

Solving Quadratic Equations by Factoring

Solve each equation by factoring.

1) $(8x - 1)^2 = 0$

$8x - 1 = 0$

$8x = 1$

$x = \frac{1}{8}$

2) $(n - 8)(n + 1) = 0$

$n - 8 = 0$ $n + 1 = 0$

$n = 8$ $n = -1$

3) $(x + 4)(x + 1) = 0$

$x + 4 = 0$ $x + 1 = 0$

$x = -4$ $x = -1$

4) $(8k + 5)(5k + 6) = 0$

$8k + 5 = 0$ $5k + 6 = 0$

$8k = -5$ $5k = -6$

$k = -\frac{5}{8}$ $k = -\frac{6}{5}$

5) $p^2 - 6p = 0$

$p(p - 6) = 0$

$p = 0$ $p - 6 = 0$

$p = 0$ $p = 6$

6) $n^2 - 6n + 5 = 0$

$(n - 5)(n - 1) = 0$

$n - 5 = 0$ $n - 1 = 0$

$n = 5$ $n = 1$

7) $x^2 - 16 = 0$

$(x + 4)(x - 4) = 0$

$x + 4 = 0$ $x - 4 = 0$

$x = -4$ $x = 4$

8) $m^2 + 4m = 0$

$m(m + 4) = 0$

$m = 0$ $m + 4 = 0$

$m = 0$ $m = -4$

9) $5r^2 + 49 = 42r$

$5r^2 - 42r + 49 = 0$

$(5r - 7)(r - 7) = 0$

$5r - 7 = 0$ $r - 7 = 0$

$5r = 7$ $r = 7$

11) $7x^2 = -4 + 16x$

$7x^2 - 16x + 4 = 0$

$(7x - 2)(x - 2) = 0$

$7x - 2 = 0$ $x - 2 = 0$

$7x = 2$ $x = 2$

13) $5x^2 - 8x - 3 = -3 - x$

$5x^2 - 7x = 0$

$x(5x - 7) = 0$

$x = 0$ $5x - 7 = 0$

$x = 0$ $x = \frac{7}{5}$

10) $25n^2 + 5n = 12$

$25n^2 + 5n - 12 = 0$

$(5n - 3)(5n + 4) = 0$

$5n - 3 = 0$ $5n + 4 = 0$

$5n = 3$ $5n = -4$

$n = \frac{3}{5}$ $n = -\frac{4}{5}$

12) $5b^2 = -38b - 48$

$5b^2 + 38b + 48 = 0$

$(5b + 8)(b + 6) = 0$

$5b + 8 = 0$ $b + 6 = 0$

$5b = -8$ $b = -6$

$b = -\frac{8}{5}$ $b = -6$

14) $7v^2 - 21v + 8 = 2v^2 + 4$

$5v^2 - 21v + 4 = 0$

$(5v - 1)(v - 4) = 0$

$5v - 1 = 0$ $v - 4 = 0$

$5v = 1$ $v = 4$

$v = \frac{1}{5}$ $v = 4$

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

Solving Quadratics using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $6a^2 + 4a - 6 = 0$ $a=6$ $b=4$ $c=-6$

$$x = \frac{-4 \pm \sqrt{16 - 4(-36)}}{12}$$

$$\frac{-4 \pm \sqrt{160}}{12} = \sqrt{16 \cdot 10}$$

$$\frac{-4 \pm 4\sqrt{10}}{12} = \boxed{\frac{-1 \pm \sqrt{10}}{3}}$$

2) $7x^2 - 7x - 5 = 0$ $a=7$ $b=-7$ $c=-5$

$$x = \frac{7 \pm \sqrt{49 - 4(-35)}}{14}$$

$$\frac{7 \pm \sqrt{189}}{14} \rightarrow \sqrt{9 \cdot 21}$$

$$\boxed{\frac{7 \pm 3\sqrt{21}}{14}}$$

3) $4p^2 - 12p + 5 = 0$ $a=4$ $b=-12$ $c=5$

$$x = \frac{12 \pm \sqrt{144 - 4(20)}}{8}$$

$$\frac{12 \pm \sqrt{64}}{8}$$

$$\frac{12+8}{8} \quad \frac{12-8}{8}$$

$$\frac{20}{8} \quad \frac{4}{8}$$

$$\rightarrow \boxed{\frac{5}{2} \text{ \& } \frac{1}{2}}$$

4) $4x^2 + 2x - 42 = -12$ $a=4$ $b=2$ $c=-30$

$$4x^2 + 2x - 30$$

$$x = \frac{-2 \pm \sqrt{4 - 4(-120)}}{8}$$

$$\frac{-2 \pm \sqrt{484}}{8}$$

$$\frac{-2+22}{8} \quad \frac{-2-22}{8}$$

$$\rightarrow \frac{20}{8} \quad \frac{-24}{8}$$

$$\rightarrow \boxed{\frac{5}{2} \text{ \& } -3}$$

5) $3n^2 - 4n - 13 = -6$ $a=3$ $b=-4$ $c=-7$

$$3n^2 - 4n - 7 = 0$$

$$x = \frac{4 \pm \sqrt{16 - 4(-21)}}{6}$$

$$\frac{4 \pm \sqrt{100}}{6}$$

$$\frac{4+10}{6} \quad \frac{4-10}{6}$$

$$\rightarrow \frac{14}{6} \quad \frac{-6}{6}$$

$$\rightarrow \boxed{\frac{7}{3} \text{ \& } -1}$$

*6) $6r^2 + 8 = -3$ $a=6$ $b=0$ $c=11$

$$6r^2 + 11 = 0$$

$$0 \pm \sqrt{0 - 4(66)}$$

$$\frac{\pm \sqrt{-264}}{12}$$

$$\sqrt{4 \cdot 66 \cdot -1}$$

$$\pm \frac{2i\sqrt{66}}{12} = \boxed{\frac{\pm i\sqrt{66}}{6}}$$

*FYI: $\sqrt{-1} = i$

*7) $5x^2 = -12 - 2x^2 - 7x$ $a=7$ $b=7$ $c=12$

$$7x^2 + 7x + 12 = 0$$

$$x = \frac{-7 \pm \sqrt{49 - 4(84)}}{14}$$

$$\frac{-7 \pm \sqrt{-287}}{14}$$

$$\boxed{\frac{-7 \pm i\sqrt{287}}{14}}$$

8) $3n^2 + 6n - 15 = 3n$ $a=3$ $b=3$ $c=-15$

$$3n^2 + 3n - 15 = 0$$

$$x = \frac{-3 \pm \sqrt{9 - 4(-45)}}{6}$$

$$\frac{-3 \pm \sqrt{189}}{6} \rightarrow \sqrt{9 \cdot 21}$$

$$\frac{-3 \pm 3\sqrt{21}}{6} = \boxed{\frac{-1 \pm \sqrt{21}}{2}}$$