

Given the following quadratic equation,

$$ax^2 + bx + c = 0$$

$$a = \quad b = \quad c =$$

the solutions or roots are...

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Discriminant

The **discriminant** tells us the number of real solutions or roots for a quadratic equation

If $b^2 - 4ac > 0$

two distinct
real solutions

If $b^2 - 4ac = 0$

one distinct
real solution

If $b^2 - 4ac < 0$

two distinct non-real
complex solutions

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Find the number of real solutions for the following quadratic equations.

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

$$0 = 4x^2 - 12x + 9$$

$$0 = 2x^2 + 3x + 6$$

If $b^2 - 4ac > 0$

two distinct
real solutions

If $b^2 - 4ac = 0$

one distinct
real solution

If $b^2 - 4ac < 0$

two distinct non-real
complex solutions

Find the number of real solutions for the following quadratic equations.

$$0 = x^2 + x + 1$$

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

$$0 = x^2 + 8x + 16$$

If $b^2 - 4ac > 0$

two distinct
real solutions

$f(x)$ has two x -intercepts

If $b^2 - 4ac = 0$

one distinct
real solution

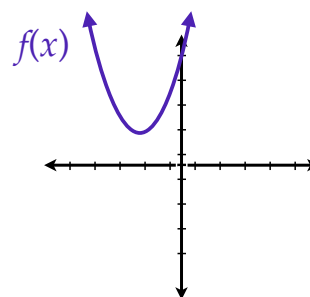
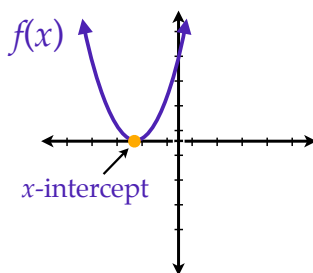
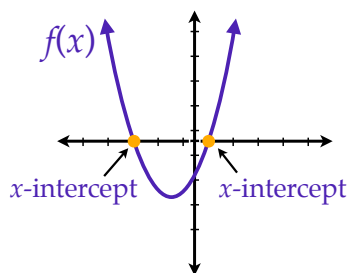
$f(x)$ has one x -intercept

If $b^2 - 4ac < 0$

two distinct non-real
complex solutions

$f(x)$ has no x -intercepts

The **Discriminant** also tells us how many x -intercepts the function will have



If $b^2 - 4ac > 0$

$f(x)$ has two x -intercepts

If $b^2 - 4ac = 0$

$f(x)$ has one x -intercept

If $b^2 - 4ac < 0$

$f(x)$ has no x -intercepts

Find the number of x -intercepts for the following functions.

$$f(x) = 2x^2 + 6x - 2$$

$$f(x) = 9x^2 + 24x + 16$$

$$f(x) = 3x^2 - 2x + 5$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Discriminant

If $b^2 - 4ac > 0$

two distinct
real solutions

$f(x)$ has two x -intercepts

If $b^2 - 4ac = 0$

one distinct
real solution

$f(x)$ has one x -intercept

If $b^2 - 4ac < 0$

two distinct non-real
complex solutions

$f(x)$ has no x -intercepts