

Solving Quadratics by Factoring

Solving Quadratics by Factoring: Use the Zero Product Property

1. If $a \cdot b = 0$ then either $a = 0$ or $b = 0$

This is also true of products in the following form:

2. If $(x - a)(x - b) = 0$, then either $(x - a) = 0$ or $(x - b) = 0$

This means that one side of the quadratic equation must equal zero!

Examples: Solve the following Quadratic equations by factoring.

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

$(x+4)(x+3) = 0$
 $(x+4) = 0$ or $(x+3) = 0$
 $x = -4$ or $x = -3$

2. $x^2 - 25 = 0$

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

3. $2x^2 + 4x - 16 = 0$

$2(x^2 + 2x - 8) = 0$
 $2(x+4)(x-2) = 0$
 ~~$2 = 0$~~ or $x+4 = 0$ or $x-2 = 0$
 $x = -4$
 $x = 2$

4. $x^2 + 2x - 7 = -4$

$x^2 + 2x - 3 = 0$
 $(x+3)(x-1) = 0$
 $x = -3$ or $x = 1$

5. $6x^2 - x - 12 = 0$

$(3x+4)(2x-3) = 0$
 $(3x+4) = 0$ or $(2x-3) = 0$
 $3x+4 = 0$ or $2x-3 = 0$
 $3x = -4$ or $2x = 3$
 $x = -\frac{4}{3}$ or $x = \frac{3}{2}$

6. $(4x - 7)(2x + 5) = 0$

$4x - 7 = 0$ or $2x + 5 = 0$
 $4x = 7$ or $2x = -5$
 $x = \frac{7}{4}$ or $x = -\frac{5}{2}$

7. $6x^2 + x + 8 = 10$

$6x^2 + x - 2 = 0$
 $(3x+2)(2x-1) = 0$
 $3x+2 = 0$ or $2x-1 = 0$
 $3x = -2$ or $2x = 1$
 $x = -\frac{2}{3}$ or $x = \frac{1}{2}$

8. $3x^2 + 15x + 18 = 0$

$3(x^2 + 5x + 6) = 0$
 $3(x+2)(x+3) = 0$
 ~~$3 = 0$~~ or $x+2 = 0$ or $x+3 = 0$
 $x = -2$ or $x = -3$

9. $5x^2 + 2x = 0$

$x(5x+2) = 0$
 $x = 0$ or $5x+2 = 0$
 $x = 0$ or $5x = -2$
 $x = 0$ or $x = -\frac{2}{5}$