

Curriculum Units and Learning Outcomes

Content Area: Algebra II Honors	Grade Level: 11
Unit 2: Quadratic Functions	
Unit Summary: Students will graph quadratic functions and solve quadratic equations using mixed methods. Student will be able to analyze situations involving quadratic functions and formulate quadratic equations. Students will be able to graph, solve these functions using algebra and a graphic calculator.	
Massachusetts Standards: AII.F-LE. A. Construct and compare linear, quadratic, and exponential models and solve problems. 4. For exponential models, express as a logarithm a solution; evaluate the logarithm using technology. A. Create equations that describe numbers or relationships. 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from simple root and rational functions and exponential functions. 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. 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.	
Enduring Understandings: • Relations and functions can be represented numerically, graphically, algebraically, and/or verbally. • The properties of functions and function operations are used to model and analyze real-world applications and quantitative relationships. • There are multiple methods of solving quadratic equations. • There are two main methods of graphing quadratic functions depending on their form. • The zero product property allows us to solve quadratic equations. • There are many ways to solve quadratic equations: square root method, factoring, completing the square, quadratic formula, and by graphing. • "i" is the square root of negative 1 and the square of i is -1 and how to perform operations with i • Solving a system of linear and nonlinear functions means to find their point of intersection • The real solutions of a quadratic equation are the X intercepts of the graph of the equation. Quadratic equations can have one, two or no real solutions.	

Essential Questions:

- How do quadratic relations model real-world problems and their solutions?
- How many solutions does a quadratic equations have?
- How do we solve quadratic equations?
- What is an imaginary number? What is a complex number? How do we perform operations using complex numbers?
- How do we solve quadratics with real coefficients that have real and nonreal solutions?

Students will demonstrate KNOWLEDGE of:

- Solving quadratic equations by any method
- Graph quadratic functions using multiple methods
- Solve for real and nonreal solutions of a quadratic equation

Students will be SKILLED at:

- Graph vertex form of a quadratic function
- Graph standard form of a quadratic function
- Convert from standard to vertex form of a parabola and visa versa
- Solve quadratic using square roots
- Solve quadratics by graphing
- Solve quadratics by factoring
- Solve quadratics using completing the square
- Solve quadratics using Quadratic Formula
- Use the discriminant to determine the number of solutions of a quadratic equation
- Operations with complex numbers
- Solve systems of linear and nonlinear equations
- Solve quadratics with real and nonreal solutions solutions
- Perform operations on imaginary and complex numbers
- Use graphing calculator to find intercepts, maximums, and minimums

Estimated Duration: 5 weeks