

6.3 Solving Quadratic Equations by Factoring

Zero Product Property

$ab=0$ Either a or b, or both are equal to 0

$(x+5)(x+7) = 0$, then $x+5=0$ or $x+7=0$

Objective:

*Solve by Factoring

*Write a quadratic with given roots

I. Solve by Factoring

EX 1. $x^2 = 6x$

$$x^2 - 6x = 0$$

$$x(x-6) = 0$$

$$x=0$$

$$x-6=0$$

$$x=6$$

2 real sol.

EX 2. $x^2 = -4x$

$$x^2 + 4x = 0$$

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

$$x=0$$

$$x+4=0$$

$$x=-4$$

2 real solutions

EX 3. $x^2 - 16x + 64 = 0$

$$(x-8)(x-8) = 0$$

$$x-8=0 \quad x-8=0$$

$$x=8$$

1 real sol.

EX 4. $4x^2 + 7x - 2 = 0$

~~$$(2x-1)(2x+2) = 0$$~~

$$(4x-1)(x+2) = 0$$

$$4x-1=0 \rightarrow 4x=1$$

$$x = \frac{1}{4}$$

$$x+2=0$$

$$x=-2$$

EX 5. $x^2 - 3x - 28 = 0$

$$(x-7)(x+4) = 0$$

$$x-7=0 \quad x+4=0$$

$$x=7$$

$$x=-4$$

EX 6. $3x^2 + 10x - 8 = 0$

$$(3x-2)(x+4) = 0$$

$$3x-2=0 \quad x+4=0$$

$$3x=2$$

$$x = \frac{2}{3}$$

$$x = -4$$

II. Write an equation given roots

EX 7. $x = -2, 7$

$$\begin{aligned} & \overbrace{(x+2)(x-7)}^F = 0 \\ & x^2 - 7x + 2x - 14 = 0 \\ & \boxed{x^2 - 5x - 14 = 0} \end{aligned}$$

EX 8. $x = -6, -8$

$$\begin{aligned} & (x+6)(x+8) = 0 \\ & x^2 + 8x + 6x + 48 = 0 \\ & \boxed{x^2 + 14x + 48 = 0} \end{aligned}$$

EX 9. $x = 1/3, 5$

$$\begin{aligned} & 3(x - \frac{1}{3})(x - 5) = 0 \\ & (3x - 1)(x - 5) = 0 \\ & 3x^2 - 15x - 1x + 5 = 0 \\ & \boxed{3x^2 - 16x + 5 = 0} \end{aligned}$$