Standard Form of a Quadratic Function:

$y = ax^2 + bx + c$

a
- Determines if a parabola opens up or down
- Determines if a parabola is taller (narrower) or shorter (wider)

c
- Moves the parabola up or down (vertical translation)

(affecting the location of the vertex)

Sec 10-2: Quadratic Functions

Standard Form of a Quadratic Function:
$y = ax^2 + bx + c$

What does b do?

b

Leads to moving a parabola left and right (horizontal translation)

$y = ax^2 + bx + c$

b

Affects the Horizontal position of the Parabola:
Therefore, it affects the location of the Vertex and the LOS

What is the connection between b and the LOS?

Quadratic Equation	Equation of LOS
$y = x^2 + 8x - 21$	$x = -4$
$y = x^2 - 6x - 19$	$x = 3$
$y = -3x^2 - 6x + 7$	$x = -1$
$y = 2x^2 + 12x + 1$	$x = -3$

LOS: $x = \frac{-b}{2a}$

"Opposite of b divided by two times a"

Find the equation for the Line of Symmetry for each quadratic.

1. $y = 3x^2 - 12x + 8$

$X = \frac{12}{6} = 2$

2. $y = -x^2 - 10x - 3$

$X = \frac{10}{-2} = -5$

3. $y = \frac{1}{2}x^2 + 5x - 7$

$X = \frac{-5}{1} = -5$

4. $y = -2x^2 + 16$

$X = \frac{0}{-4} = 0$

Now that you have found the LOS, find the coordinates of the Vertex.

1. $y = 3x^2 - 12x + 8$ LOS: x = 2

Vertex: (2, -4)

$3(2)^2 - 12(2) + 8$

2. $y = -x^2 - 10x - 3$ LOS: x = -5

Vertex: (-5, 22)

$-(-5)^2 - 10(-5) - 3$

3. $y = \frac{1}{2}x^2 + 5x - 7$ LOS: x = -5

Vertex: (-5, -19.5)

$0.5(-5)^2 + 5(-5) - 7$

Find the LOS and Vertex of this parabola:

$y = -6x^2 + 13$

LOS $X = 0$

(0, 13)

The y-intercept of a parabola:

Replace x with zero and solve for y.

This is how you find the y-intercept for ANY equation!

Find the y-intercept of each parabola:

1. $y = 5x^2 + 2x - 11$ y-int = -11

2. $y = -6x^2 - x + 8$ y-int = 8

3. $y = 4x^2 - 19x$ y-int = 0

Given a quadratic in Standard Form:

$y = ax^2 + bx + c$

What is the y-intercept?

C

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

- Find the LOS
- Find the Vertex
- Find the y-intercept
- Reflect y-intercept over the LOS
- Use a table to find other point(s) and reflect over the LOS

Graph $y = 2x^2 + 4x - 3$

y-int

LOS $x = \frac{-4}{4} = -1$

(-1, -5)

Vertex

x	y
1	3