Integrated Alg2 Precalc Unit 04: Quadratic Equations

Content Area: **Math**
Course(s): **Integrated Algebra II & PreCalculus**
Time Period: **Semester 1**
Length: **2 cycles**
Status: **Published**

Standards

MA.F-BF.A.1	Write a function that describes a relationship between two quantities.
MA.F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, 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.
MA.F-BF.B.5	Use the inverse relationship between exponents and logarithms to solve problems involving logarithms and exponents.
MA.F-IF.B.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.
MA.F-IF.B.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.
MA.F-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MA.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.N-CN.A.1	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.
MA.A-APR.B.3	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.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MA.A-CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
MA.A-REI.B.4	Solve quadratic equations in one variable.
MA.A-REI.B.4b	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 $a \pm bi$ for real numbers a and b.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.

Unit Introduction

Essential Questions

- How are the real solutions of a quadratic equation related to the graph of the related quadratic function?
- How is any quadratic function related to the parent quadratic function y=x^2?
- What are the advantages of a quadratic function in vertex form? In standard form?

Content

- Completing the Square
- Complex Numbers
- Factoring Quadratic Expressions
- Modeling With Quadratic Functions
- Quadratic Equations
- Quadratic Formula
- Quadratic Functions and Transformations
- Quadratic Systems
- Standard Form of a Quadratic Function

Skills

- Completing the Square
- Factoring using complex conjugates
- Find zeros of a quadratic function from a graph
- Finding imaginary solutions
- Graph a quadratic function in standard form
- Graph a quadratic function in vertex form
- Identify axis of symmetry
- Identify maximum and minimum
- Identify transformations on a quadratic function
- Identify vertex
- Operations of complex numbers
- Solve quadratic functions by factoring
- Solving a linear-quadratic system
- Solving a perfect square trinomial equation
- Solving a quadratic system
- Solving by finding square roots
- Use graphing calculators and technology where appropriate

- Use relevant vocabulary, notations, and symbols when appropriate
- Using and applying the quadratic formula
- Using the discriminant to solve a problem
- Writing in vertex form