

NOTES: Section 9.5 – Solving Quadratic Equations by Graphing

Goals: #1 - I can use a graph to find or check a solution of a quadratic equation.

Homework: Section 9.5 Worksheet



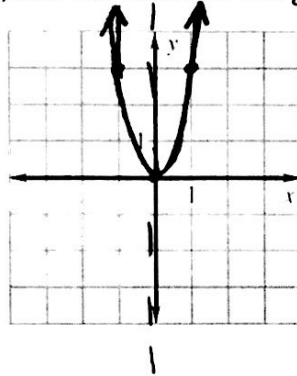
Warm Up: Graph the function by completing the table. Identify the graph's axis of symmetry (AOS), vertex, and tell whether the graph opens up or down.

1. $y = 3x^2$

AOS: $X = 0$

vertex: $(0, 0)$

opens: up

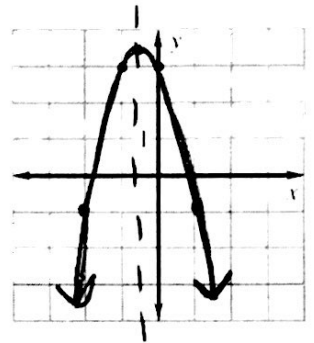


2. $y = -2x^2 - 2x + 3$

AOS: $x = -\frac{1}{2}$

vertex: $(-\frac{1}{2}, 3.5)$

opens: down



x	-2	-1	0	1	2
y	12	3	0	3	12

$$x = \frac{-b}{2a} = \frac{0}{2(3)} = 0$$

$$y = 3(0)^2 = 0$$

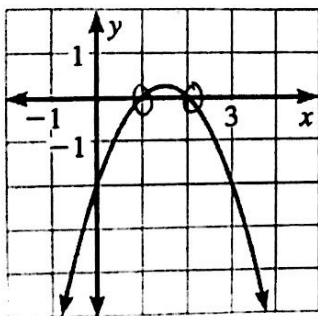
x	-2	-1	$-\frac{1}{2}$	0	1
y	-1	3	3.5	3	-1

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

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

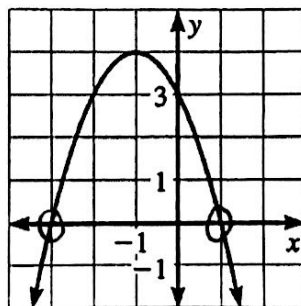
Example #1: Use the graph to identify the x-intercepts of the quadratic function.

1.



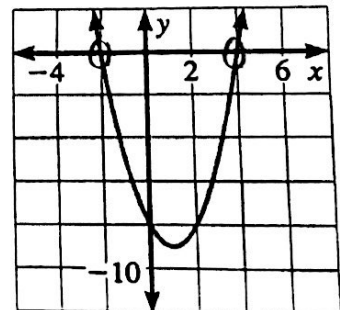
1, 2

2.



-3, 1

3.



-2, 4

Name: _____ Hour: _____ Date: _____

Notes:

We can solve certain quadratic equations by graphing.

- Solutions:
 - Roots:
- } x-intercepts

- Step 1: Set the quadratic equation equal to 0.
- Step 2: Graph the quadratic function.
- Step 3: Look for x-intercepts: crosses x-axis

Example #2: Solve the following equations.

1. $0 = -x^2 + 4$

$x = \frac{-b}{2a} = 0$

AOS: $x = 0$

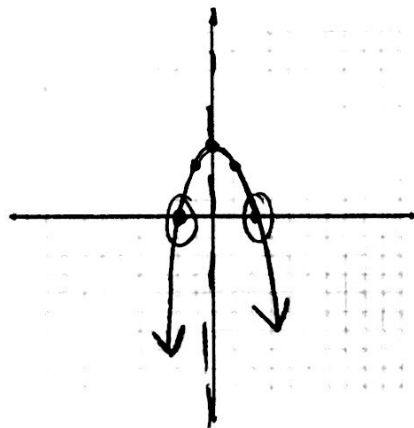
vertex: $(0, 4)$

y-int: $(0, 4)$

opens: down

solutions: $-2, 2$

x	-2	-1	0	1	2
y	0	3	4	3	0



2. $x^2 - 3x = 4$

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

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

AOS: $x = \frac{3}{2}$

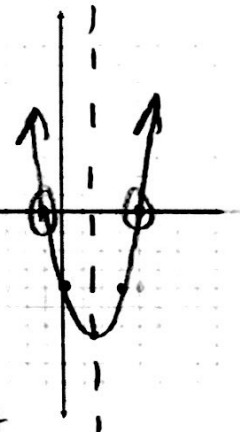
vertex: $(\frac{3}{2}, -6.25)$

y-int: $(0, -4)$

opens: up

solutions: $-1, 4$

x	-1	0	$\frac{3}{2}$	3	4
y	0	-4	-6.25	-4	0



$(\frac{3}{2})^2 - 3(\frac{3}{2}) - 4 = -6.25$

Check your solution:

$-(-2)^2 + 4$

$-4 + 4 = 0 \checkmark$

$0 \checkmark$

$-(2)^2 + 4$

$-4 + 4 = 0 \checkmark$

$0 \checkmark$

$(-1)^2 - 3(-1) - 4$

$1 + 3 - 4 = 0 \checkmark$

$0 \checkmark$

$(4)^2 - 3(4) - 4$

$16 - 12 - 4 = 0 \checkmark$

$0 \checkmark$

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You practice: Solve the following equations.

1. $x^2 + 4x = 5$

$$x^2 + 4x - 5 = 0$$

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

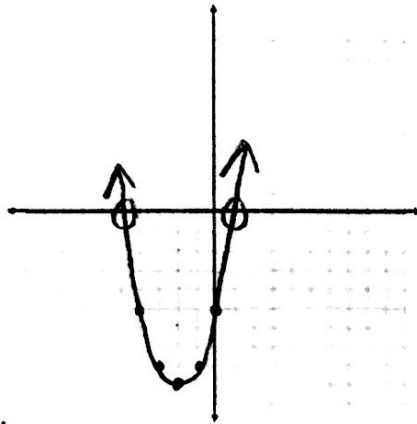
AOS: $x = -2$

vertex: $(-2, -9)$

y-int: $(0, -5)$

opens: UP

solution/s: -5, 1



x	0	-1	-2	-3	-4
y	-5	-8	-9	-8	-5

2. $-x^2 + 7x = 10$

$$-x^2 + 7x - 10 = 0$$

$$x = \frac{-7}{2(-1)} = \frac{-7}{-2} = \frac{7}{2}$$

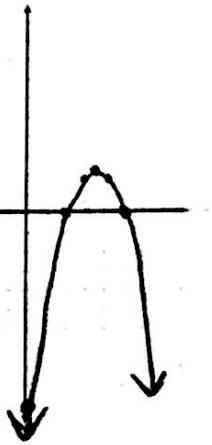
AOS: $x = 3.5$

vertex: $(3.5, 2.25)$

y-int: $(0, -10)$

opens: down

solution/s: 2, 5



x	2	3	3.5	4	5
y	0	2	2.25	2	0

Check your solution:

$$(-5)^2 + 4(-5) - 5$$

$$25 - 20 - 5$$

$$0 \checkmark$$

$$(1)^2 + 4(1) - 5$$

$$1 + 4 - 5$$

$$0 \checkmark$$

$$-(2)^2 + 7(2) - 10$$

$$-4 + 14 - 10$$

$$0 \checkmark$$

$$-(5)^2 + 7(5) - 10$$

$$-25 + 35 - 10$$

$$0 \checkmark$$