QUADRATIC EQUATIONS WITHOUT A LINEAR TERM

To solve $ax^2 + c = 0$, $c < 0$, remember the difference of two squares: $a^2 - b^2 = (a - b)(a + b)$.

Example 8

Solve:

(a) $x^2 - 4 = 0$ **(b)** $2x^2 - 18 = 0$ **(c)** $9x^2 = 25$ **(d)** $(x - 2)^2 = 9$

Solution

(a) $x^2 - 4 = 0$

$(x - 2)(x + 2) = 0$

$x - 2 = 0$ or $x + 2 = 0$

$x = 2$ or $x = -2$

(b) $2x^2 - 18 = 0$

$2(x^2 - 9) = 0$

$2(x - 3)(x + 3) = 0$

$x = 3$ or $x = -3$

(c) $9x^2 = 25$

$9x^2 - 25 = 0$

$(3x - 5)(3x + 5) = 0$

$3x - 5 = 0$ or $3x + 5 = 0$

$x = \frac{5}{3}$ or $x = -\frac{5}{3}$

(d) $(x - 2)^2 = 9$

$(x - 2)^2 - 9 = 0$

$(x - 2 - 3)(x - 2 + 3) = 0$

$(x - 5)(x + 1) = 0$

$x = 5$ or $x = -1$

Example 9

Solve:

(a) $x^2 - 6 = 0$ **(b)** $3x^2 = 15$

Solution

(a) $x^2 - 6 = 0$ or $x^2 = 6$

Use $6 = \left(\sqrt{6}\right)^2$ $x = \pm\sqrt{6}$

$x^2 - \left(\sqrt{6}\right)^2 = 0$

$\left(x - \sqrt{6}\right)\left(x + \sqrt{6}\right) = 0$

$x = \sqrt{6}$ or $x = -\sqrt{6}$

(b) $3x^2 = 15$ or $x^2 = 5$

$3(x^2 - 5) = 0$ $x = \pm\sqrt{5}$

$3\left(x - \sqrt{5}\right)\left(x + \sqrt{5}\right) = 0$

$x = \sqrt{5}$ or $x = -\sqrt{5}$