

SOLVING QUADRATIC EQUATIONS USING THE QUADRATIC FORMULA

The General Form of a Quadratic Equation: $ax^2 + bx + c = 0$

$$\text{The Quadratic Formula: } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Discriminant tells the nature of the roots of the equation.

Discriminant	Equation	Function
If $b^2 - 4ac < 0$	\Rightarrow No Real Solutions	\Rightarrow Has no x intercepts
If $b^2 - 4ac = 0$	\Rightarrow One Real Solution	\Rightarrow Has one x intercept
If $b^2 - 4ac > 0$	\Rightarrow Two Real Solutions	\Rightarrow Has two x intercepts

Make sure the correct terminology is used when discussing the solutions.

When the quadratic is **in the form of an equation**, it is appropriate to call the solutions **roots of the equation**.

When the quadratic is **in the form of a function**, the roots of the equation are referred to as the **zeros of the function**.

When looking at **the graph of the function**, the zeros of the function are **the x intercepts of the graph**.

Solve the following using the quadratic formula

a) $x^2 - 14x + 33 = 0$

b) $\frac{1}{3}x^2 - 5x + 12 = 0$

c) $4x^2 - 32x + 40 = 0$

d) $3x^2 - 2x + 8 = 0$