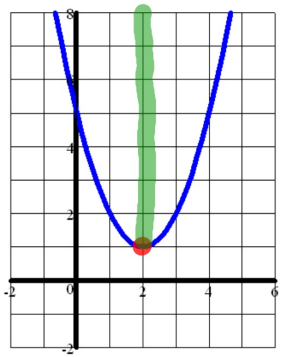
Section 10-1: Graphs of Quadratics

Standard Form of a Quadratic Function:

$y = ax^2 + bx + c$

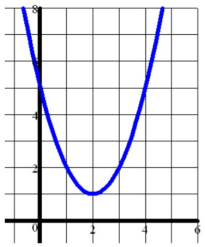
Graph of a quadratic equation is a Parabola



Vertex

Line of Symmetry LOS
Axis of Symmetry

Does this parabola open Up or Down? up



Coordinates of the Vertex (2 , 1)

Eq for the LOS: $x = 2$

What is the relationship between the Line of Symmetry (LOS) and the vertex of a parabola? The Equation for the LOS and the x-coord of the vertex are ALWAYS the same

The vertex of a parabola is the point (-5, 8)

What is the equation for the LOS?

$x = -5$

The quadratic $y = x^2 + 6x - 1$
has the following LOS: $x = -3$

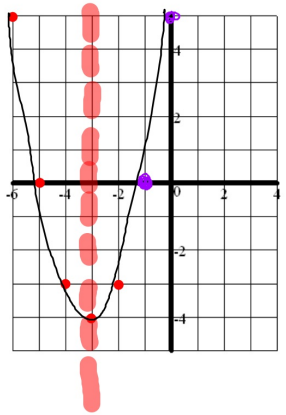
What are the coordinates of the vertex?

$(-3, -10)$

$(-3)^2 + 6(-3) - 1$

$9 - 18 - 1$

Given the following points of a parabola
find 2 other points.

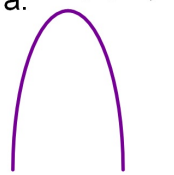


(-6, 5) (-5, 0) (-4, -3)
(-3, -4) (-2, -3)

Use the line of symmetry
and reflect points from
the left side onto the right side.

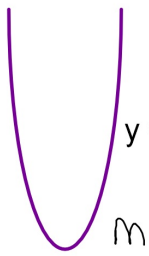
Tell if each parabola has a Maximum or a Minimum:

a. Max



$y = -x^2 + 2x$

b.



$y = 3x^2 - 4x - 1$

Min

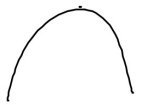
Match the equations below to the graphs above.

$y = 3x^2 - 4x - 1$ $y = -x^2 + 2x$

Given the quadratic $y = ax^2 + bx + c$

The parabola opens up if: $a > 0$ Vertex is min

The parabola opens down if: $a < 0$ Vertex is max



$y = ax^2 + bx + c$

What the coefficient a does to the graph of a parabola.

a>0 parabola opens up

a<0 parabola opens down

|a|

as |a| >1 the more narrow the parabola gets.

bigger is more narrow

as 0<|a| <1 the wider the parabola gets.

smaller is wider

Put these parabolas in order from widest to narrowest.

Widest $y = -0.14x^2 + 8x + 14$

$y = 0.2x^2 + 92$

$y = -1.3x^2 - 4x + 11$

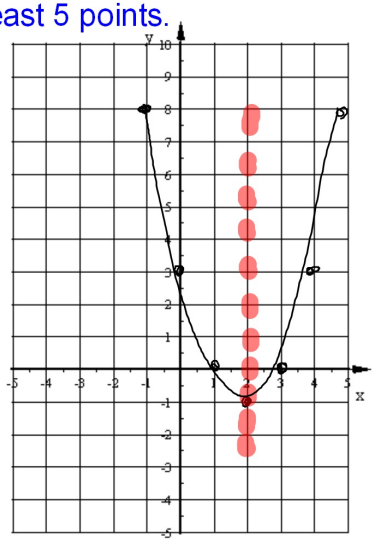
$y = 4x^2 - 27x - 100$

Narrowest $y = -6x^2 + x - 75$

Graphing Quadratics: Use at least 5 points.

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

X	Y
-2	15
-1	8
0	3
1	0
2	-1
3	0



Solving Quadratic Equations:

A Quadratic Equation has the following form:

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

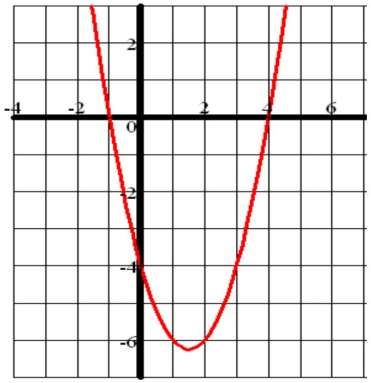
When y=0 the corresponding value of x is the x-intercept of the graph.

Solutions to this equation are also:

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

Use the graph below to solve this equation:

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



$x = -1, 4$

they are the x-intercepts of the graph.

Solve by factoring:

$x^2 - 2x - 8 = 0$

-8

$-4 \quad 2$

-2

$(x+2)(x-4) = 0$

$x = -2, 4$

How do these solutions relate to the graph of $y = x^2 - 2x - 8$?

They are the x-intercepts of the graph