



Unit 3: Quadratic Function

Unit Length: 30 (PAP) and 45 (Regular) days

Domain: The Complex Number System

- Cluster 4: Perform arithmetic operations with complex numbers.
- Cluster 5: Use complex numbers in polynomial identities and equations.

Domain: Seeing Structure in Expressions

- Cluster 8: Write expressions in equivalent forms to solve problems.

Domain: Reasoning with Equations and Inequalities

- Cluster 15: Solve equations and inequalities in one variable.

Domain: Interpreting Functions

- Cluster 19: Interpret functions that arise in applications in terms of the context.
- Cluster 20: Analyze functions using different representations.

Domain: Building Functions

- Cluster 22: Build new functions from existing functions.

Standards:

- *HSF.IF.C.7:
 - Graph **functions** expressed algebraically and show key features of the graph, with and without technology: Graph **quadratic function**, identifying **zeros** when suitable **factorizations** are available, and showing **end behavior**.
- HSA.SSE.B.3:
 - Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression: **factor a quadratic expression** to reveal the **zeros** of the function it defines; **complete the square** in a **quadratic expression** to reveal the **maximum** or **minimum value** of the function it defines
 - Note: Students should be able to identify and use various forms of a **quadratic expression** to solve problems.
 - **Standard Form:** $ax^2 + bx + c$
 - **Factored Form:** $a(x - r_1)(x - r_2)$
 - **Vertex Form:** $a(x - h)^2 + k$
- HSF.IF.B.4:



Northside High School

Algebra 2 Curriculum

- 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.
- Note: Key features may include but not limited to: **intercepts**; **intervals where the function is increasing, decreasing, positive, or negative**; **relative maximums and minimums**; **symmetries**; **end behavior**.
- HSF.BF.B.3:
 - Write a function that describes a relationship between two quantities: 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 (k , a **constant** both positive and negative); find the value of given the graphs of the **transformed functions**; experiment with multiple **transformations** and illustrate an explanation of the effects on the graph with or without technology.
 - Note: Include recognizing **even** and **odd functions** from their graphs and **algebraic expressions**.
- HSN.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.
- *HSN.CN.A.2:
 - Use the relation $i^2 = -1$ and the **commutative, associative, and distributive properties** to add, subtract, and multiply **complex numbers**.
- HSN.CN.A.3:
 - Find the **conjugate of a complex number**; use **conjugates** to find **quotients of complex numbers**.
- *HSA.REI.B.4:
 - Solve **quadratic equations** in one variable: Use the method of **completing the square** to transform any **quadratic equation** in x into an equation of the form $(x - p)^2 = q$ that has the same solutions; solve **quadratic equations** (as appropriate to the initial form of the equation) by:
 - Inspection of a graph.
 - Taking square roots.
 - **Completing the square.**
 - Using the **quadratic formula.**
 - **Factoring.**
 - Recognize **complex solutions** and write them as $a \pm bi$ for real numbers a and b .
 - Note: This would be a good opportunity to demonstrate/explore how the **quadratic formula** is derived. This standard also connects to the **transformations of functions** and identifying key features of a graph (F-BF3). Introduce this with a leading **coefficient of 1** in Algebra I. Finish mastery in Algebra II.
- HSN.CN.C.7:
 - Solve **quadratic equations** with **real coefficients** that have **real or complex solutions**.

**Guaranteed Viable Curriculum.*

Vocabulary to Emphasize is highlighted in **bold** script.



Northside High School
Algebra 2 Curriculum

Learning Goal	Notes	Bellwork/Exit	Practice
<p>Students will analyze powers of i and be able to explain how powers of i can be simplified.</p> <p>Students will use commutative, associative, and distributive properties to add, subtract, multiply complex numbers.</p> <p>Students will find the conjugate of a complex number and be able to explain how the conjugate is used to find a quotient.</p>	<p>Investigation: Powers of i Complex Numbers Note with Teaching Commentary.</p> <p>Complex Number Operations Note with Teaching Commentary.</p>	<p>Pre-assessment CFA 1 Unit 3: Complex Number Operations.</p> <p>CFA 1 Unit 3: Complex Number Operations.</p>	<p>Match Complex Number Expressions (add and subtract).</p> <p>Complex Number Operation Puzzle.</p> <p>Complex Number Operations (Free Kuta Worksheet).</p> <p>Maze Activity with Complex Number. Review free from TPT.</p>
<p>Students will solve real-world problems using quadratic equations and be able to describe zeros, extreme values and symmetry of a quadratic function in terms of context.</p> <p>Students will investigate the discriminant of a quadratic function and be able to explain its relationship to the number of complex roots.</p>	<p>Solving Quadratic Equation Note with Teaching Commentary.</p> <p>Extracting Square Roots and Completing the Square Note with Teaching Commentary.</p>	<p>Pre Assessment for CFA 2 Solving Quadratic Equations.</p> <p>CFA 2 Solving Quadratic Equations.</p>	<p>Solving Quadratic Lesson (MAP) Critiquing the Work of others.</p> <p>Task: Quadratic Formula Braking Car.</p> <p>Application Puzzle.</p> <p>Application Worksheet with 65 questions involving projectiles and area.</p>



Learning Goal	Notes	Bellwork/Exit	Practice
<p>Students will graph quadratic functions and be able to describe characteristics of the graphs by analyzing the Equations.</p> <p>Students will explore properties of parabolas and be able to describe the relationships between the function in standard, vertex, and intercept form and the graph.</p>	<p>Graphing Quadratic Function Note.</p> <p>Quadratic Function Characteristics Note with Teacher Commentary.</p>	<p>Pre Assessment for CFA 3 Graphing Quadratic Functions.</p> <p>CFA 3 Graphing Quadratic Functions.</p> <p>Projectile Motion Warm up Template free from TPT.</p>	<p>Matching Activity (MAP) of Different Forms to the Graph.</p> <p>Task: Building a Quadratic (Vertex Form).</p> <p>Task: Different Forms of Quadratic Functions.</p> <p>Task: Transforming using Different Forms.</p> <p>Matching Activity: Graphs to Quadratic Equations free from TPT.</p> <p>Review Activity: Graphing, Transformation, Characteristics free from TPT.</p> <p>Chain Activity: Quadratic Transformation free from TPT.</p>

Regular Summative Test for Unit 3: Quadratic Functions.

PAP Summative Test for Unit 3: Quadratic Functions.