$y = ax^2 + c$

a
- determines if parabola opens up or down
- determines if parabola is wide or narrow

c
- moves parabola up and down and thus affects the y-coordinate of the vertex.
- y-int

No Horizontal Shift

LOS is: $x = 0$ Vertex is $(0, c)$

$y = ax^2 + bx + c$

a
- determines if parabola opens up or down
- determines if parabola is wide or narrow

b
- Moves parabola left and right
- determines the location of the LOS and thus the x coordinate of the Vertex

c
- moves parabola up and down and thus affects the y-coordinate of the vertex.
- y-int

$y = ax^2 + bx + c$

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

"Opposite of b divided by two times a"

1. Find the equation of the LOS and the coordinates of the Vertex for each parabola.

a) $y = -2x^2 + 8x - 1$

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

$(2, 7)$

b) $f(x) = x^2 - 9x + 8$

$X = \frac{-9}{2(1)}$

$X = 4.5$

$(4.5, -12.25)$

1. Find the equation of the LOS and the coordinates of the Vertex for each parabola.

c) $y = 7x^2 - 113$

$X = 0$

$(0, -113)$

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!

2. Find the y-intercept for each parabola.

a) $f(x) = 11x^2 + x - 14$

$y = -14$

b) $y = 9x^2 - 2x$

$y = 0$

3. Write an equation for a parabola to fits the following description.

a) The Vertex is at the point $(0, -5)$ and the parabola opens up.

$c = -5$ $a = +$

$y = 2x^2 - 5$

3. Write an equation for a parabola to fits the following description.

b) The parabola opens down but the Line of Symmetry is to the left of the y-axis.

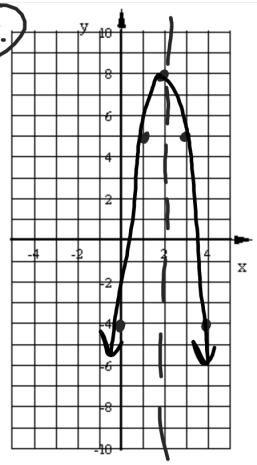
$a = -$ LOS $X = $ Neg

$y = -6x^2 + 3x$ $\quad x = \frac{-b}{2a}$

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

4. Graph $y = -3x^2 + 12x - 4$

1. $x = 2$
2. $(2, 8)$
3. $y = -4$
4. 

5.

x	y
3	5

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

Important characteristics of a Parabola to know:

- Equation for the LOS $X = \frac{-b}{2a}$
- Coordinates of the Vertex
- Does parabola open up or down $a = +$ $a = -$
- Is the Vertex a Maximum or a Minimum
- Y-intercept
- X-intercept(s)

Do the following for this quadratic:
$y = -4x^2 - 24x + 19$

a. Write the eq for the LOS. $\frac{-b}{2a}$ $\frac{24}{(2)(-4)}$
$X = -3$

b. Write the coordinates of the Vertex.
55 $(-3, 55)$

c. Find the y-intercept.
$Y = 19$

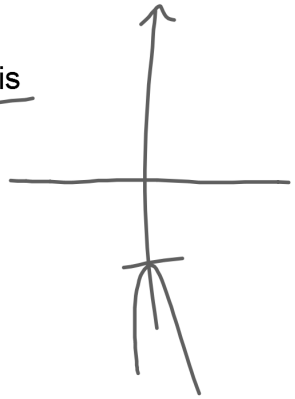
d. Is the vertex a Max or a Min?
Max

e. Is the parabola wide or narrow?
narrow

Write the equation of a quadratic that meets the following condition:

The graph lies entirely below the x-axis

$y = -5x^2 - 5$



$\sqrt{}$

This is called the radical symbol.

It's used for undoing exponents.

Simplify each square root.

1. $\sqrt{320}$ → $8\sqrt{5}$ (5, 64)

2. $\sqrt{243}$ → $9\sqrt{3}$ (81, 3)

3. $\sqrt{450}$ → $15\sqrt{2}$ (2, 225)

4. $\sqrt{576}$ → 24

4 81
9 100
16 121
25 144
36 169
49 196
64 225

Simplify each.

5. $\sqrt{384}$ → $8\sqrt{6}$ (6, 64)

6. $\sqrt{112}$ → $4\sqrt{7}$ (7, 16)

7. $\sqrt{288}$ → $12\sqrt{2}$ (2, 144)

Section 10-3: Finding and Estimating Square Roots.

$(3)^2 =$ 9 $(-3)^2 =$ 9

What are the square roots of 9? ± 3

What are the square roots of 729? ± 27

What are the square roots of - 196?

- 196 has no real roots

Every positive number has how many square roots? 2 real roots

Every negative number has how many square roots? No real roots

What is the only number that has ONE real square root? Zero

Find the real square roots of each number

1. $\frac{81}{169}$ $\pm\frac{9}{13}$

2. -144 No Real Square Roots

3. 729 ± 27

4. 0.0064 ± 0.08

What is each problem asking for?

1. $-\sqrt{25}$ -5 The negative Square Root of 25.

2. $\pm\sqrt{25}$ $+5$ -5 Both the positive and negative Square Root of 25.

3. $\sqrt{25}$ 5 The positive Square Root of 25. Also known as the Principal Square Root.