

Discriminant

two Real
solutions

no Real
solutions

what is the
discriminant?

one Real
solution

What is the discriminant?

Recall- The Quadratic formula is:

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

The **discriminant** of the quadratic equation is:

$$b^2 - 4ac$$

(the part of the equation under the radical sign)

You can determine the number of solutions by evaluating the discriminant.

Example 1: $x^2 - 4x + 3 = 0$

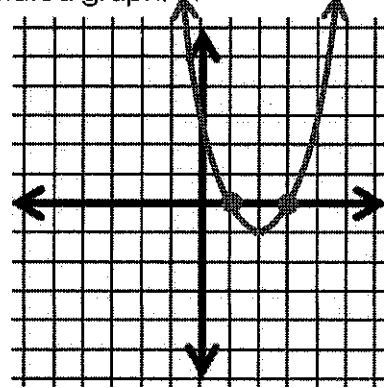
$$b^2 - 4ac$$
$$(-4)^2 - 4(1)(3)$$

$$16 - 12$$

$$4 \rightarrow 2 \text{ solutions}$$

($\pm\sqrt{\quad}$)

Look at the related graph!



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

$$b^2 - 4ac$$

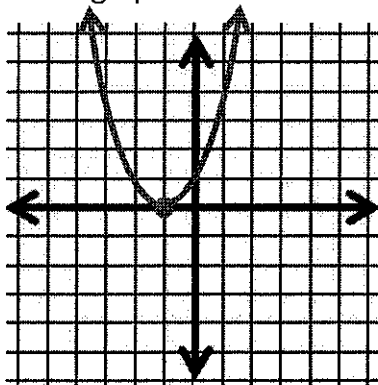
$$2^2 - 4(1)(1)$$

$$4 - 4$$

$$0 \rightarrow 1 \text{ solution}$$

(vertex)

Look at the related graph!



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

$$b^2 - 4ac$$

$$(-2)^2 - 4(1)(2)$$

$$4 - 8$$

$$-4 \rightarrow \text{no real solutions}$$

Look at the related graph!

