

Major Topics

- Quadratic Functions
- Factoring
- The Complex Numbers
- Quadratic Systems

Formulas

$$f(x) = a(x - h)^2 + k$$

$$y = ax^2 + bx + c$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x \text{ value} = -\frac{b}{2a}$$

$$b^2 - 4ac$$

$$i = \sqrt{-1}; i^2 = -1$$

Vocabulary

- Parabola
- Axis of symmetry (AOS)
- Vertex of parabola
- Minimum / Maximum Value
- Domain & Range
- Standard vs. Vertex Form
- Greatest common Monomial Factor (GCMF)
- Perfect Square Trinomial
- Difference of Two Squares (DOTS)
- Factorable Quadratic Trinomial
- Factor By Grouping
- Zero Product Property
- Zeros
- Complete the square
- Discriminant
- Complex numbers
- Imaginary number

You should be able to:

- Solve quadratic equations
 - By factoring
 - Using quadratic formula
 - By completing the square
 - By graphing
- Graph quadratic functions
- Factor quadratic expressions
- Add, subtract, and multiply complex numbers
- Solve and graph systems with quadratics

Classwork:

1) Identify the vertex, the equation of the axis of symmetry, the minimum or maximum value, and the domain & range. Then graph the parabola using transformations.

a) $f(x) = 3(x - 2)^2 + 1$

b) $f(x) = -\frac{1}{2}(x + 3)^2 + 3$

2) Graph each function. Identify the vertex, the axis of symmetry, and the x and y intercepts.

a) $f(x) = x^2 + 6x + 5$

b) $f(x) = x^2 - 7x - 18$

3) Factor each expression:

a) $3x^2 + 11x - 20$

b) $9x^2 + 30x + 25$

c) $3x^3 - 21x^2 + 36x$

d) $25x^2 - 4$

4) Solve each quadratic equation by factoring, then using quadratic formula, then by completing the square. If prime, state the discriminant and round solution to 2 decimals or find the complex solution.

a) $x^2 - 12x + 36 = 0$

b) $3x^2 + 11x = 4$

c) $x^2 = 5x - 9$

d) $3x^2 - 5x = 4x + 9$

5) Perform the indicated operations.

a) $(3 - 7i) - (4 + 2i)$

b) $(2 - 5i)(3 + 8i)$

c) $(4 + 5i)^2 - 2i(9 + 4i)$

6) Solve the system algebraically. Confirm your solution by graphing the system on a graphing calculator.

a)
$$\begin{cases} y = x^2 + 3x - 10 \\ y = x + 5 \end{cases}$$

b)
$$\begin{cases} y = -x^2 - 3x + 2 \\ y = x + 6 \end{cases}$$

Chapter 4 Review Homework

- 1) Identify the vertex, the equation of the axis of symmetry, the minimum or maximum value, and the domain & range. Then graph the parabola using transformations.

$$f(x) = -2(x + 3)^2 + 4$$

- 2) Graph each function. Identify the vertex, the axis of symmetry, and the x and y intercepts.

$$f(x) = x^2 + 2x - 24$$

- 3) Factor each expression:

a) $4x^2 - 19x - 5$

b) $4x^2 - 28x + 49$

c) $2x^4 - 20x^3 - 48x^2$

d) $5x^3 - 80x$

- 4) Solve the quadratic equation by factoring, then using quadratic formula, then by completing the square. If prime, state the discriminant and round solution to 2 decimals or find the complex solution.

$$x^2 + 8x + 13 = 0$$

- 5) Perform the indicated operations.

$$(7 - 2i)^2 + 4i(6 - 5i)$$

- 6) Solve the system algebraically. Confirm your solution by graphing.

$$\begin{cases} y = x^2 - 7x - 6 \\ y = 8 - 2x \end{cases}$$