question:	Knowledge: Students will….
• Can you transform quadratic equations from its original form and find the value of K? • Determine if a function is even or odd. • Determine if a function has a maximum or minimum and and its vertex. • Can you factor the quadratics and determine their zeros? • Can you convert a quadratic function to standard form. • Can you find the intercepts, axis of symmetry, and vertex of a quadratic function? • Know a complex number and represent it in the form of a +bi. • Can you perform operations with complex numbers? • Can you solve quadratic equations and present solutions with complex numbers? • Can you solve quadratic equations by completing the square or using the quadratic formula. • Can you solve simple systems consisting of a linear equation and a quadratic equation in two variables. • Can you define a parabola, focus, and directrix?	• Students will be able to factor a simple quadratic equation to find intercepts. • Given an equation and a graph of that equation, students will be able to accurately describe the effects of changing the equation on the graph. • Students will be able to solve systems of equations involving linear, quadratic, and other nonlinear functions. • Students will be able to apply quadratic functions to real world situations in order to solve problems. • Students will use the relation i^2=-1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. • Students will extend their knowledge of the quadratic formula to include complex numbers. • Students will be able to describe the relationship between the focus, directrix, and graph of a parabola. • Students will be able to solve a system of nonlinear equations in two variables by the substitution and elimination method.
Resources (with embedded links):	**Assessments:**
2.1 2.4 2.7 2.2 2.5 2.9 2.3 2.6 12.7 12.5	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Axis of symmetry **Standard form** **Maximum value** **Minimum value** **Parabola** **Vertex form** **Zero of function** **Root of function** **Binomial** **Trinomial** **Imaginary number** **Complex number** **Complex conjugate** **discriminant**	Definition of a Parabola Properties of a Parabola Quadratic Equations and Robots Imaginary roots in quadratics Complex solutions in quadratics Complex roots in quadratic formula Discriminant Quadratic Formula Completing the Square Solving by taking square root Building a Quadratic Function Building a Quadratic Function from X Deriving the Quadratic Formula Identify Even and Odd Functions Graphing Quadratic Functions Wakulla Caves Parabolas Through two points Graphs of a second degree polynomial Solving quadratics using square roots Intro to imaginary numbers Multiply Complex numbers Subtract complex numbers Computations with complex numbers

	Finding Maximum and Minimum Building a General Quadratic Function Graphs of Quadratic Functions Increasing or Decreasing A Circle and a line A linear and Quadratic System Video of Parabola and a line 1 Video Parabola and lines 2 Write and solve quadratic equations Write and Solve Inequalities Write and solve simple rational Equations

Content Area:	Mathematics	Course:	Algebra 2	Pacing:	14
Domain(s): Arithmetic with Polynomials			**Unit**: 3 Polynomial Functions		

Standard (Student Friendly):	**Standard:**	**Standard:**
3.1-3 Understand the definition of a polynomial and show how to add, subtract, multiply, and divide.	MAFS.912.A-APR.1.1	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.
3.2 Prove polynomial identities and use them to describe numerical relationships such as triples.	MAFS.912.A-APR.3.4	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.
3.3 Divide polynomials using long division. Rewrite simple rational expressions and divide and simplify.	MAFS.912.A-APR.2.2 MAFS.912.A-APR.4.6	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). 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
3.4Distinguish between a factor, term, coefficient, expression, and the context of an expression. Rewrite and identify expression according to their common factors, terms, and other similarities.	MAFS.912.A-SSE.1.1 MAFS.912.A-SSE.1.2	Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients Use the structure of an expression to identify ways to rewrite it. For example, see x4 - y4 as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2) (x^2 + y^2)$
3.5 Factor a quadratic expression and identify its zeros, max, min, and other properties.	MAFS.912.A-APR.2.3 MAFS.912.F-IF.3.9	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. 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.
3.7 Graphically display a function and transform it into different forms. Understand vertex, intercepts, max, min, and end behavior.	MAFS.912.F-IF.3.7 MAFS.912.F-IF.2.4	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases a. Graph linear and quadratic functions and show intercepts, maxima, and minima. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior 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.

Essential Question:	Knowledge: Students will….
• Can you identify and perform operations with polynomials? • Do you know how to divide polynomials using long division? • Can you classify and graph a polynomial? • Can you use binomial expansion to multiply polynomials? • Can you factor a polynomial? Do you know what their zeros are? • Do you know the difference of a max and min? • Can you determine the end behavior of a polynomial? • Can you identify zeros of a polynomial?	• Students will be able to… Write polynomials in standard form. Classify polynomials. Add, subtract, and multiply polynomials. Expand a product of two binomials. Factor polynomials using the GCF, perfect square trinomials, and difference of squares. • Student will learn how to multiply, add, subtract, and factor quadratic and cubic polynomials using concrete models and analytic techniques • Students will be able to graph linear and quadratic functions and show intercepts, maxima, and minima. • Students will be able to factor polynomials and identify zero.
Resources (with embedded links):	**Assessments:**
3.1 3.2 3.3 3.4 3.5 3.7	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Monomial **Degree** **Leading coefficient** **Synthetic division** **Multiplicity** **End behavior** **Turning point** **Local max** **Local min**	**Special Products** **Division of Polynomials using inspection** **Polynomial Remainder Theorem** **Dividing Polynomials** **Factoring and Zeros** **Trina's triangles** **Max and Min** **Graphs of Second degree Polynomials** **Combine Fuel Efficiency**

Content Area:	Mathematics	Course:	Algebra 2	Pacing:	12
Domain(s): Rational Expressions			**Unit**: 4 Rational and Radical Functions		

Standard (Student Friendly):	**Standard:**	**Standard:**
5.1 Solve problems involving direct, inverse, and combined variation.	MAFS.912.A-CED.1.4 MAFS.912.A-CED.1.3 MAFS.912.F-BF.2.4	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.* Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.
5.2-5.3Simplify and perform operations with rational expressions	MAFS.912.A-APR.4.6	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.
5.4Graph and transform rational expressions. Identify key features of rational expressions.	MAFS.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
5.5Solve rational equations.	MAFS.912.A-REI.1.2 MAFS.912.A-REI.1.1	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. 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.
5.6 Rewrite radical equations using rational exponents. Use properties of exponents to simplify rational exponents.	MAFS.912.N-RN.1.2 MAFS.912.N-RN.1.1 E	Rewrite expressions involving radicals and rational exponents using the properties of exponents 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 to be the cube root of 5 because we want = to hold, so must equal 5
6.3Write and graph piecewise functions.	MAFS.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.B.Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Essential Question:	**Knowledge: Students will….**
● Can you solve equation with rational and radical equations? ● Can you simplify a radical expression? ● Do you know what makes a rational expression undefined?	● Students will be able to multiply and divide rational expressions ● Students will be able to understand how to simplify an expression that has a polynomial in the numerator and denominator. ● Students will be able to understand and be able to identify

● How do you simplify a rational expression? ● Can you perform operations with rational expressions? ● Can you solve problems involving rational equations and inequalities?	when a Rational Expression is undefined. ● Students will be able to Simplify rational expressions Perform arithmetic operations with rational expressions Transform rational functions Solve problems involving rational equations and inequalities Compose rational functions with other functions Create rational functions to represent real life situations
Resources (with embedded links):	**Assessments:**
5.1 5.2 5.3 5.4 5.5	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Index **Rational exponent** **Extraneous solution** **Rational equation** **Rational function** **Discontinuous function** **Continuous functions** **Rational expression** **Direct variation** **Inverse variation**	**Solving a Literal equation** **Basic Linear Function** **Rainfall-Inverses** **Dividing** **Power of a Power** **Rational Exponents** **Simplify Radicals** **Exponents and Fractions** **Decimal exponents** **Roots and unit fractions**

Content Area:	Mathematics	**Course:**	Algebra 2	**Pacing:**	20
Domain(s): Interpreting Functions			**Unit**: 6 Radical Functions		

Standard (Student Friendly):	**Standard:**	**Standard:**
6.5 Understand composition functions, how to evaluate functions, and perform operations with functions.	MAFS.912.F-BF.1.1	Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. c. Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time
	SECOND Quarter TEST	
6.6 Determine if an inverse of a function is a function and be able to find the inverse.	MAFS.912.F-BF.2.4	Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$. b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table, given that the function has an inverse. d. Produce an invertible function from a non-invertible function by restricting the domain.
5.7 Graph radical functions and inequalities.	MAFS.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
5.8 Solve radical equations and inequalities.	MAFS.912.A-REI.1.2 S MAFS.912.A-CED.1.3	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods

Essential Question:	**Knowledge: Students will….**
• Can you perform operations with composition functions? • What is the process for solving radical equations? • How are radical equations different from linear equations? • How does an inverse function relate to the original function? • Can you solve radical equations with extraneous solutions? • What is an extraneous solution? • How do graphing inequalities differ from graphing linear equations?	• Students will solve radical equations that model real-world relationships. • Create and Reflect upon their understanding of composition and inverse function. • Students will be able to understand and convey why certain changes to the equations will transform the graph. And also be able to identify what changes have been made to the equation given the graph with the changes made. • Students will be able to use function notation correctly. Find the domain and range of a function. Combine functions by addition, subtraction, multiplication, division and composition.
Resources (with embedded links):	**Assessments:**
6.5	**Observations**

6.4 6.6 5.6 5.7 5.8	**Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Radical Function **Radical Equation** **Composition of Functions** **One-to-one function** **Inverse**	Graphs of compositions Building A Graph by Composition Invertible or Not Rainfall Transforming a Graph

FIRST SEMESTER EXAM

Content Area:	Mathematics	Course:	Algebra 2	Pacing:	15
Domain(s): Linear, Quadratic, & Exponential Functions			**Unit**: 7 Exponential and Logarithm Functions		

Standard (Student Friendly):	Standard:	Standard:
4.1Write and ed evaluate exponential function expression.	MAFS.912.F-LE.2.5	Interpret the parameters in a linear or exponential function in terms of a context
4.2Find the inverse and graph the function.	MAFS.912.F-BF.2.4 MAFS.912.F-IF.2.5	Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x^3 or f(x) = (x+1)/(x–1) for x ≠ 1. b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table, given that the function has an inverse. d. Produce an invertible function from a non-invertible function by restricting the domain. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person hours it takes to assemble engines in a factory, then the positive integers would be an appropriate domain for the function.
4.3Write equivalent forms for exponential and logarithm functions	MAFS.912.A-CED.1.1 MAFS.912.F-IF.3.8	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational, absolute, and exponential functions. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = , y = , y = , y = , and classify them as representing exponential growth or decay
4.4Use properties and the change of base formula to simplify logarithm functions	MAFS.912.F-BF.2.a MAFS.912.F-BF.2.4	Use the change of base formula. Find inverse functions
4.5 Solve exponential and logarithmic functions.	MAFS.912.F-LE.1.4	For exponential models, express as a logarithm the solution to = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology
4.6Use the natural base to solve logarithm equations.	MAFS.912.F-LE.1.4 MAFS.912.A-CED.1.3	For exponential models, express as a logarithm the solution to = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
4.7 Transform exponential and logarithm functions.	MAFS.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are

	MAFS.912.A-REI.4.11	available, and showing end behavior. d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. Algebra II Toolkit 24 e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift 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.

Essential Question:	**Knowledge: Students will….**
• How do exponential functions model real-world problems and their solutions? • How do logarithmic functions model real-world problems and their solutions? • How are expressions involving exponents and logarithms related? • How do I graph an exponential function and determine its domain and range? • How do I write and exponential expression as a logarithm? • How do I use logarithms to solve exponential equations? • How do I use the properties of exponents to simplify logarithmic expressions and solve logarithmic equation?	• Students will be able to convert equations between logarithmic form and exponential form, evaluate common and natural logarithms and graph them. • Students will be able to: Use the properties of exponents. Evaluate and simplify expressions containing rational exponents. Solve equations containing rational exponents. Solve problems involving exponential growth and decay. Use the exponential function $y = x\ e$. Evaluate expressions involving logarithms. Solve equations involving logarithms. Find common logarithms and antilogarithms of numbers. Solve equations using common logarithms. Solve real-world applications with common logarithmic functions. Find natural logarithms of numbers. Solve equations using natural logarithms.
Resources (with embedded links):	**Assessments:**
4.1 4.2 4.3 4.4 4.5 4.6 4.7	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Exponential function **Base** **Asymptote** **Exponential growth** **Exponential decay** **Inverse relation** **Logarithm** **Natural logarithm**	**Canoe Trip Interest** **Canoe Trip Interest 2** **Newtons Law-Exponential** **Estimation Exponential Graphs** **Carbon 14 -Dating** **Logistic Growth** **Throwing Baseballs** **Real World Exponential equations** **Snail Invasion** **Change of Base** **Proof of Change of Base**

THIRD QUARTER ASSESSMENT

Content Area:	Mathematics	Course:	Algebra 2	Pacing:	15
Domain(s): Statistics and Probability			**Unit**: 8 Probability		

Standard (Student Friendly):	Standard:	Standard:
*Union/intersections complements Khan Academy Set Operations Khan Academy-intersections	MAFS.912.S-CP.1.1	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").
7.1Solve problems using the fundamental counting principle, permutations, and combinations.	MAFS.912.S-CP.1.1	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").
7.2 Find the theoretical and experimental probability of an event.	MAFS.912.S-CP.1.3 MAFS.912.S-CP.1.5 MAFS.912.S-IC.1.2	Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B 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 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?
7.3 Find the probability of independent and dependent events.	MAFS.912.S-CP.1.2 MAFS.912.S-CP.1.3	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. Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
7.4Interpret and construct two-way frequency tables.	MAFS.912.S-CP.1.4	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
7.5Find the probability of mutually exclusive and inclusive events.	MAFS.912.S-CP.2.7	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.

Essential Question:	Knowledge: Students will….
• What is conditional probability? • How do you determine if 2 events are mutually exclusive?	• Use permutations and combinations in conjunction with other probability methods to calculate probabilities of compound events and solve problems

• How do I use the General Multiplication Rule to calculate probabilities? • How do I determine when to use a permutation or a combination to calculate a probability? • How do I graphically display the probability distribution of two way table? • How do I calculate theoretical and experimental probabilities of probability distributions? • How can frequency tables help us to find trends in real life scenarios? • How can I communicate mathematically using set notation? • What makes two random variables independent? • How do I determine whether or not variables are independent?	• Define the complement of an event. • Identify the complement of an event by examining the sample space for that event. • Describe the formula for finding the probability of the complement of an event. • Define mutually exclusive events. • Examine experiments in which the events are mutually exclusive. • Examine experiments in which the events are not mutually exclusive. • Distinguish between mutually exclusive events and non-mutually exclusive events. • Determine whether two events are mutually exclusive or non-mutually exclusive. • Examine experiments in which Addition Rule 1 is applied to compute probabilities of mutually exclusive events.
Resources (with embedded links):	**Assessments:**
7.1 7.2 7.3 7.4 7.5	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Fundamental counting Principle **Permutation** **Factorial** **Combination** **Probability** **Sample space** **Favorable outcomes** **Complement** **Trial** **Experimental probability** **Joint-relative frequency** **Marginal relative** **Frequency** **Simple event** **Compound event** **Mutually exclusive** **Inclusive event**	**Freds Fun Factory-Permutations and Combinations** **Rain and Lighting** **Breakfast-Independence** **Titantic-Two-Way tables** **Titantic2** **Titantic 3** **Interactive Marbles** **Lucky Envelopes-Independent events** **Coffee at Mom's-Addition Rule** **Addition Rule** **Venn Diagram-Union and intersections** **Fred's Factory-Perm/Combination**

Content Area:	Mathematics	**Course:**	Algebra 2	**Pacing:**	18
Domain(s): Interpreting Data			**Unit**: 9 Data Analysis and Statistics		

Standard (Student Friendly):	**Standard:**	**Standard:**
8.1 Find the measure of Central tendency and Variation	MAFS.912.S-ID.1.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve
8.2 Explain how random samples can be used to make inferences about a population	MAFS.912.S-IC.2.3 MAFS.912.S-IC.2.4 MAFS.912.S-IC.2.6	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each 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 Evaluate reports based on data
8.3Find commonalities and differences between surveys experiments and studies.	MAFS.912.S-IC.2.3 MAFS.912.S-IC.2.5	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant
(*pg 594 extension) Recognize normally distributed data.	MAFS.912.S-ID.1.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve
8.6Find binomial probabilities and test hypothesis	MAFS.912.A-APR.4.6	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.
8.7Use tables to find normal distribution.	MAFS.912.S-ID.1.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve

Essential Question:	**Knowledge: Students will….**
● If you were to pick a number that best describes all the data in a set, what number would you pick? ● How is the mean (average) affect when all the data are close to each other, or when one piece of data is much bigger or much smaller than the rest? ● How is the median (middle) determined when there is an even number of numbers in a set of data? ● How can the measures of central tendency be used to describe tendencies and make predictions?	● State measures which describe central tendency of a set of numbers. ● To define data and range of a set of data. To find the range. ● To define arithmetic mean of a set of data. To compute the mean. ● To find the median of a set of data. ● To find the mode*(s)* of a set of data. ● Produce sets of numbers whose statistical measures are specified. ● To organize, plot and analyze statistical data.

• Can you explain the purpose of sample surveys, experiments and observations? • Can you use the data from sample surveys to estimate? • I can compare reports by using standard deviation and normal distribution.	
Resources (with embedded links):	**Assessments:**
8.1 8.2 8.3 8.6 8.7	**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**
Essential Vocabulary:	**Lesson Activities:**
Expected value **Probability distribution** **Variance** **Standard deviation** **Population** **Sample** **Random sample** **Experiment** **Observational study** **Controlled experiment** **Binomial theorem** **Binomial probability** **Standard normal value**	**SAT scores-probability** **Certificate-Normal Distribution** **Do you fit in this car-Standard Deviation** **Normal Distribution Interactive Activity** **Words and Music-Observational study** **Ecological Sampling Method** **Is Bigger better** **Fire Simulator** **Montey Hall**

FOURTH QUARTER ASSESSMENT

Content Area:	Mathematics	**Course:**	Algebra 2	**Pacing:**	16
Domain(s): Trigonometric Functions			**Unit**: 10 trigonometric Functions		
Standard (Student Friendly):		**Standard:**	**Standard:**		
10.1Understand and use trig relationships in triangles.		MAFS.912.F-TF.1.2	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		
10.2Determine the values of trig functions.		MAFS.912.F-TF.1.2	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		
10.3Convert angle between degrees and radians		MAFS.912.F-TF.1.2 MAFS.912.F-TF.1.	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 1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle; Convert between degrees and radians		
11.1Recognize and graph trig functions		MAFS.912.F-TF.2.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline		
11.3Use Fundamental trig identities to simplify and rewrite expressions		MAFS.912.F-TF.3.8	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.		
Essential Question:			**Knowledge: Students will….**		
• What is the definition of a radian? You should be able to explain this in your own words. • How can you convert from radians to degrees and vice versa? • How can the six basic trig functions be used to solve right triangles? • What is the main difference between a trig function and its inverse? • How can the unit circle help us evaluate trig functions quickly?			• The student will learn the basic right-triangle definitions for sine, cosine, and tangent. • The student will understand the connections between trigonometric ratios. • Define radian measure and convert angle measures between degrees and radians, including revolutions. • Determine the quadrants where sine, cosine, and tangent are positive and negative. • Recognize and write the fundamental trigonometric identities		
Resources (with embedded links):			**Assessments:**		
10.1 10.2 10.3 11.1 11.3			**Observations** **Exam view** **Exit tickets** **Performance Matters** **Near-pod** **Quick writes/quiz**		
Essential Vocabulary:			**Lesson Activities:**		
Sine **Cosine** **Tangent** **Cosecant** **Secant** **Cotangent**		**Angle of rotation** **Radian** **Unit circle** **Periodic function** **Cycles**	**Foxes and Rabbits2** **Foxes and Rabbits 3** **Intro to Unit Circle** **As the wheels turn** **Ferris Wheel Measures**	**Trig Identities** **Pythagorean Trig Identity** **Unit Circle** **PytHagorean Identity**	