

## ALGEBRA 2

### **Understand Relations and Functions - Unit 1-2 in iclasses or other (packets/independent project)**

Recognize and graph various types of functions, including polynomial, rational, and algebraic functions. Use function notation. Add, subtract, multiply, and divide pairs of functions. Example: Let  $f(x) = 7x + 2$  and  $g(x) = x^2$ . Find the value of  $f(x) \cdot g(x)$ . Understand composition of functions and combine functions by composition. Example: Let  $f(x) = x^3$  and  $g(x) = x - 2$ . Find  $f(g(x))$ . Find the zeros of a function. Example: Find the zeros of the function; i.e., find  $x$  when  $y = 0$ . Graph functions defined as piece-wise. They solve equations and inequalities by examining their graphs and interpret situations as functions in graphs, formulas, and words.

### **Understand Linear and Absolute Value Equations and Inequalities - Unit 3-4 in iclasses or other**

Students graph linear equations and inequalities involving absolute value. They use a variety of methods (substitution, elimination, and matrices) to solve systems of up to three linear equations in up to three variables, and they model data with linear equations and make predictions from the results.

### **Understand Quadratic Equations and Functions – Unit 6-7 iclasses or other**

Students extend the number system by defining complex numbers, relating them to the real numbers, and using them to solve quadratic equations. Example: Multiply  $7 - 4i$  and  $10 + 6i$ . They draw graphs of quadratic functions and apply transformations to the functions. They find and interpret zeros and maximum and minimum values, and solve word problems. They also solve equations containing radicals and solve pairs of equations.

### **Understand Conic Sections - Seminar or other**

Students write equations and draw graphs of conic sections (circle, ellipse, parabola, and hyperbola), thus relating an algebraic representation to a geometric one.

### **Understand Polynomials – Unit 5 iclasses or other**

Students understand and use the binomial theorem for positive integer powers. They learn techniques (long division, synthetic division, and factoring perfect squares/cubes) for factoring polynomials in order to solve equations and related word problems. They find approximate solutions of equations using graphing technology and write equations with given solutions. They understand the relationships among the solutions of an equation, the zeros of a function, the  $x$ -intercepts of a graph, and the factors of a polynomial.

### **Understand Algebraic Fractions Unit 8 iclasses or other**

Students understand and use the concepts of negative and fractional exponents. They add, subtract, multiply, divide, and simplify algebraic fractions. They solve equations involving algebraic fractions and solve related word problems. They also solve problems of direct, inverse, and joint variation.

### **Understand Logarithmic and Exponential Functions – Seminar or other**

Students understand the concepts of logarithmic and exponential functions. They graph exponential functions and solve problems of growth and decay. They understand the inverse relationship between exponents and logarithms and use it to prove laws of logarithms and to solve equations. And they convert logarithms between bases and simplify logarithmic expressions.

### **Understand Sequences and Series – Unit 9 iclasses or other**

Students define the concepts of arithmetic and geometric sequences and series. They find specified terms of sequences and partial sums of series and use their knowledge of sequences and series to solve word problems.

### **Understand Counting Principles and Probability - Unit 10 iclasses or other**

Students understand and apply counting principles to find permutations and combinations and related probabilities.

### **Understand the History of Math - Independent Project**

Students research historical events related to algebra or people involved into its development.

### **Improve My Own Mathematical Writing Skills - Independent Project**

Students understand mathematical concepts and will explain their reasoning in journals and/or writing an essay on the development of concepts.