

Find the vertex

**week 3**

1)  $y = -2x^2 - 4x + 7$

$a = -2, b = -4, c = 7$

$$X = \frac{4}{2(-2)} = \frac{4}{-4}$$

$$x = -1$$

$$y = -2(-1)^2 - 4(-1) + 7$$

$$y = 9$$

$$\text{vertex}(-1, 9)$$

2)  $y = x^2 - 4$

$a = 1, b = 0, c = -4$

$$X = \frac{0}{2(1)}$$

$$x = 0$$

$$y = 0^2 - 4$$

$$y = -4$$

$$\text{vertex}(0, -4)$$

Out of 35 pts

A - 31.5

B - 28

C - 24.5

D - 21

## 9.4 Solving Quadratic Equations by Graphing

### Goals:

- Solve a quadratic equation graphically.
- Use quadratic models in *real-life* settings.

**EQ:** What is the difference between finding roots algebraically vs. graphically?

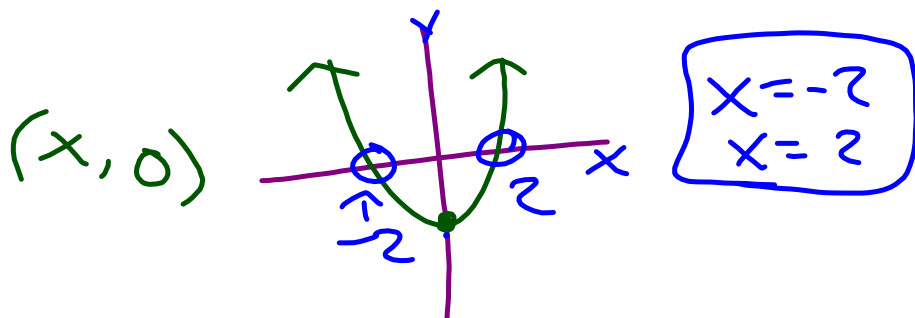
## Vocabulary

x-int.

Roots:

solutions , x-intercepts

where parabola  
crosses the x-axis



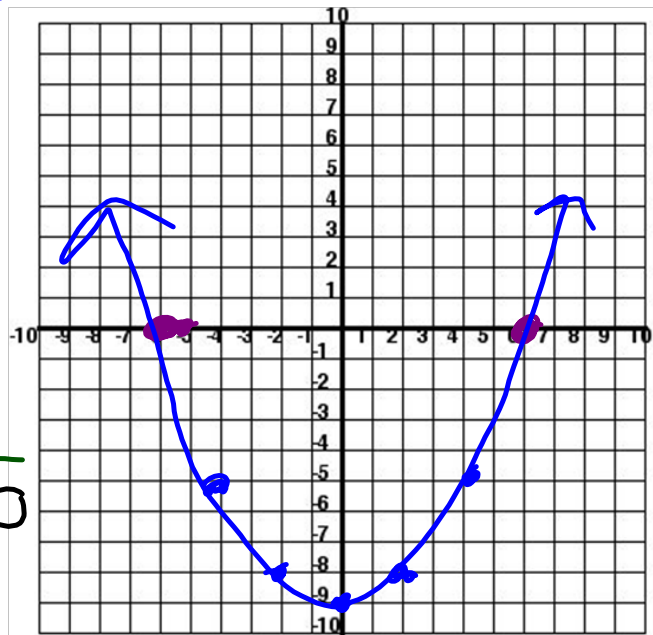
**Example 1: Representing a Solution Using a Graph**

Solve  $\frac{1}{4}x^2 = 9$  algebraically. Represent your solutions as the x-intercepts of a graph.

$$\frac{4}{1} \cdot \frac{1}{4}x^2 = 9 \cdot 4$$

$$\sqrt{x^2} = \sqrt{36}$$

$$x = \pm 6$$



$$\frac{1}{4}x^2 = 9 \quad ax^2 + bx + c = 0$$

$$\frac{1}{4}x^2 - 9 = 0$$

$$x = \frac{-b}{2a} = \frac{0}{2(\frac{1}{4})}$$

$$x = 0$$

vertex (0, -9)

$$a = \frac{1}{4}$$

$$b = 0$$

$$c = -9$$

$$y = \frac{1}{4}x^2 - 9$$

$$y = \frac{1}{4}(6)^2 - 9$$

$$y = -9 \quad | \quad -4 \quad | \quad -2 \quad | \quad 0 \quad | \quad 2 \quad | \quad 4 \quad | \quad 6$$


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$$-9 \quad | \quad -5 \quad | \quad -8 \quad | \quad -9 \quad | \quad -8 \quad | \quad -5 \quad | \quad 0$$

**Example 2: Solving an Equation Graphically**Solve  $x^2 + 2x = 3$  graphically. Check your solution algebraically.

$$x^2 + 2x - 3 = 0 \quad a=1$$

$$b=2$$

$$c=-3$$

$$x = \frac{-2}{2(1)} = \frac{-2}{2}$$

$$x = -1 \quad y = (-1)^2 + 2(-1) - 3$$

$$y = -4$$

(-1, -4)

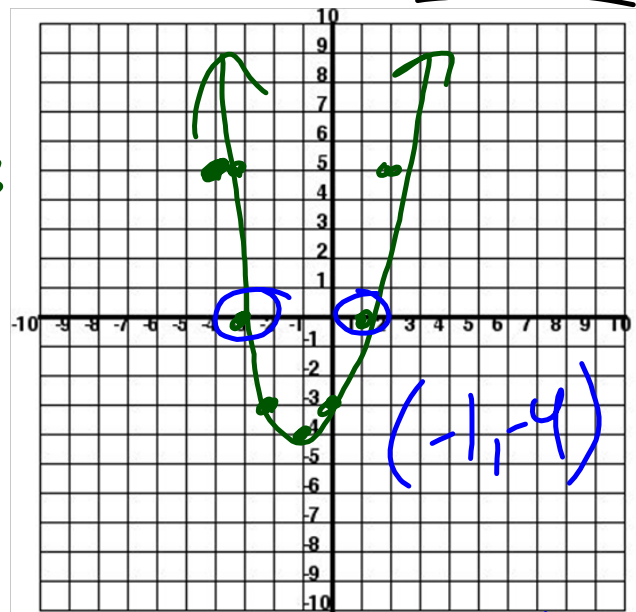
-4	+3	-2	-1	0	1	2
5	0	-3	-4	+3	0	5

$$x^2 + 2x = 3$$

$$(-3)^2 + 2(-3) = 3$$

$$3 = 3 \checkmark$$

$$x = -3 \text{ and } x = 1$$



$$x = -3 \text{ and } x = 1$$

$$(1)^2 + 2(1) = 3$$

$$3 = 3 \checkmark$$

**Try It**

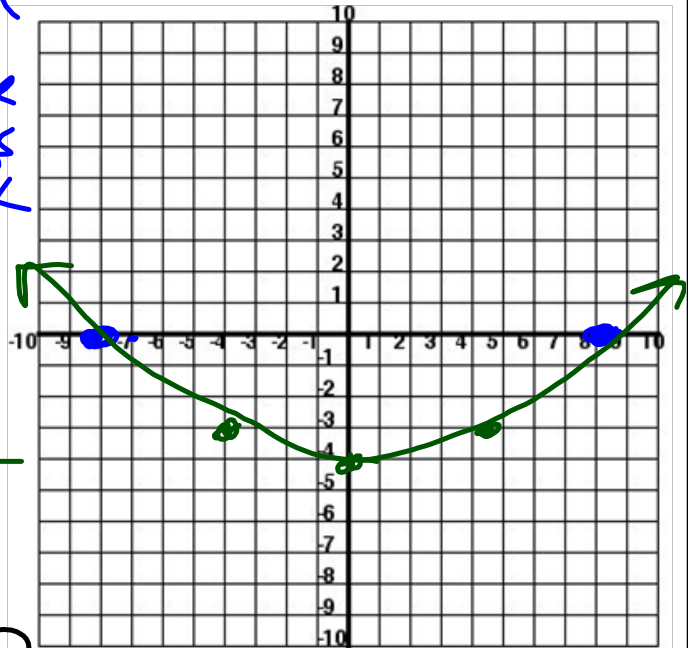
Solve the equation algebraically. Check the solutions graphically.

1)  $\frac{1}{16}x^2 = 4 \cdot 16$

Solve for x

$\sqrt{x^2} = \sqrt{64}$

$x = \pm 8$



$\frac{1}{16}x^2 - 4$

$a = \frac{1}{16}$

$b = 0$

$c = -4$

$\frac{1}{16}x^2 - 4 = 0$

$x = \frac{0}{2(\frac{1}{16})}$

$y = \frac{1}{16}(0)^2 - 4$

$x = 0$

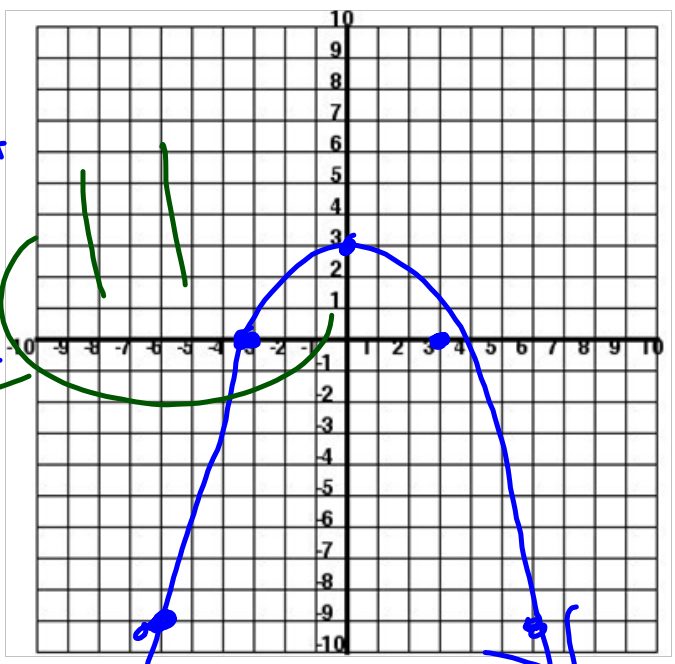
vertex (0, -4)

$y = -4$	$12$	$-8$	$-4$	$0$	$4$	$8$	$12$
$5$	$0$	$-3$	$-4$	$-3$	$0$	$5$	

Solve the equation algebraically. Check the solutions graphically.

2)  $-\frac{1}{3}x^2 = -3 \cdot -3$

$x^2 = 9$   
 $x = \pm 3$  ← x-int (Root)



$-\frac{1}{3}x^2 = -3$   
 $+3 +3$

$-\frac{1}{3}x^2 + 3 = 0$

$a = \frac{1}{3}, b = 0, c = 3$

$x = \frac{0}{2(\frac{1}{3})}$

$x = 0$

$(0, 3)$

$y = \frac{1}{3}(0)^2 + 3$

$y = 3$

-9	-6	-3	0	3	6	9
-24	-9	0	3	0	9	-24



9.4 wkst  
#1-19

**AND p.529 #21-32**

SHOW WORK

(no graphs)