

8.8 The Quadratic Formula and Discriminant

Any quadratic equation in standard form ($ax^2 + bx + c = 0$) can be solved using the quadratic formula.

Quadratic Formula: Given $ax^2 + bx + c = 0$.

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

where $b^2 - 4ac$ is known as the discriminant

If $b^2 - 4ac > 0$ then 2 real solution

If $b^2 - 4ac = 0$ then 1 real solutions

If $b^2 - 4ac < 0$ then no real solutions

Example 1: Find the value of the discriminant and describe the nature of the roots.

a. $x^2 - 3x = 10$

b. $x^2 - 3x + 10 = 0$

c. $x^2 + 5 = 5x$

d. $x^2 - 6x + 9 = 0$

Example 2: Use the quadratic formula to solve $3x^2 + 2x - 1 = 0$.

Example 3: Use the quadratic formula to solve $x^2 - 5x = 3$.