key

Algebra I
8.5 Notes Solutions of Quadratic Equations

Solutions to a quadratic function are the values of the X -intercepts (y = 0).

If your quadratic is factored, find the x-values that will make each ( ) = 0.

Example: $y = 2(x - 1)(x + 3)$
$0 = 2(x - 1)(x + 3)$

The solutions (x-intercepts) are x = 1 and x = -3.

Example: $y = -2(x - 4)(x - 8)$
$0 = -2(x - 4)(x - 8)$

The solutions (x-intercepts) are x = 4 and x = 8.

8.6 Notes, Part 1 Using the Discriminant to Determine the Number of Solutions of a Quadratic Equation

If your quadratic equation is in general form $ax^2 + bx + c = 0$, then the number of solutions will be determined by the value of the discriminant, *d*.

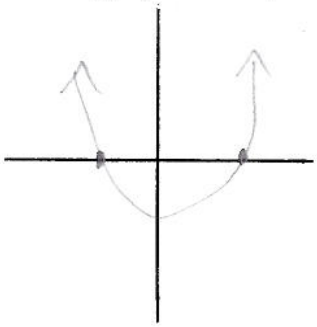
$$d = (b)^2 - 4ac$$

If d is a positive value, there will be 2 solutions.

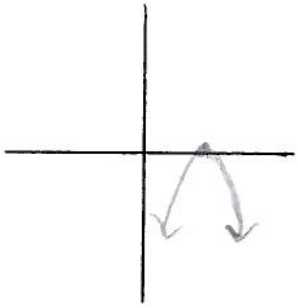
If d is zero, there will be 1 solution.

If d is negative, there will be 0 solutions.

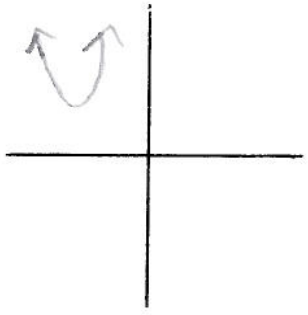
Draw a graph of a quadratic equation with the following number of solutions:



2 solutions
(2 x-intercepts)



1 solution
(1 x-intercept)



no solutions
(no x-intercepts)

8.6 Notes, Part 2 Using the Quadratic Formula to Solve a Quadratic Equation

If your quadratic equation is in general form $ax^2 + bx + c = 0$, then the solution(s) can be found using the discriminant and the Quadratic Formula.

$d = (b)^2 - 4ac$	$x = \frac{(-b \pm \sqrt{d})}{2a}$
(# of solutions)	(these are the solutions)

1. $x^2 + 8x + 12 = 0$

a = 1 b = 8 c = 12

$x = \frac{(-8 \pm \sqrt{16})}{2} = \frac{-8 \pm 4}{2}$

d = $8^2 - 4(1)(12) = 16$

$\frac{(-8+4)}{2} = \frac{-4}{2} = -2$ $\frac{(-8-4)}{2} = \frac{-12}{2}$

number of solutions: 2

$x = -2$ $x = -6$

2. $2x^2 - 4x + 2 = 0$

a = 2 b = −4 c = 2

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

d = $(-4)^2 - 4(2)(2) = 0$

$x = 1$

number of solutions: 1

3. $-2x^2 + 4x - 9 = 0$

a = −2 b = 4 c = −9

d = $(4)^2 - 4(-2)(-9) = -56$

number of solutions: 0