

<p>Standards</p>	<p>A1.FIF.7* Graph functions from their symbolic representations. Indicate key features including intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity. Graph simple cases by hand and use technology for complicated cases.</p> <p>A1.AREI.4* Solve mathematical and real-world problems involving quadratic equations in one variable. (Note: A1.AREI.4a and 4b are not Graduation Standards.) a. Use the method of completing the square to transform any quadratic equation in $ax^2 + bx + c = 0$ into an equation of the form $(x - h)^2 = k$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection, 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 $a + bi$ for real numbers a and b. (Limit to noncomplex roots.)</p>
<p>Learning Targets I Can Statements</p>	<p>I can graph and analyze quadratic equations from different representations.</p>
<p>Essential Question(s)</p>	<p>What makes quadratic functions unique? What are the key properties needed to understand quadratic functions? How do we convert different forms of quadratic functions?</p>
<p>Resources</p>	<p>https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations https://www.desmos.com/calculator/zukjgk9iry</p>
<p>Learning Activities or Experiences</p>	<ol style="list-style-type: none"> 1. Recall questions (attached) 2. Watch the Khan Academy video (link above) quadratic functions-equations. Alternate Assignment: Notes on Quadratic Equations 3. Desmos Activity (link above) 4. Assignment

Recall Questions

1. Factor the trinomial. $x^2 + 7x + 12$
2. What is the leading coefficient of the polynomial? $-7x^2 + 3x - 10$
3. What are the zeros of the polynomial?
 $(x - 5)(x - 10) = 0$
4. How many terms are in the polynomial? $4xy^3 - 16$

Quadratic Equations Review



A **quadratic function** is a function that can be written in the standard form $f(x) = ax^2 + bx + c$, where "a" is not zero. Recall that in function notation, $f(x)$ represents y , so we may write

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

The graph of a quadratic equation is called a *parabola*.

We can find ordered pairs that lie on the graph of a quadratic function by making a table of values. We choose a value for x , substitute it into the function, and simplify to find the corresponding value of y .

The points that lie on the graph of the function are solutions of the equation. The ordered pair will make the equation true.

Ex: $y = 2x^2 + 6x + 1; \quad x = 1$

$$Y = 2(1)^2 + 6(1) + 1$$

$$Y = 2 + 6 + 1 = 9$$

Parts of a quadratic equation:

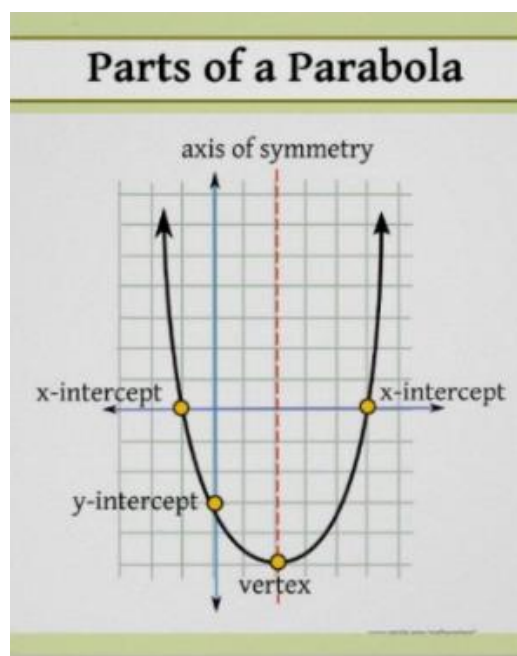
Vertex

Axis of symmetry

Roots, x-intercepts, zeros, solutions

Y intercept

Solving by quadratic equations by factoring:



$$x^2 + 4x + 3 = 0$$

$$(x + 1)(x + 3) = 0$$

$$x + 1 = 0 \text{ if } x = -1$$

$$x + 3 = 0 \text{ if } x = -3$$

Solving by quadratic equations by quadratic formula:

standard form:


$$f(x) = ax^2 + bx + c$$

equation: $x^2 + 2x + 1$
 $9x + 10x - 8$

vertex form:

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

equation: $9(x - 4)^2 + 18$
 $-3(x - 5)^2 + 1$



Solving equations by completing the square:

$$x^2 + 12x + 11 = 0$$

Step 1: Subtract 11 from both sides

$$x^2 + 12x + \underline{\quad} = -11$$

Step 2: Divide the (12) B by 2 and square it

$$36$$

Step 3: Add 36 to both sides

$$x^2 + 12x + 36 = -11 + 36$$

$$x^2 + 12x + 36 = 25$$

Step 4: $x^2 + 12x + 36$ can be factor to $(x + 6)^2$

$$(x + 6)^2 = 25$$

Step 5: Remove the squared by finding the square root of each side

$$x + 6 = \pm 5$$

Step 6: Solve for x

$$x = 11, 1$$