

Bell Work: Friday, October 24th, 2014

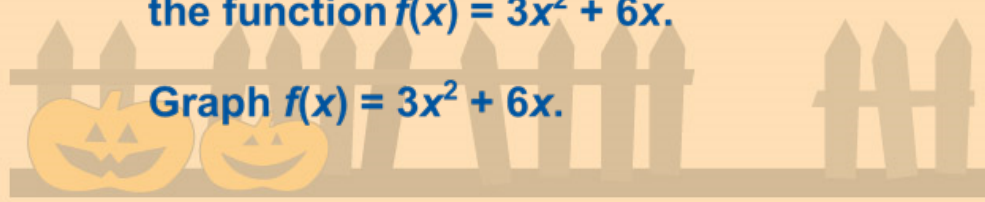
Does the function $f(x) = 3x^2 + 6x$ have a *maximum* or a *minimum* value?

Find the y-intercept of $f(x) = 3x^2 + 6x$.

Find the equation of the axis of symmetry for $f(x) = 3x^2 + 6x$.

Find the x-coordinate of the vertex of the graph of the function $f(x) = 3x^2 + 6x$.

Graph $f(x) = 3x^2 + 6x$.



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Does the function $f(x) = 3x^2 + 6x$ have a *maximum* or a *minimum* value?

minimum

Find the y-intercept of $f(x) = 3x^2 + 6x$. * x is always zero.
 $(0, 0)$

Find the **equation** of the axis of symmetry for $f(x) = 3x^2 + 6x$.

$x = -b/2a$

$\frac{-6}{2(3)} = \frac{-6}{6} = -1$

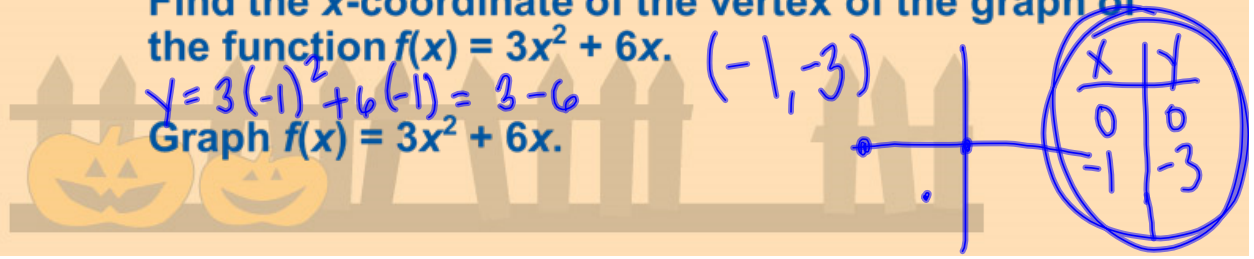
$x = -1$

Find the x-coordinate of the vertex of the graph of the function $f(x) = 3x^2 + 6x$.

$y = 3(-1)^2 + 6(-1) = 3 - 6$

$(-1, -3)$

Graph $f(x) = 3x^2 + 6x$.





Solving Quadratics by Graphing

Section 4.2

HW: Page 233 #s 14-29, 49-51
(Check ~~Monday~~, turn in ~~Tuesday~~)
Tuesday *wednesday*



Today's Objectives

- Solve quadratic equations by graphing.
- Use the graphing calculator to solve quadratic equations.



New Vocabulary

- quadratic equation $ax^2 + bx + c = 0$
- standard form : $f(x) = ax^2 + bx + c$
- root
- zero



Solving a Quadratic Equation

- The solution(s) to a quadratic equation occurs at the intersection points of both sides of a quadratic equation.

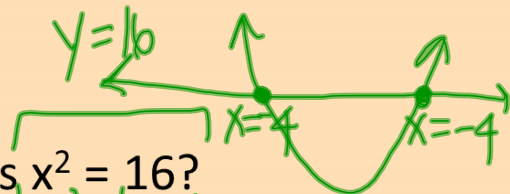
- For example:

- For what values of x does $x^2 = 16$?

- $x = 4$ and $x = -4$ ← $(4, 0)$ & $(-4, 0)$

- For what values of x does $x^2 = -16$?

- There is no real value for x that works



Solving a Quadratic Equation

To solve by graphing it is easiest to:

- Rewrite the quadratic equation in standard form. $ax^2 + bx + c = 0$ (with an arrow pointing to the x-axis)
- Graph it (using the strategies we practiced on block day)

- Determine where the graph crosses the x-axis.



A solution by any other name...

- When you are asked to solve a quadratic, you can be asked in a variety of ways:

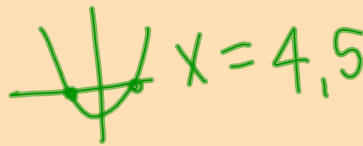
- Find the roots

- Answer is a number

$$x = 4, 5$$

- Find the zeros

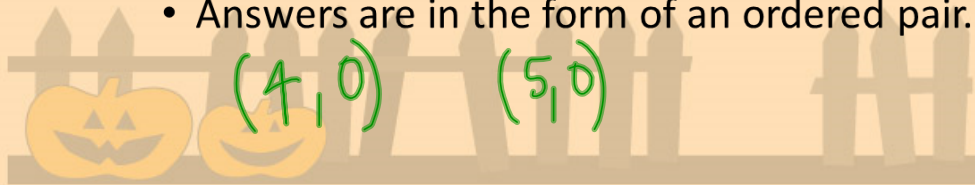
- Answer is a number



- Find the x-intercepts

- Answers are in the form of an ordered pair.

$$(4, 0) \quad (5, 0)$$

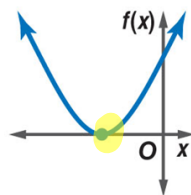


Possible Solutions to a Quadratic

KeyConcept Solutions of a Quadratic Equation

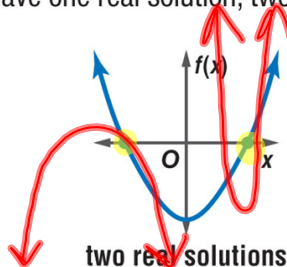
Words A quadratic equation can have one real solution, two real solutions, or no real solutions.

Models

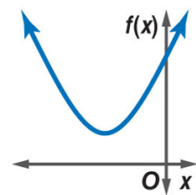


one real solution

* Vertex on x-axis



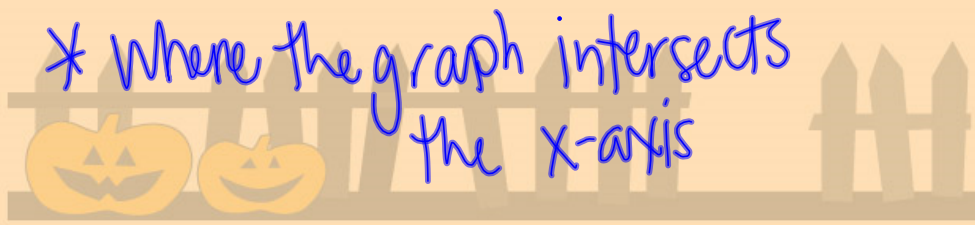
two real solutions



no real solution

* No intersection

* Where the graph intersects the x-axis



Looking for x-ints.

Example 1

Solve $x^2 + 6x + 8 = 0$ by graphing. $(-4, 0)$ & $(-2, 0)$

1. A.O.S : $X = \frac{-b}{2a} = \frac{-6}{2(1)}$
 $X = -3$

2. Vertex: $(-3, -1)$
 $(-3)^2 + 6(-3) + 8$
 $9 - 18 + 8 = -1$

3. y-int: $(0, 8)$
 $(0)^2 + 6(0) + 8 = 8$

4. Table

X	Y
-3	-1
0	8
-1	3

Example 2

Solve $x^2 + 2x - 3 = 0$ by graphing. $x = \frac{-2}{2(1)} = -1$

$x = -1$

A. $f(x) = x^2 + 2x - 3$
-3, 1

B. $f(x) = x^2 + 2x - 3$
-1, 3

C. $f(x) = x^2 + 2x - 3$
-3, 1

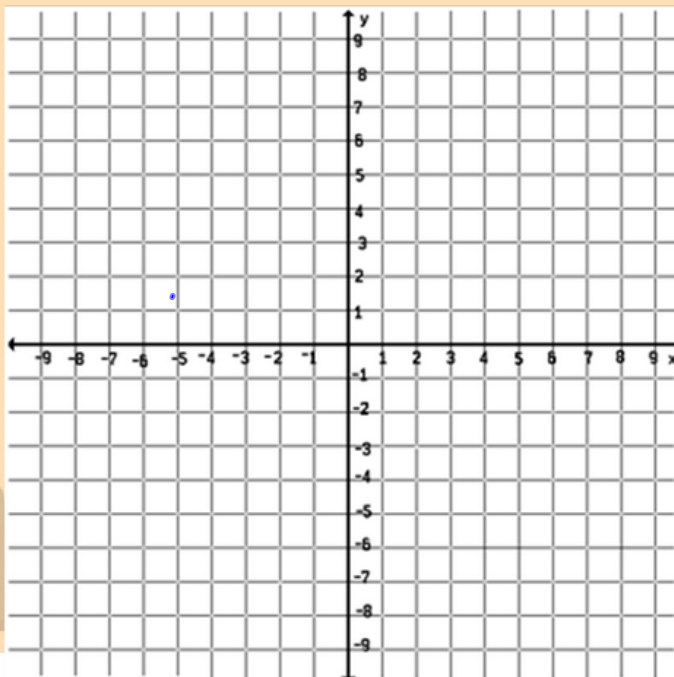
D. $f(x) = x^2 + 2x - 3$
-1, 3

Example 3

Solve $x^2 - 4x = -4$ by graphing.

* Equation must = 0.

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



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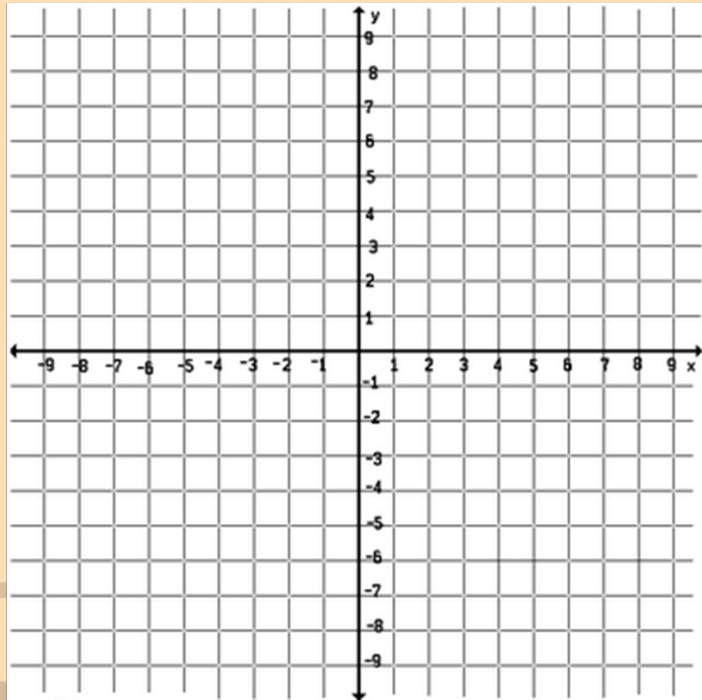
Find the equation of the axis of symmetry for $f(x) = 3x^2 + 6x$.

Find the x-coordinate of the vertex of the graph of the function $f(x) = 3x^2 + 6x$.

Graph $f(x) = 3x^2 + 6x$.

Example 4

Solve $-x^2 + 4x - 1 = 0$ by graphing.



Not all solutions work out perfectly

- It is certainly possible that your solution is a decimal. Then what do you do?
- Graphing Calculator! 😊
 1. Write the quadratic in standard form.
 2. Press the “y=” button
 3. Carefully type in your function
 4. Press the “Graph” button
 5. Press “2nd” and “Trace”
 6. Press “2” for zero
 7. Move your curser to the left of the zero and press “Enter”
 8. Move your curser to the right of the zero and press “Enter” again
 9. Press “Enter” a third time to reveal the zero.