

Objective: Solve quadratic equations by factoring.

Concept

Steps to Solve a Quadratic Equation by Factoring

1. Write the equation in standard form, $ax^2 + bx + c = 0$.
2. Factor the polynomial completely, including any greatest common factor.
3. Use the Zero Product Property.
4. Solve for the values of the variable, x .
5. State the solution.

Zero Product Property

If the product of two factors is zero, then at least one of the factors must be equal to zero.

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



Objective: Solve quadratic equations by factoring.

Practice) Solve the equation by factoring.

$$8x^2 - 14x + 10 = 4$$

$$8x^2 - 14x + 6 = 0$$

$$2(4x^2 - 7x + 3) = 0$$

$$2(4x - 3)(x - 1) = 0$$

$$2 \neq 0, \quad 4x - 3 = 0 \quad \text{or} \quad x - 1 = 0$$

$$4x = 3 \quad x = 1$$

$$x = \frac{3}{4}$$

$$\boxed{\text{solutions: } x = \frac{3}{4}, 1}$$



Objective: Solve quadratic equations by factoring.

Practice) Solve the equation by factoring.

$$6x^2 - 15x - 6 = 30$$

$$6x^2 - 15x - 36 = 0$$

$$3(2x^2 - 5x - 12) = 0$$

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

$$3 \neq 0, \quad 2x + 3 = 0 \quad \text{or} \quad x - 4 = 0$$

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

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

$$\text{solutions : } x = -\frac{3}{2}, 4$$



Objective: Solve quadratic equations by factoring.

Ex) Solve the equation by factoring.

$$(2x-1)(x+2) = -3$$

multiply

① standard form

$$2x^2 + 4x - 1x - 2 = -3$$

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

$$2x^2 + 3x + 1 = 0$$

② factor

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

$$2x^2 + 2x + 1x + 1$$

③ zero product property

$$2x+1=0 \text{ or } x+1=0$$

$$\frac{2x}{2} = \frac{-1}{2}$$

$$x = -1$$

$$x = -\frac{1}{2}$$

④

⑤ solutions: $x = -1, -\frac{1}{2}$

Objective: Solve quadratic equations by factoring.

Practice) Solve the equation by factoring.

$$(3x + 1)(x + 3) = 11$$

$$3x^2 + 10x + 3 = 11$$

$$3x^2 + 10x - 8 = 0$$

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

$$3x - 2 = 0 \quad \text{or} \quad x + 4 = 0$$

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

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

$$\text{solutions: } x = \frac{2}{3}, -4$$



Objective: Solve quadratic equations by factoring.

Practice) Solve the equation by factoring.

$$(2x - 1)(3x - 2) = 12$$

$$6x^2 - 7x + 2 = 12$$

$$6x^2 - 7x - 10 = 0$$

$$(6x + 5)(x - 2) = 0$$

$$6x + 5 = 0 \text{ or } x - 2 = 0$$

$$6x = -5 \quad x = 2$$

$$x = \frac{-5}{6}$$

$$\left\{ x = -\frac{5}{6}, 2 \right\}$$

Objective: Solve quadratic equations by factoring.

Closure

James solved a quadratic equation by factoring. His work is shown. What is the first mistake James made?

$$\begin{aligned}x^2 - 2x - 15 &= 2 \\(x+3)(x-5) &= 2 \\x+3 = 2 \quad \text{or} \quad x-5 &= 2 \\x = -1 \quad \quad \quad x &= 7 \\ \text{solutions : } x = -1, 7\end{aligned}$$

The first mistake James made is that he factored before putting the equation in standard form.