

Algebra II Course Description and Overview

Course Description	Major Content of Grade
Building on their work with linear, quadratic, and exponential functions, students extend their repertoire of functions to include logarithmic, polynomial, rational, radical, trigonometric and piecewise functions in Algebra II. Students will work closely with the expressions that define these functions and become increasingly facile with algebraic manipulations of expressions. Students will continue to expand and hone their abilities to model situations and to solve equations in applied settings. Students will also interpret quantitative relationships and use statistics to analyze empirical situations, to understand them better, and to make decisions based on statistical models. This course is a work in progress! Here is where I am tracking that progress: www.scholarsonmayhew.blogspot.com	● Extend the properties of exponents to rational exponents (N-RN.1,2). ● Interpret the structure of expressions (A-SSE.2). ● Write expressions in equivalent forms to solve problems (A-SSE3,4). ● Understand the relationship between zeros and factors of polynomials (A-APR.2,3). ● Understand solving equations as a process of reasoning and explain the reasoning (A-REI.1,2). ● Represent and solve equations and inequalities graphically (A-REI.11) ● Interpret functions that arise in applications in terms of the context (F-IF.4,6). ● Build a function that models a relationship between two quantities (F-BF.1,2). ● Make inferences and justify conclusions from sample surveys, experiments, and observational studies (S-IC.3,4,5,6).
Critical Areas	Standards for Mathematical Practices
Instructional time will focus on four critical areas: (1) relate arithmetic of rational expressions to arithmetic of rational numbers; (2) expand understandings of functions and graphing to include trigonometric functions; (3) synthesize and generalize functions and extend understanding of exponential functions to logarithmic functions; and (4) relate data display and summary statistics to probability and explore a variety of data collection methods. Emphasis will be placed on critical area (3) Students will synthesize and generalize what they have learned about a variety of function families. They will extend their work with exponential functions to include solving exponential equations with logarithms. They explore the effects of transformations on graphs of diverse functions, including functions arising in an application, in order to abstract the general principle that transformations on a graph always have the same effect regardless of the type of the underlying function. They will identify appropriate types of functions to model a situation, they adjust parameters to improve the model, and they compare models by analyzing appropriateness of fit and making judgments about the domain over which a model is a good fit.	3. Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and-if there is a flaw in an argument-explain what it is. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. 4. Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. By high school, a student might use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.