The Quadratic Formula

Standard form of a quadratic equation

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

You cannot begin to solve a quadratic equation until it is written in standard form.

Solve for x.

$$x^2+3x-17=0$$

When a quadratic equation cannot be factored, you can solve for x by using the quadratic formula.

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

$x^2+3x-17=0$

$a=1 \quad b=3 \quad c=-17$

$$x=\frac{-3\pm\sqrt{3^2-4(1)(-17)}}{2(1)}=\frac{-3\pm\sqrt{9+68}}{2}$$

$$x=\frac{-3\pm\sqrt{77}}{2}$$

$$x=\frac{-3+\sqrt{77}}{2}, \frac{-3-\sqrt{77}}{2}$$

Find the roots of $3x^2 - x = 10$

$3x^2 - x - 10 = 0$

$a = 3 \quad b = -1 \quad c = -10$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(3)(-10)}}{2(3)}$$

$$x = \frac{1 \pm \sqrt{1 + 120}}{6}$$

$$x = \frac{1 \pm \sqrt{121}}{6} = \frac{1 \pm 11}{6}$$

$$\frac{1+11}{6} = 2$$

$$\frac{1-11}{6} = -\frac{5}{3}$$

The roots of a quadratic equation are the special x-values that, when plugged into the given quadratic equation, make it equal to zero.