MPM 2D

SOLVING QUADRATIC EQUATIONS BY FORMULA

FORMULA: If a quadratic equation is in the form $\boldsymbol{ax^2 + bx + c = 0}$, to solve the equation, identify the ***a, b*** and ***c*** values, then use the quadratic formula:

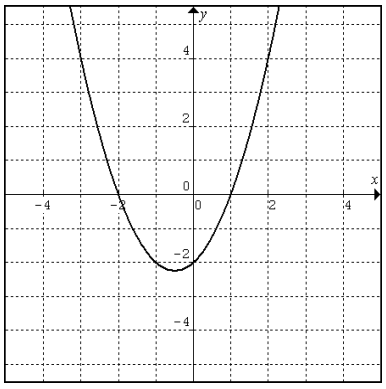
$$\boldsymbol{x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}}$$

Recall that solving a quadratic equation is equivalent to finding the x −intercepts (or zeros) of a quadratic relation. A quadratic relation has at most 2 zeros.

The above quadratic formula can be rewritten as follows:

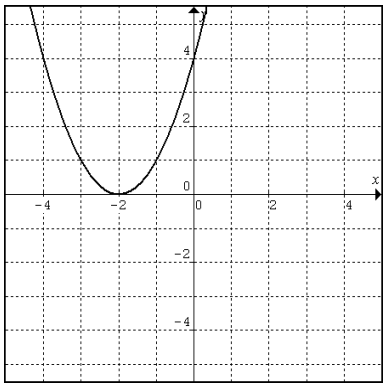
$$\boldsymbol{x = \frac{-b+\sqrt{b^2-4ac}}{2a}} \quad \text{and} \quad \boldsymbol{x = \frac{-b-\sqrt{b^2-4ac}}{2a}}$$

To determine the number of possible solutions (# of zeros), use the ***discriminant*** [the part of the formula inside the square root].



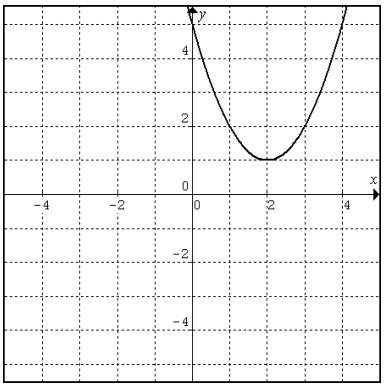
2 solutions exist

$b^2 - 4ac > 0$



1 solution exists

$b^2 - 4ac = 0$



no solutions exist

$b^2 - 4ac < 0$

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY FORMULA.

[NOTE: If the discriminant is a perfect square, simplify the square root; otherwise, leave the root.]

1. $(p-1)(p-3)=-2$

2. $(3p-1)(2p-3)=-3$

3. $(3p-1)(2p-3)=1$

4. $x(3x-2)=4$

5. $(3x+1)(x-2)=3x$

6. $(2x-1)(x-3)=2x(1-x)-3$