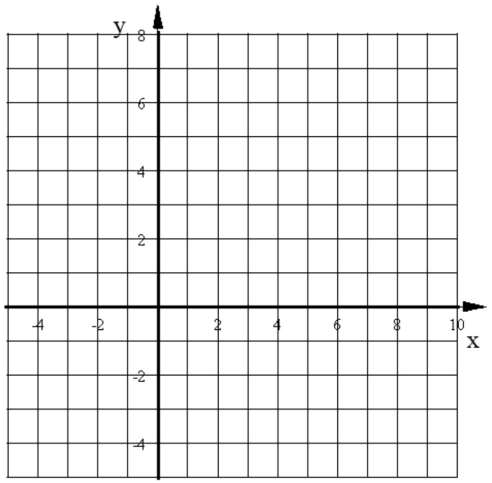
$y = x^2 - 10x + 26$

X	Y
−2	50
−1	37
0	26
1	17
2	10

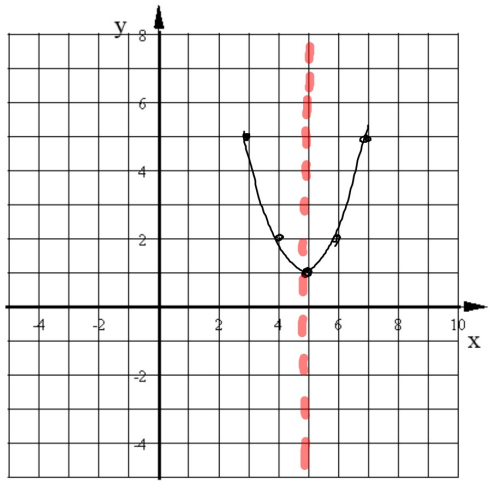
These points won't fit on the graph!



$y = x^2 - 10x + 26$

How would it help if you know the LOS was x = 5?

X	Y
3	5
4	2
5	1
6	2
7	5



Finding the Line of Symmetry:

$y = ax^2 + bx + c$

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

"opposite of b divided by $2a$"

Find the equation for the LOS in each Quadratic

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

$x = \frac{-12}{6} = -2$

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

$x = \frac{8}{2} = 4$

3. $y = -2x^2 + 20x + 33$

$x = \frac{-20}{-4} = 5$

4. $y = -x^2 + 9x - 1$

$x = \frac{-9}{-2} = 4.5$

Find the LOS: $y = 2x^2 + 16$

$x = \frac{0}{4} = 0$

When there is no b term the LOS is always: $x = 0$

Once you've found the LOS what part of the parabola can you now find? VERTEX

$y = 2x^2 - 16x + 7$

$32 - 64 + 7$

Find the equation for the LOS and the coordinates of the vertex.

LOS: $x = \frac{16}{4} = 4$

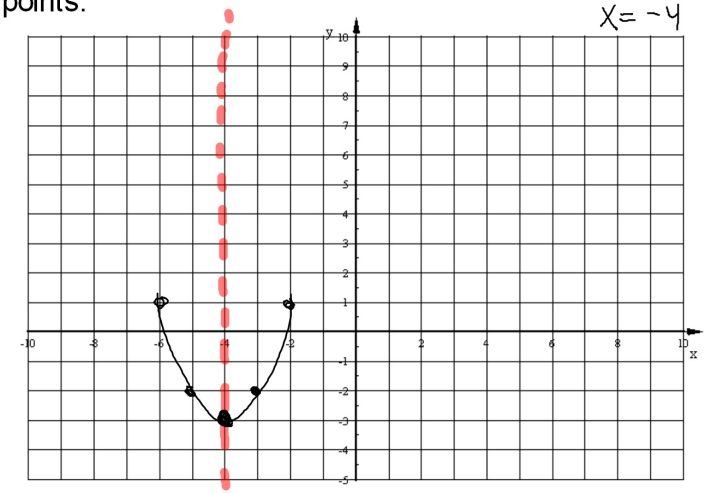
Vertex: $(4, -25)$

Graph this quadratic using at least 5 points.

$y = x^2 + 8x + 13$

LOS $x = -4$

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



Important characteristics of a Parabola to know:

- Equation for the LOS $x = -b/2a$
- Coordinates of the Vertex (,)
- Does parabola open up or down
- Is the Vertex a Maximum or a Minimum
- Y-intercept
- X-intercept(s)

To find the y-intercept of any function you simply replace x with zero and find y.

Find the y-intercept of each quadratic.

1. $y = 3x^2 - 6x + 10$ y-int = 10
2. $y = -5x^2 + x - 7$ y-int = -7
3. $y = 8.3x^2 + 13x$ y-int = 0

When a quadratic is in Standard Form: $y = ax^2 + bx + c$

the y-intercept is always the constant (c).

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

a. Write the eq for the LOS. $x = \frac{24}{2(-4)} = \frac{24}{-8} = -3$

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

c. Find the y-intercept. 19

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

e. Is the parabola wide or narrow? Narrow

The x-intercepts of a quadratic are found by replacing y with zero and SOLVING for x.

Solving Quadratic Equations:

A Quadratic Equation has the following form:

$ax^2 + bx + c = 0$ This means y = 0

When y=0 the corresponding value of x is the x-intercept of the graph.

Solutions to this equation are:

- zeros of the function
- x-intercepts of the graph

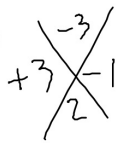
Ways to find x-intercepts of a quadratic function (solving the equation when y=0):

- Factoring
- Graphing
- Square Roots
- Quadratic Formula

Given this quadratic function: $y = x^2 + 2x - 3$

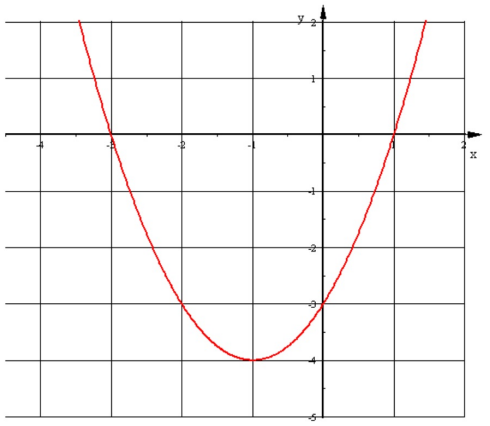
Find the x-intercepts by following these steps:

1. Replace y with zero $0 = x^2 + 2x - 3$
2. Factor the right side $0 = (x+3)(x-1)$



3. Find the zeros of each factor $x = -3, 1$

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

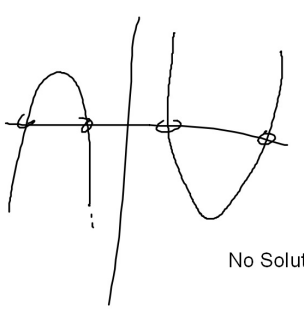


This graph shows that the solutions to the equation:

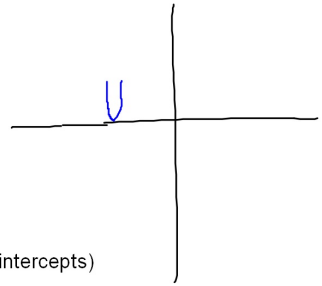
$0 = x^2 + 2x - 3$

are the same as the x-intercepts of the graph.

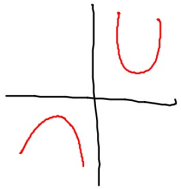
2 solutions (2 x-intercepts)



1 solution (1 x-intercept)



No Solution (0 x-intercepts)



Find the x-intercepts of this quadratic function:

$y = x^2 - 13x + 30$

$0 = x^2 - 13x + 30$

$0 = (x-3)(x-10)$

GCF

30

3 −10

−13

$x = 3, 10$