

Algebra 2

2.1 Solving Quadratic Equations by Graphing

Objective: Solve quadratic equations by graphing.

To graph quadratics:

1. Find Vertex
(use line of symmetry to find x then plug in x to find y)
2. Plot Vertex
3. Draw Line of Symmetry
4. Plot y-intercept
5. Plot the reflection of the y-intercept
6. Make a Table of Values
(pick 2-3 x-values and plug in to find y)
7. Connect the points to get a parabola

Example 1: $y = x^2 + 4x + 3$

$a=1$ $b=4$ $c=3$

a is positive \cup

$\textcircled{\text{up}}$ /down

max/ $\textcircled{\text{min}}$

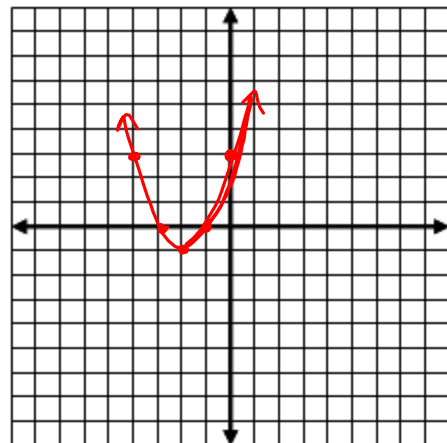
line of symmetry: $x = \frac{-b}{2a} = \frac{-4}{2(1)} = -2$

vertex: $(-2, -1)$

y-intercept: $(0, 3)$

x-intercepts: $(-1, 0)$ and $(-3, 0)$

x	y
-2	-1
-1	0
0	3



Example 2: $y = -2x^2 + 4x - 2$

$a = -2$ $b = 4$ $c = -2$

a is negative

up/down max/min

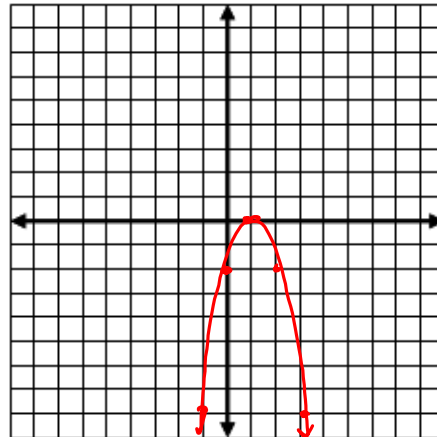
line of symmetry: $x = \frac{-4}{2(-2)} = 1$

vertex: $(1, 0)$

y-intercept: $(0, -2)$

x-intercepts: $(1, 0)$ and $(1, 0)$ *that's all (just one)*

x	y
1	0
0	-2
2	-2
3	-8



Example 3: $y = (x - 2)^2 - 4 = y = (x - 2)(x - 2) - 4$

$y = a(x - h)^2 + k$ $y = x^2 - 4x + 4 - 4 \rightarrow y = x^2 - 4x$

up/down min *change sign!*

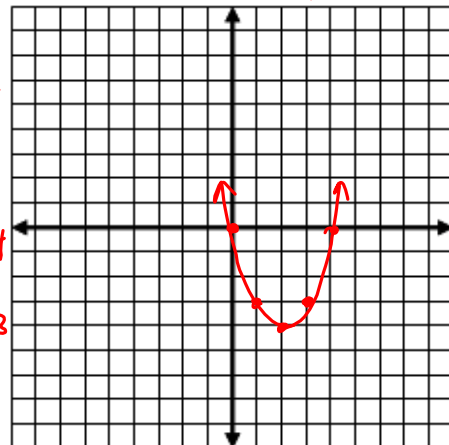
line of symmetry: $x = 2$

vertex: $(2, -4)$ (h, k)

y-intercept: 0

x-intercepts: $(0, 0)$ and $(4, 0)$

x	y
2	-4
0	0
1	-3



Example 4: $y = x^2 - 9$

up/down

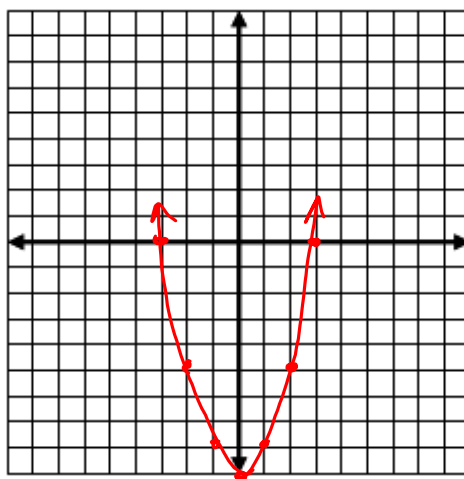
max/min

line of symmetry: $x = \frac{-b}{2(a)} = 0$

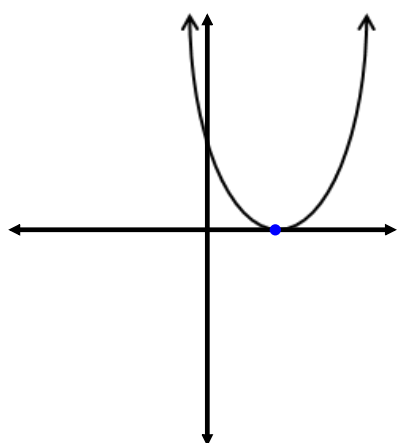
vertex: $x = 0$

y-intercept: $(0, -9)$

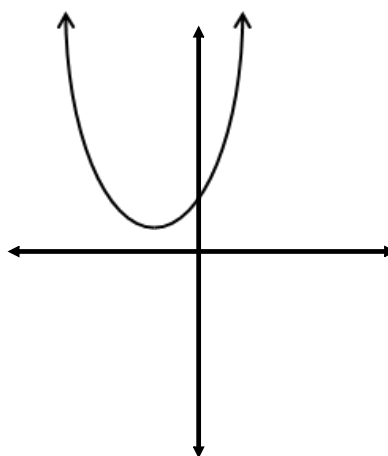
x-intercepts: $(3, 0)$ and $(-3, 0)$



Special Cases



Only 1 Solution - one x-intercept



No Solution - no x-intercepts

Assignment: Worksheet 2.1



Q: Why did the algebra students throw bottles of hand cream across the classroom?

A: