

Algebra II Part 1: Review of Algebra

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Students will demonstrate the ability to simplify algebraic expressions and equations by applying the properties of the complex number system. - Students will demonstrate the ability to solve equations, inequalities and systems by analyzing structure and applying the properties of equality and rational expressions. - Students will demonstrate the ability to apply functions to solve problems in a variety of contexts by interpreting and analyzing multiple representations of functions. - Students will demonstrate the ability to use mathematics to model real world problems by building and analyzing the appropriate expression, equation, or function. - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> - A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. - A.CED.3 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. - A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. - A.REI.6 Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables. - A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. - A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	Transfer	
	Students will be able to independently use their learning to summarize information in order to answer questions and make predictions.	
	Meaning	
	ENDURING UNDERSTANDINGS Students will understand that... - information can be represented in a variety of ways and is dependent upon the information you are given and/or the information you are seeking. - a constant rate of change always results in a direct correlation between quantities. - there are many factors to consider when selecting a method for representing information.	ESSENTIAL QUESTIONS When presented with multiple methods of solving a problem, how does one select the best method?
	Acquisition	
	Students will know... - graphs can be used to visually represent the relationship between two variable quantities as they both change. - that functions can be represented using tables, words, equations, sets of ordered pairs, mappings, and graphs. - that, if both the x-values and the y-values in a table have a common difference, then the table represents a linear function. - that the set of all solutions of an equation forms the equation's graph. - that a rate of change can be represented with slope. - that a horizontal line has zero slope, and a vertical line has undefined slope. - that, if the ratio of two variables is constant, then they vary directly. - the various forms of the equations for linear and absolute value functions. - the parent functions for linear and absolute value functions.	Students will be skilled at... - calculating the slope of a line. - writing and graphing an equation of a direct variation. - writing linear equations in standard, slope-intercept, and point-slope forms. - graphing linear equations in standard, slope-intercept, and point-slope forms. - rewriting linear equations in the various forms. - identifying/Interpreting key features of a graph, such as intercepts and slope - graphing and transforming linear and absolute functions. - graphing vertical and horizontal translations for linear and absolute value functions. - identifying/Interpreting key characteristics of absolute value graphs, including vertex, axis of symmetry, decreasing/increasing rate of change. - solving systems of equations by graphing, substitution, and elimination. - writing and graphing linear inequalities in two variables.

• F-IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. • F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. • F-IF.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. • F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. • F-IF.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. • F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. • F-IF.C.7a Graph linear functions and show intercepts. • F-IF.C.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. • F-IF.C.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). • F-BF.1 Write a function that describes a relationship between two quantities. ◦ Determine an explicit expression, a recursive process, or steps for calculation from a context. ◦ Combine standard function types using arithmetic operations. • 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. • F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context. • A.SSE.1 Interpret expressions that represent a quantity in terms of its context. ◦ Interpret parts of an expression, such as terms, factors, and coefficients. ◦ Interpret complicated expressions by viewing one or more of their parts as a single entity. • A.SSE.2 Use the structure of an expression to identify ways to rewrite it. • A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the	• <i>that parallel lines have equal slopes.</i> • <i>that the slopes of perpendicular lines are opposite reciprocals of each other.</i> • <i>that the solution to a system of equations or of inequalities is the point(s) that they have in common.</i> • <i>that a system of equations can have one, no, or infinite solutions.</i> • <i>the graph of a linear inequality in two variable consists of all points in the coordinate plane that represent solutions.</i> • <i>that the solution of a system of linear inequalities is the region where the graphs of the inequalities overlap.</i> • <i>that in order for a radical to be in simplest form, the properties of radicals must be applied, perfect nth powers must be removed, the root index should be as small as possible, and the denominator must be rationalized.</i> <u>vocabulary:</u> linear, slope, rate of change, direct variation, constant of variation, parent function, translation, y-intercept, x-intercept, parallel, perpendicular, absolute value, system of equations, substitution, elimination, consistent, inconsistent, independent, dependent, vertex, maximum, minimum, increasing, decreasing, axis of symmetry	• <i>applying the properties of exponents to simplify expressions.</i> • <i>explaining the meaning of rational exponents using properties of integer exponents.</i> • <i>rewriting an expression involving radicals and rational exponents using properties of exponents.</i> • <i>performing the four operations on radical expressions.</i>
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expression. - o Use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15t$ can be rewritten as $(1.151/12)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. • N.RN.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. • N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. • MP2 Reason abstractly and quantitatively. • MP4 Model with mathematics. • MP5 Use appropriate tools strategically. • MP7 Look for and make use of structure. • MP8 Look for and express regularity in repeated reasoning.		
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Content Area Literacy Standards	21st Century Skills
• RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. • RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9-10 texts and topics</i>. • RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	• <i>reason effectively</i> • <i>use systems thinking</i> • <i>solve problems</i> • <i>access and evaluate information</i> • <i>use and manage information</i> • <i>be self-directed learners</i>

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

<i>Science Integration</i>	<i>College, Career, and Civic Life Integration</i>	<i>Technology Integration</i>
<i>District Materials</i>	<i>Distance Learning/Field Trips</i>	<i>Technology Resources</i>