I. Model Problems.
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IV. Answer Key

Web Resources

Factoring Quadratic Equations
Different Methods for Solving Quadratic Equations
Quadratic Equation Grapher

We Recommend Meta Calculator- A Free Graphing Calculator

Free Graph Paper : www.mathworksheetsgo.com/paper/

Solving Quadratic Equations by Factoring

I. Model Problems

In the following examples you will solve quadratic equations by factoring.

Example 1: **Solve: $x^2 - 3x - 20 = 8$.**

Write down the equation.

Rearrange so the equation is equal to zero ($ax^2 + bx + c = 0$).

$$x^2 - 3x - 20 = 8$$
$$-8 \quad -8$$

Factor.

Apply Zero Product Principle: if the product is zero, either one of the factors or both of the factors equal zero.

$$x^2 - 3x - 28 = 0$$
$$(x + 4)(x - 7) = 0$$

Apply additive inverse.

$$(x + 4) = 0 \qquad (x - 7) = 0$$
$$-4 \quad -4 \qquad +7 \quad +7$$
$$x = -4 \qquad x = 7$$

The solutions are: $x = -4, 7$

Example 1: **Solve: $x^2 - 3x - 20 = 8$.**

Write down the equation.

Factor.

Apply Zero Product Principle: if the product is zero, either one of the factors or both of the factors equal zero.

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

Apply additive inverse.

$$(3x + 3) = 0 \qquad (x - 2) = 0$$
$$-3 \quad -3 \qquad +2 \quad +2$$

Apply multiplicative inverse.

$$3x/3 = -3/3 \qquad x = 2$$

The solutions are: $x = -1, 2$

Example 3: **Solve: $3x^2 - 27x + 54 = 0$.**

Write down the equation.

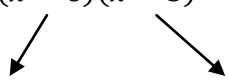
First check that equation is set equal to zero.

Next check to see if you can factor a GCF.

Finish factoring.

Apply Zero Product Principle. We can ignore the factor of 3- it does not equal 0.

$$3x^2 - 27x + 54 = 0$$
$$3(x^2 - 9x + 18) = 0$$
$$3(x - 6)(x - 3) = 0$$



Apply additive inverse.

$$(x - 6) = 0 \qquad (x - 3) = 0$$
$$+6 \quad +6 \qquad +3 \quad +3$$
$$x = 6 \qquad x = 3$$

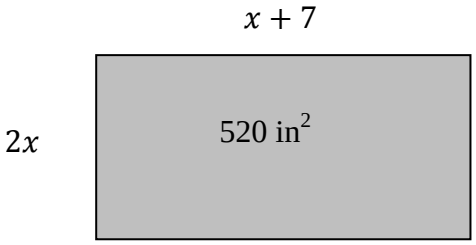
The solutions are: $x = 3, 6$

II. Practice solving quadratics by factoring.

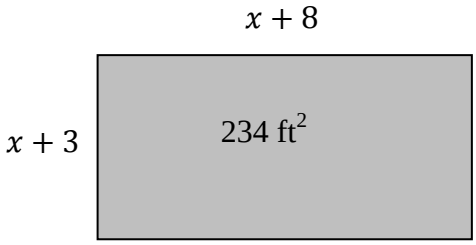
1. $x^2 + 5x + 6 = 0$
2. $x^2 - x - 12 = 0$
3. $a^2 - 9a + 18 = 0$
4. $t^2 + 2t - 19 = 5$
5. $x^2 + 15x + 30 = -6$
6. $d^2 + 10d = -16$
7. $2x^2 + 6x + 4 = 0$
8. $3a^2 - 12a = 15$
9. $c^2 - 6c + 9 = 0$
10. $5x^2 - 14x + 8 = 0$
11. $h^2 - 7 = 9$
12. $7t^2 - 15t + 6 = 4$
13. $d^2 + 10d + 18 = -7$
14. $4x^2 - 46 = 3$
15. $11a^2 - 32a + 17 = 20$
16. $4n^2 + 12n + 9 = 0$
17. $5x^2 - 11x - 3 = 2x + 3$
18. $6t^2 - 15t - 36 = 0$
19. $12h^2 + 40h + 32 = 0$

III. Challenge Problems

20. $3x^3 + 21x^2 + 36x = 0$
21. $2a^3 - 18a^2 + 36a = 0$
22. $x^4 - 13x^2 + 36 = 0$
23. $x^4 + 3x^2 - 4 = 0$
24. Find the dimensions of the rectangle below.



25. Find the dimensions of the rectangle below.



IV. Answer Key

1. $x = -2\ , -3$
2. $x = -3{,}4$
3. $a = 3{,}6$
4. $t = -6{,}4$
5. $x = -3, -12$
6. $d = -8, -2$
7. $x = -2, -1$
8. $a = 5, -1$
9. $c = 3$
10. $x = \frac{4}{5}, 2$
11. $h = -4{,}4$
12. $t = \frac{1}{7}, 2$
13. $d = -5$
14. $x = -\frac{7}{2}, \frac{7}{2}$
15. $a = -\frac{1}{11}, 3$
16. $n = -\frac{3}{2}$
17. $x = -\frac{2}{5}, 3$
18. $t = -\frac{3}{2}, 4$
19. $h = -\frac{4}{3}, -2$
20. $x = -4, -3{,}0$
21. $x = 0{,}3{,}6$
22. $x = -2{,}2, -3{,}3$
23. $x = -1{,}1$
24. 26 inches by 20 inches
25. 13 feet by 18 feet