



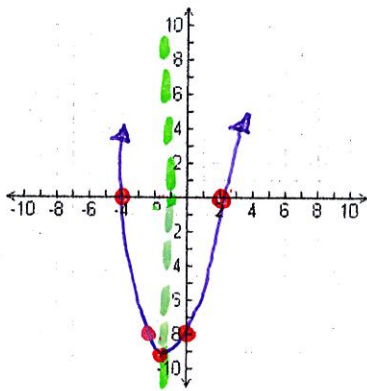


# Standard Form

<b>Quadratic Functions</b> $f(x) = ax^2 + bx + c$ $x$ -int.	<b>Example 1:</b> $f(x) = x^2 + 2x - 8$ $(-4, 0)$ $(2, 0)$	<b>Example 2:</b> $f(x) = -x^2 - 4x + 5$ $(1, 0)$ $(-5, 0)$	<b>Example 3:</b> $f(x) = 2x^2 - 8x + 9$	<b>Example 4:</b> $f(x) = -4x^2 + 8x - 3$ $(\frac{1}{2}, 0)$ and $(\frac{3}{2}, 0)$
<b>Direction of Opening:</b> based off of "a"	 UP ← min.	 DOWN ↓ max	 UP	 DOWN
<b>Axis of Symmetry:</b> $x = \frac{-b}{2a}$ or the $x$ -value of the vertex "aos"	$x = \frac{-2}{2(1)} = -1$	$x = \frac{4}{2(-1)} = -2$	$x = \frac{8}{2(2)} = 2$	$x = \frac{-8}{2(-4)} = 1$
<b>Vertex:</b> Solve by hand or find max/min in the calculator	$(-1)^2 + 2(-1) - 8$ $1 - 2 - 8 = -9$ $(-1, -9)$	$-(-2)^2 - 4(-2) + 5$ $-4 + 8 + 5 = 9$ $(-2, 9)$	$2(2)^2 - 8(2) + 9$ $8 - 16 + 9 = 1$ $(2, 1)$	$-4(1)^2 + 8(1) - 3$ $-4 + 8 - 3 = 1$ $(1, 1)$
<b>Y-Intercept:</b> $(0, c)$	$(0, -8)$	$(0, 5)$	$(0, 9)$	$(0, -3)$
<b>Domain:</b> $x$ -values of the graph	$\mathbb{R}$ or $(-\infty, +\infty)$	$\mathbb{R}$ or $(-\infty, +\infty)$	$\mathbb{R}$ or $(-\infty, +\infty)$	$\mathbb{R}$ or $(-\infty, +\infty)$
<b>Range:</b> $y$ -values of the graph	$y \geq -9$ $[-9, +\infty)$	$y \leq 9$ $(-\infty, 9]$	$y \geq 1$ $[1, +\infty)$	$y \leq 1$ $(-\infty, 1]$

Example 1:



$a=1$   $b=2$   $c=-8$

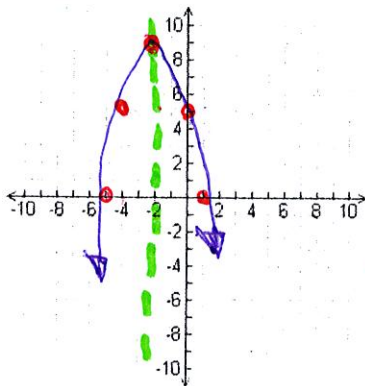
$x^2 + 2x - 8$

$\frac{-2}{2} \pm \sqrt{1 + 8}$   
 $(x+4)(x-2) = 0$   
 $x+4=0$   $x-2=0$   
 $x=-4$   $x=2$

$a=-1$   $b=-4$   $c=5$

$-1(x^2 + 4x - 5)$   
 $\frac{-4}{2} \pm \sqrt{4 + 20}$   
 $-1(x-1)(x+5) = 0$   
 $x-1=0$   $x+5=0$   
 $x=1$   $x=-5$

Example 2:

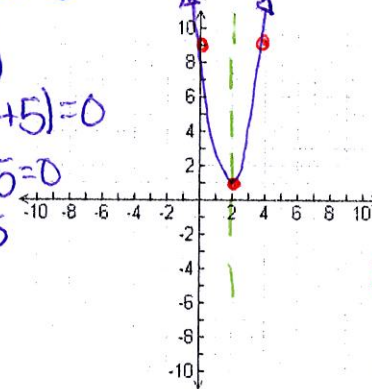


$a=2$   $b=-8$   $c=9$

$x = \frac{8 \pm \sqrt{(-8)^2 - 4(2)(9)}}{2(2)}$

$= \frac{8 \pm \sqrt{-8}}{4}$  imag.

Example 3:



$a=-4$   $b=8$   $c=-3$

$x = \frac{-8 \pm \sqrt{(8)^2 - 4(-4)(-3)}}{2(-4)}$

$= \frac{-8 \pm \sqrt{16}}{-8}$

$x = \frac{-8+4}{-8} = \frac{1}{2}$  or  $x = \frac{-8-4}{-8} = \frac{3}{2}$

Example 4:

