Solving Quadratic Equations by Factoring

Algebra Worksheet · Grade 8-10

Name: _____ Date: _____ Score: / 10

Learning Objectives

- Factor quadratic expressions of the form ax^2+bx+c
- Apply the Zero Product Property to find solutions
- Verify solutions by substitution into the original equation

Solve each quadratic equation by factoring and show all work on a separate sheet.

1. Solve the quadratic equation by factoring.

$x^2 + 5x + 6 = 0$

Answer: _____

2. Solve the quadratic equation by factoring.

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

Answer: _____

3. Solve the quadratic equation by factoring.

$x^2 - 9 = 0$

Answer: _____

4. Solve the quadratic equation by factoring.

$2x^2 + 7x + 3 = 0$

Answer: _____

5. Solve the quadratic equation by factoring.

$x^2 + 4x = 0$

Answer: _____

6. Solve the quadratic equation by factoring.

$3x^2 - 12x + 9 = 0$

Answer: _____

7. Solve the quadratic equation by factoring.

$x^2 - 10x + 25 = 0$

Answer: _____

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8. Solve the quadratic equation by factoring.

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

Answer: _____

9. Solve the quadratic equation by factoring.

$x^2 + 2x - 15 = 0$

Answer: _____

10. Solve the quadratic equation by factoring.

$4x^2 - 25 = 0$

Answer: _____

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ANSWER KEY & SOLUTIONS

Encourage students to always set the equation equal to zero before attempting to factor.

Solutions

1. Solve the quadratic equation by factoring.

$x^2 + 5x + 6 = 0$

→ *Find two numbers that multiply to 6 and add to 5, which are 2 and 3.*
→ *Factor the expression as (x+2)(x+3)=0.*
→ *Set each factor equal to zero to get x=-2 or x=-3.*

Answer: $x = -2,\ x = -3$

2. Solve the quadratic equation by factoring.

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

→ *Find two numbers that multiply to 12 and add to -7, which are -3 and -4.*
→ *Factor the expression as (x-3)(x-4)=0.*
→ *Set each factor equal to zero to get x=3 or x=4.*

Answer: $x = 3,\ x = 4$

3. Solve the quadratic equation by factoring.

$x^2 - 9 = 0$

→ *Recognize the difference of squares pattern.*
→ *Factor as (x-3)(x+3)=0.*
→ *Set each factor equal to zero to get x=3 or x=-3.*

Answer: $x = 3,\ x = -3$

4. Solve the quadratic equation by factoring.

$2x^2 + 7x + 3 = 0$

→ *Multiply a and c to get 6, then find two numbers that multiply to 6 and add to 7, which are 1 and 6.*
→ *Rewrite the middle term and factor by grouping to get (2x+1)(x+3)=0.*
→ *Set each factor equal to zero to get x=-1/2 or x=-3.*

Answer: $x = -\frac{1}{2},\ x = -3$

5. Solve the quadratic equation by factoring.

$x^2 + 4x = 0$

→ *Factor out the common factor x to get x(x+4)=0.*
→ *Set each factor equal to zero.*
→ *Solve to find x=0 or x=-4.*

Answer: $x = 0,\ x = -4$

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6. Solve the quadratic equation by factoring.

$3x^2 - 12x + 9 = 0$

→ *Factor out the greatest common factor 3 to get 3(x^2-4x+3)=0.*
→ *Factor the trinomial as 3(x-1)(x-3)=0.*
→ *Set each factor equal to zero to get x=1 or x=3.*

Answer: $x = 1,\ x = 3$

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7. Solve the quadratic equation by factoring.

$x^2 - 10x + 25 = 0$

→ *Recognize the perfect square trinomial pattern.*
→ *Factor as (x-5)^2=0.*
→ *Solve to find the double root x=5.*

Answer: $x = 5$

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8. Solve the quadratic equation by factoring.

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

→ *Multiply a and c to get -12, then find two numbers that multiply to -12 and add to -1, which are -4 and 3.*
→ *Rewrite the middle term and factor by grouping to get (3x-2)(2x+1)=0.*
→ *Set each factor equal to zero to get x=2/3 or x=-1/2.*

Answer: $x = \frac{2}{3},\ x = -\frac{1}{2}$

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9. Solve the quadratic equation by factoring.

$x^2 + 2x - 15 = 0$

→ *Find two numbers that multiply to -15 and add to 2, which are 5 and -3.*
→ *Factor the expression as (x+5)(x-3)=0.*
→ *Set each factor equal to zero to get x=-5 or x=3.*

Answer: $x = 3,\ x = -5$

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10. Solve the quadratic equation by factoring.

$4x^2 - 25 = 0$

→ *Recognize the difference of squares pattern with (2x)^2 and 5^2.*
→ *Factor as (2x-5)(2x+5)=0.*
→ *Set each factor equal to zero to get x=5/2 or x=-5/2.*

Answer: $x = \frac{5}{2},\ x = -\frac{5}{2}$