UNIT 1: Simplifying Expressions (1st Quarter)
I can simplify expressions and/or write expressions in equivalent forms.

Goal 1a: I can simplify <u>numerical</u> expressions.

	Beginning	Developing	Proficient	Mastery
Order of Operations	-I can perform integer operations. -I can add, subtract, multiply and divide fractions.	-I can simplify numerical expressions using the order of operations.	-I can simplify algebraic expressions with exponents, using the order of operations.	-I can analyze and critique solutions and identify mistakes in a problem that is solved.
Simplifying Exponents	-I can write exponents in standard, and expanded form. -I can define a power, base and exponent. -I can define scientific notation and standard notation. -I can multiply and divide decimals and fractions.	-I can simplify exponential expressions with positive exponents. -I can simplify exponential expressions with negative bases. -I can transfer between scientific notation and standard notation. -I can order numbers in scientific notation	-I can simplify exponential expressions with integer exponents. -I can explain the difference between $-a^n$ and $(-a)^n$. -I can multiply and divide numbers written in scientific notation.	-I can simplify exponential expressions with rational exponents. -I can describe when $-a^n = (-a)^n$. -I can connect multiplying and dividing numbers in scientific notation with other numerical expressions and describe the similarities and differences in the two types of expressions.

Simplifying Radicals	-I can define a perfect square, perfect cube and a radical. -I can define a radical. -I recognize positive and negative solutions to even roots.	-I can approximate the value of non-perfect squares. -I can simplify radicals (square roots and cube roots).	-I can simplify expressions with radicals (like those found when the quadratic formula is set up). -I can add and subtract radicals (square roots). -I can multiply and divide radicals (square roots). -I can identify when radicals will result in no real solutions.	-I can rewrite radicals and powers with rational exponents. -I can simplify radical expressions, by rewriting the expressions with rational exponents, then simplifying. -I can explain why some roots of negative numbers result in "No Real Solution," while others have solutions.
Goal 1b: I can simplify algebraic expressions.				
	Beginning	**Developing**	**Proficient**	**Mastery**
Algebraic Expressions	-I can define like terms, coefficient, constant, polynomial, distributive property, etc.	-I can add and subtract polynomials by combining like terms.	-I can explain the similarities and differences between simplifying numerical expressions and simplifying algebraic expressions. -I can multiply a constant, or monomial with a polynomial by applying the distributive property.	-I can simplify rational expressions.
Quadratic Expressions	-I can define a monomial, binomial, trinomial and polynomial. -I can multiply a constant, or monomial with a polynomial by applying the distributive property.	-I can multiply two binomials using methods like FOIL, "double distribution," the area model, etc. -When asked to multiply two binomials, I can identify the factors and the product.		

	-I can identify the greatest common factor of a polynomial	-I can “undistribute” or factor the greatest common factor from a polynomial.	-I can factor a polynomial with a leading coefficient using methods like, grouping, guess and check, etc. -I can identify the factors and product of a polynomial.	-I can factor a polynomial with a greatest common factor, and a leading coefficient. -I can explain how equivalence is maintained throughout factoring.
Rational Expressions	-I can simplify rational expressions using the laws of exponents (numerator and denominator are both monomials).	-I can simplify a single rational expression when one or more polynomials need to be reduced.	-I can multiply and divide algebraic rational expressions.	-I can add and subtract algebraic rational expressions.
Exponential Expressions		-I can simplify exponential expressions with positive exponents. -I can transfer between scientific notation and standard notation. -I can order numbers in scientific notation	-I can simplify exponential expressions with integer exponents. -I can multiply and divide numbers written in scientific notation.	-I can simplify exponential expressions with rational exponents. -I can connect multiplying and dividing numbers in scientific notation with other numerical expressions and describe the similarities and differences in the two types of expressions.
Radical Expressions		-I can simplify radical algebraic expression.	-I can represent a radical expression as a rational exponent. -I can transfer between radicals and rational exponents.	-I can add and subtract radical expressions. -I can multiply and divide radical expressions using laws of exponents and rational exponents.
	Note: This is not an expectation, however, <u>if time allows</u>, you may introduce the connection between radicals, and rational exponents.			

UNIT 2: Solving Equations and Inequalities (2nd Quarter)
I can find and represent the solutions to equations and inequalities.

Goal 2a: I can solve one variable equations and explain what the solution(s) represents.

	Beginning Involves solving equations with integer coefficients and solving quadratics by square roots.	**Developing** Involves solving equations with fractions, proportions, special cases, and solving quadratics by factoring.	**Proficient** Involves solving word problems, absolute value, radical and quadratics by factoring.	**Mastery** Involves solving and having a deep understanding of solutions for any kind of equation, or solution set.
Solving Equations	-I can solve equations with one solution (includes integer coefficients only)	-I can write an equation to represent a verbal situation. -I can solve one variable equations with one solution (including equations multiple fractions and proportions)	-I can write and solve equations given a verbal situation. -I can solve one variable equations that will have one or two real solutions (including absolute value and radical equations).	-I can solve a multi-variable equation for a selected variable. -I can explain why absolute value and quadratic equations have two solutions, while other equations only have one. I have a firm understanding on what it means to be a solution, and when multiple solutions are possible.
Solving Special Cases		-I can solve one variable equations with one solution, no real solutions and infinitely many solutions.	-I can explain why equations have one solution, two solutions, no real solution or infinitely many solutions by analyzing the equation given. -I can solve absolute value, square root and quadratic equations with one-solution, two solutions or no real solutions.	-I can create equations that will have one solution, two solutions, no real solution or infinitely many solutions and explain why the equation will have those results. -I can explain why certain absolute value, square root or radical equations have no real solutions by analyzing the equations.

Solving Quadratic Equations	-I can solve quadratic equations using square roots.	-I can solve quadratic equations with a leading coefficient of 1, by factoring.	-I can solve quadratic equations by factoring with a leading coefficient greater than 1. -I can explain why quadratic equations will have no real solutions, one or two real solutions. -I can explain the limitations of solving quadratic equations by factoring (some are not factorable) and find alternative methods to solving the quadratic (completing the square). Note: While students are not expected to complete the square on overly difficult equations, students should have an understanding of the basic structure of completing the square.	-I can solve quadratic equations by factoring the greatest common factor and with a leading coefficient greater than 1. -I can create quadratic equations that will have no real solutions, one solution or two solutions and explain why the equation will have those results. -I can explain when completing the square is necessary when solving quadratic equations. -I can analyze an equation to determine the most appropriate strategy for solving the quadratic equation; solving by square roots, solving by factoring, or solving by completing the square (Note: Students will be able to use the general form of completing the square (the quadratic formula))
Goal 2b: I can solve inequalities and explain what the solutions represent.				
	Beginning Involves solving and graphing one variable inequalities.	**Developing** Involves simply solving compound inequalities.	**Proficient** Involves solving and representing the solutions of compound inequalities	**Mastery** Involves a deep understanding of what it means to be a solution of compound inequalities
Solving Inequalities	-I can solve one variable inequalities, and represent the solutions graphically.	-I can solve compound inequalities with “and” or “or” statements.	-I can graph the solutions to compound inequalities, and can explain the solutions to the compound inequality. -I can solve and graph absolute value inequalities.	-I can solve and graph special cases of compound inequalities. -I can solve and graph special cases of absolute value inequalities.

Types of Solutions	-I can explain the similarities and differences between solving equations and solving inequalities.	-I can explain why there are infinitely many solutions to inequalities.	-I can explain the difference between “Infinitely many solutions” and “All real solutions” when solving inequalities.	-I can explain why special cases compound inequalities have no solution or all real solutions. -I can explain why some absolute value equations create “and” statements, while other absolute value inequalities create “or” statements.
Goal 2c: I can solve systems of equations.				
	Beginning Involves writing equations in different forms.	**Developing** Involves solving systems of equations by substitution and elimination.	**Proficient** Involves solving systems with special cases and word problems.	**Mastery** Involves making connections to previously learned concepts, like solving one-variable equations.
Solving Systems of Equations	-I can write an equation in multiple forms; more specifically, I can write a standard form equation, in slope-intercept form.	-I can solve a system of equations, using substitution, when at least one of the equations is written in slope-intercept form. -I can solve systems of equations using elimination.	-I can solve a system of equations by substitution when no equations are written in slope-intercept form. -I can solve systems of equations with no solution and infinitely many solutions and explain what it means. -I can create a system of equations with no solution or infinitely many solutions.	-I can appropriately select a method for solving a system of linear equations (substitution or elimination), based on the information provided. -I can explain the connections between “no solution” equations and “no solution” systems. -I can solve a system of equations, when one equation is linear, and the second is quadratic, using substitution.
Applications	-I can explain what it means for a company to “break-even” or for two companies to have the “same” cost.	-I can write equations to represent verbal situations.	-I can apply systems of equations to real-world situations, like break-even, same cost, menu problems, perimeter problems, etc.	-I can write, solve and interpret systems of equations, given real-world situations. I can explain what the solution means in the context of the problem.

UNIT 3: Functions (3rd and 4th Quarter)
I can represent functions using multiple representations and can interpret information given.

Goal 3a: I can write arithmetic and geometric sequences using multiple representations.

	Beginning Involves identifying the type of function and using function notation to describe terms in the sequence.	**Developing** Involves describing the key features of a sequence, to prepare to write explicit equations.	**Proficient** Involves writing and interpreting explicit equations.	**Mastery** Involves writing explicit equations when given two non-consecutive terms.
Sequences	-I can determine if a sequence will be arithmetic, geometric or neither. -I can represent any term in the sequence in function notation (For example, in the sequence 2, 5, 8, 11…, f(1) = 2 means that the first term in the sequence is 2.)	-Given a sequence, I can find the common difference (arithmetic sequences) or common ratio (geometric sequences). -Given a sequence, I can find the initial term (zero term).	- I can write an explicit equation to represent any term in an arithmetic or geometric sequence. -I can explain the structure of the equation, and how it can be used to represent any term in the sequence. -Given an explicit equation, I can make inferences about the type of sequence, a term number, the common difference or ratio, etc.	-Given any two terms in an arithmetic sequence, I can write an explicit equation to represent any term in the sequence. -Given any two terms in a geometric sequence, I can write an explicit equation to represent any term in the sequence.

Goal 3b: I can write functions using multiple representations and express the connections among such representations.

	Beginning Involves defining and labeling key features of a function.	**Developing** Involves transferring from one representation to another.	**Proficient** Involves transferring easily from one representation to another,in more than one step.	**Mastery** Involves comparing the features or solutions of multiple functions.
Basics of Functions	-I can determine if a table, graph, equation, set or verbal situation will be a function. -I can determine if a point is a solution to an equation.	-I can determine and defend if a table, graph, equation, set or verbal situation will be discrete or continuous. -I can evaluate a function in function notation.		

Linear Functions	-I can determine and defend if a table, graph, equation, set or verbal situation will be direct variation. -I can identify the constant of variation. -I can determine and defend if a table, graph, equation, set, or verbal situation represents a linear function. -I can define key vocabulary associated with linear functions, such as slope, y-intercept, x-intercept, points, slope-intercept form, standard form, point-slope form, etc. -I can label the y-intercept and slope given the slope-intercept form of a linear function. I can label the point and slope given the point-slope form of a linear function. -I can connect linear functions to arithmetic sequences.	-I can write linear equations in multiple ways and transfer between such forms (slope-intercept, standard, point-slope). -I can find the slope of a linear function, given a graph, two points, a table, an equation, etc. -Given an equation (in any form), a graph, table, set or verbal situation, I can label key information provided, including, slope, y-intercept, x-intercept, other coordinates, etc. -I can graph linear functions written in any form to represent the solutions of the function. -I can explain that the graph of function is a visual representation of the infinite solutions to the equation, and use the graph to identify additional solutions to the function.	-I can write a linear equation, given information about a linear function (points, slope, intercepts). -Given a linear function in any form (graph, table, equation, set, verbal context), I can represent the function in all other ways. For example: -I can write an equation given two points, a graph, a table, a point and a slope, a set of points, etc. -I can graph an equation written in any form. -I can create a table of values for a function, then graph the table of values. -I can write an equation, make a table, and/or graph solutions that can represent a verbal situation. (Note: Students should develop a strong flexibility in what it means to be a function and be able to interpret information provided, to create other representations) -I can graph linear inequalities,	-Given a real-world context, I can interpret the points, slope and/or intercepts, within the context of the problem. -Given a real world context, I can compare key features of two linear functions (represented in any form), and make conclusions based on the information provided. (Which company will cost more after 3 hours, which company has a greater flat fee, when will company A be greater than company B, etc.) -Given a linear function in any form (graph, table, equation, set, verbally), I can find another function that will be parallel or perpendicular to that function, and that passes through a given point. -I can graph a system of

			and explain what the “shaded region” represents.	inequalities and describe the solutions to the system. Using the graph, I can easily identify solutions that apply to each linear inequality, the system, or neither linear inequality. -I can describe the transformations of linear functions, including horizontal and vertical translations, reflections, etc. (Note: This is not a priority, but students can begin to notice patterns in functions)
Scatterplots	-I can identify if a linear scatterplot has positive, negative or no correlation. -Given a graph, I can estimate the placement of the line of best fit.	-I can write the equation for the line of best fit, given data from a scatterplot.	-I can use data to make estimations both within and outside of the data set. (interpolation vs. extrapolation)	-Given a real-world context, I can interpret the meaning of the key features, within the context of the problem and use the data to make approximations.
Quadratic Functions	-I can determine and defend if a table, graph, equation, set, or verbal situation represents a quadratic function. -I can define key vocabulary associated with quadratic functions, such as vertex, line of symmetry, y-intercepts, x-intercepts/zeros, standard form, factored form and vertex form, etc. -I can label the vertex, maximum/minimum, line of symmetry, y-intercepts,	-I can write quadratic equations in multiple ways and transfer between such forms (standard form, factored form and vertex form). -Given an equation (in any form), a graph, table, set or verbal situation, I can identify key features including, slope, y-intercept, x-intercept/zeros, other coordinates, vertex, line of symmetry, additional equations, etc. -I can explain that the graph of	-Given information about a quadratic function (vertex, y-intercept and a point, zeros, etc.), I can select an appropriate form to write a quadratic equation - standard form, factored form, vertex form and use the equation to make additional inferences about the function. -Given a quadratic function in any form (graph, table, equation, set, verbal context), I can represent the function in all other ways.	-Given a real-world context, I can interpret the points, vertex and/or intercepts, within the context of the problem. (Vertical motion problems, catapult problems, throwing objects, how long will it take for the ball to hit the ground, when will the ball be above 100 feet, when will the rocket reach the maximum height, how high will the rocket be after 4 seconds, etc.) -Given a real world context, I can compare key features of two quadratic functions (represented

	x-intercepts/zeros, given the graph of a quadratic function. -I can label the y-intercept given standard form of a quadratic function. I can label the x-intercepts given the factored form of a quadratic equation. I can label the vertex given vertex form of a quadratic function.	function is a visual representation of the infinite solutions to the equation, and use the graph to identify additional solutions to the function.	For example: -Given a table of values, I can write an equation. -Given a graph, I can write an equation. -Given a verbal situation, I can write an equation and create a graph to represent the situation. (Note: Students should develop a strong flexibility in what it means to be a function and be able to interpret information provided, to create other representations)	in any form), and make conclusions based on the information provided. (Which function has a larger initial velocity, which function has a larger initial value, which ball will hit the ground first, etc.) -Given two functions, one linear and one quadratic, I can find and interpret the point of intersection between the two functions, within the context of a problem. -I can find the solution to the system by substitution. -I can find the solution by graphing. -I can describe the transformations of quadratic functions, including horizontal and vertical translations, reflections, dilations, etc. (Note: This is not a priority, but students can begin to notice patterns in functions)
Exponential Functions	-I can determine and defend if a table, graph, equation, set, or verbal situation represents an exponential function. -I can determine and defend if a table, graph, equation, set, or verbal situation represents an exponential growth or exponential decay. -I can define key vocabulary	-I can find the rate of growth/decay of an exponential function, given an equation, a graph, a table, two consecutive points etc. -Given an equation (in any form), a graph, table, set or verbal situation, I can label key information given, including, slope, y-intercept, x-intercept/zeros, other	-Given an exponential growth/decay function, I can interpret the growth/decay rate and initial value, in the context of the problem. -Given an exponential function in any form (graph, table, equation, set, verbal context), I can represent the function in all other ways.	-Given two different exponential functions in a real-world context, I can interpret the points, intercepts, growth/decay rates and make conclusions based on such key features. (Given two exponential functions in any form, I can compare the initial values, the growth/decay rate, which function will have a greater output given a certain input, etc.)

	associated with exponential functions, such as y-intercept, horizontal asymptote, common ratio, exponential growth, exponential decay, rate of growth/decay, etc. -I can label the y-intercept and common ratio, given the equation of an exponential function. -I can connect exponential functions to geometric sequences.	coordinates, vertex, line of symmetry, asymptote, additional equations, etc. -I can explain that the graph of function is a visual representation of the infinite solutions to the equation, and use the graph to identify additional solutions to the function.		-I can describe the transformations of exponential functions, including horizontal and vertical translations, reflections, dilations, etc. (Note: This is not a priority, but students can begin to notice patterns in functions)
Comparing Functions				-Given two functions (linear, quadratic and/or exponential) in any form, I can compare the key features, within the context of the problem and draw conclusions about the two situations. (For example, given an linear and exponential function to describe the growth of two different populations, I can determine if/when the two populations will be the same, which function has a greater growth/decay rate, which function will have a higher population after 5 years, etc.) -I can find the solution to a system of equations and can explain that the point of intersection represents a solution to BOTH functions or the intersection of the two

				graphs (two linear, a linear and a quadratic, a linear and an exponential, etc.) -Given two functions (not necessarily linear) in any form, I can solve a system of equations in a real-world situation, and interpret the meaning within the context of the problem.
3c. I can identify and interpret the features of functions.				
	Beginning	**Developing**	**Proficient**	**Mastery**
Features of Functions	-I can define key features of functions, including intercepts, domain, range, horizontal asymptotes, end behavior, intervals of increase, intervals of decrease, etc.	-I can verbally identify the domain and range, when given a function or verbal situation. -I can verbally identify the intervals of increase and decrease of a function, given a graph.	-I can write the domain and range of a function in interval notation and inequality notation. -I can write the intervals of increase and decrease interval notation and inequality notation. -I can write the end behavior of a function (as $x \to -\infty,\ y \to$ ___ and as $x \to +\infty,\ y \to$ ___) -When given a graph, I can identify the features of any function. This could include graphs of absolute value functions, rational functions, radical functions, etc.	-Given several features of functions, I can sketch a graph that would satisfy such features. -I can begin to identify the transformations of functions - horizontal and vertical translations, reflections, dilations.
3d. I can use online graphing software, like desmos.com and the graphing calculator as effective tools to solve math problems.				
	Beginning	Developing	Proficient	Mastery

Using Graphing Calculators	-I can use the graphing calculator to perform basic calculations. -I can enter exponents into the graphing calculator.	-I can change the mode from standard to scientific.	-I can graph a function(s). -I can graph a system of equations. -I can access a table of values for a given function. -I can appropriately select and change the window of a graph based on a situation. -I can use the graphing calculator to write an equation of a linear, quadratic or exponential table of values, using “linreg,” “quadreg,” or “expreg.”	-I can graph a table of values and select a window that is appropriate based on the data. -I can find the line of best fit equation, given a table of values and graph the table and line of best fit.
Note: This does not mean that students know how to solve problems using the graphing calculator only, however, the graphing calculator is an effective tool, when used appropriately. This will not be on the bypass test, but will give students a smooth transition into high school courses.				