Graphing Quadratic Equations

In This Unit:

Graphing Quadratic Equations

Bellwork
04/19/2012

Solve using the quadratic formula.

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

1. $2x^2 - 4x - 14 = 0$

$a = 2 \quad b = -4 \quad c = -14$

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(2)(-14)}}{2(2)}$$

$$\frac{4 \pm \sqrt{16 + 112}}{4}$$

$$\frac{4 \pm \sqrt{128}}{4}$$

$$\frac{4 \pm 8\sqrt{2}}{4}$$

$$1 \pm 2\sqrt{2}$$

$$1 + 2\sqrt{2} \quad \text{\&} \quad 1 - 2\sqrt{2}$$

128

	128
2	64
4	32
16	8

$\sqrt{64 \cdot 2}$

$\sqrt{64} \cdot \sqrt{2}$

$8\sqrt{2}$

Lesson 14.1a
Describing a Quadratic

What You Need to Know:

To graph a quadratic equation:
1. Find Axis of Symmetry [A.O.S.]
2. Find Vertex
3. Make a T-Chart
4. Plot Graph

· If a is +, then the graph opens up.

· If a is -, then the graph opens down.

To find the A.O.S., use $x = -\dfrac{b}{2a}$.

This is also the x-coordinate of the vertex (x,y).

To find the y-coordinate of the vertex, plug the x-value back into the equation.

To make an t-chart, pick x-values to the right or to the left of the x-coordinate.

To finish the graph, mirror the points across the A.O.S.

Opens Up or Down?
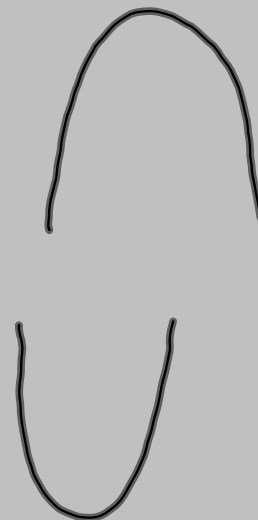
Tell whether the graph opens up or down.

$y=2x^2$

$+ \; , \; \uparrow$

$y=-4x^2-4x+12$

$- \; , \; \downarrow$

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

$- \quad \downarrow$

A.O.S. and Vertex

Find the A.O.S. and the vertex.

$$y=x^2+2x+1$$

$a=1 \quad b=2 \quad c=1$

$X=\dfrac{-b}{2a} = \dfrac{-2}{2(1)} = \dfrac{-2}{2} = -1$

$\boxed{A.O.S. \to X=-1 \qquad Vertex \to (-1, 0)}$

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

$y=1+-2+1$

$\qquad y=0$

$$y=-2x^2-8x+12$$

$a=-2 \quad b=-8 \qquad c=12$

$X=\dfrac{-b}{2a}$

$X=\dfrac{8}{2(-2)}$

$X=\dfrac{8}{-4}$

$-2(-2)^2-8(-2)+12$

$-2(4)-8(-2)+12$

$-8+16+12$

20

$A.O.S. \to X=-2$

$Vertex \to (-2, 20)$

$$y=-x^2-x+1$$

$a=-1 \quad b=-1 \qquad c=1$

$X=\dfrac{-b}{2a}$

$X=\dfrac{1}{2(-1)}$

$X=-\dfrac{1}{2}$

$-\dfrac{1}{2} \cdot -\dfrac{1}{2}$

$y=-\left(-\dfrac{1}{2}\right)^2-\left(\dfrac{1}{2}\right)+1$

$y=-\dfrac{1}{4}+\dfrac{1}{2}+1$

$\left(-\dfrac{1}{2}, 1\dfrac{1}{4}\right)$

$$y=-\dfrac{1}{2}x^2-2x+1$$

$a=-\dfrac{1}{2} \quad b=-2 \qquad c=1$

$X=\dfrac{-b}{2a}$

$X=\dfrac{2}{2\left(-\dfrac{1}{2}\right)}$

$X=\dfrac{2}{-1}$

$X=-2$

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

$-\dfrac{1}{2}(4)-2(-2)+1$

$-2+4+1$

$(-2, 3)$

Bellwork
04/20/2012

In This Unit:

Graphing Quadratic Equations

Lesson 14.1b
Graphing a Quadratic

What You Need to Know:

To graph a quadratic equations:
1. Find Axis of Symmetry [A.O.S.]
2. Find Vertex
3. Make a T-Chart
4. Plot Graph

To find the A.O.S., use $x=-\dfrac{b}{2a}$

This is also the x-coordinate of the vertex (x,y).

To find the y-coordinate of the vertex, plug the x-value back into the equation.

To make an t-chart, pick x-values to the right or to the left of the x-coordinate.

To finish the graph, mirror the points across the A.O.S.

Graphing Quadratic Equations
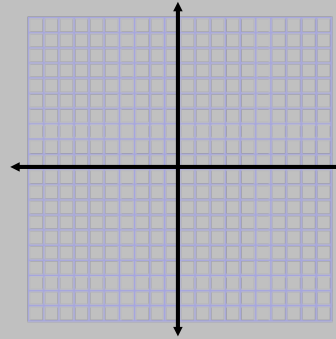
Find the A.O.S. and the vertex.

$y=2x^2$

x	y

Vertex: (　,　)

AOS: x=

$y=x^2+2x+1$

x	y
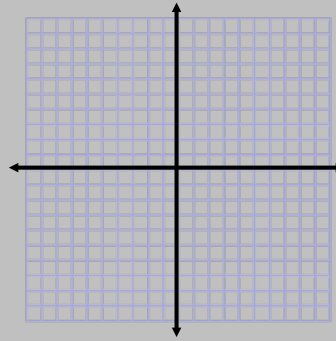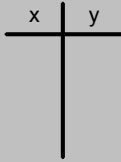
Vertex: (　,　)

AOS: x=

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

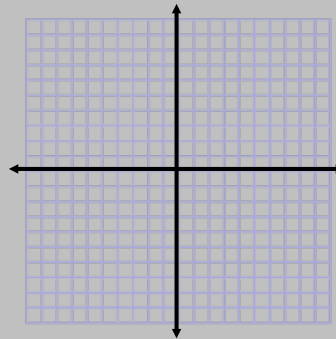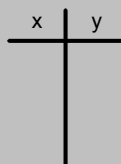| x	y

Vertex: (　,　)

AOS: x=

$y=-x^2+2$

x	y
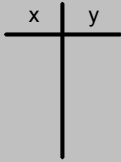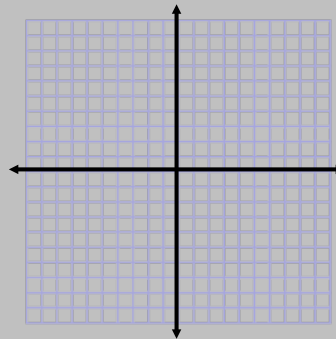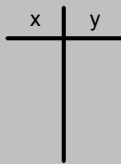
Vertex: (　,　)

AOS: x=

Homework Assignment

Worksheet
"Graphing Quadratic Equations"