

## Solve Quadratics by Factoring:

Answer

Steps to solve by Factoring:

1. Start with the equation in the form  $ax^2 + bx + c$  set equal to zero
2. Factor the left hand side (assuming zero is on the right)
3. Set each factor equal to zero
4. Solve each equation to find the values of  $x$  (also known as the zeroes) /roots/ solutions

Try It!

Solve each equation by factoring.

1)  $x^2 - 9x + 18 = 0$

3, 6

2)  $x^2 + 5x + 4 = 0$

-1, -4

3)  $n^2 - 64 = 0$

8, -8

4)  $b^2 + 5b = 0$

-5, 0

5)  $35n^2 + 22n + 3 = 0$

$-3/7, -1/5$

6)  $15b^2 + 4b - 4 = 0$

$-2/3, 2/5$

7)  $7p^2 - 38p - 24 = 0$

$-4/7, 6$

8)  $3x^2 + 14x - 49 = 0$

$7/3, -7$

9)  $3k^2 - 18k - 21 = 0$

7, -1

10)  $6k^2 - 42k + 72 = 0$

3, 4

11)  $x^2 = 11x - 28$

7, 4

12)  $k^2 + 15k = -56$

-8, -7

Application:

1. Suppose that four times the square of a number equals 20 times that number. What is the number?

$$4x^2 = 20x$$

$$\frac{4x^2 - 20x}{4x} = \frac{0}{4x}$$

$$x - 5 = 0$$

$$x = 5$$

2. The area of a square is numerically equal to five times its perimeter.

Find the length of a side of the square. Area =  $x^2$  Perimeter =  $4x$

$$x^2 = 5(4x)$$

$$x^2 - 20x = 0$$

$$x - 20 = 0$$

$$x = 20$$

3. When 10 is subtracted from the square of a number the result is three times the number. What is the positive solution?

$$5$$

$$x^2 - 10 = 3x$$

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

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

$$\begin{array}{r} -10 \\ -5 \times 2 \\ -3 \end{array}$$

4. Bailey is 3 years older than Louie. The product of their ages is 40.

How old is Louie?

$$B = L + 3$$

Louie is 5

$$L(L + 3) = 40$$

$$L^2 + 3L - 40 = 0$$

$$(L - 5)(L + 8) = 0$$

$$L = 5, L = -8$$

$$\begin{array}{r} -40 \\ -5 \times 8 \\ 3 \end{array}$$

$$\begin{array}{r} 40 \\ 5 \times 20 \\ 4 \times 10 \\ 5 \times 8 \end{array}$$

5. The product of two consecutive even integers is 48. Find the integers

$$\begin{array}{l} x - 6 = 0 \quad x + 8 = 0 \\ \boxed{x = 6} \quad x = 8 \\ \text{First 4} \\ \text{plug in: } \begin{array}{l} x+2 \\ 6+2 \end{array} \end{array}$$

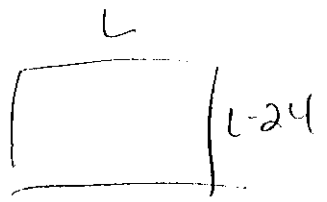
$$x(x + 2) = 48$$

$$x^2 + 2x = 48$$

$$x^2 + 2x - 48 = 0$$

$$\begin{array}{r} -48 \\ -6 \times 8 \\ 2 \end{array}$$

6. The shorter side of a rectangle is 24 less than the longer side. The area is 81. Find the length and the width.



$$L(L - 24) = 81$$

$$L^2 - 24L - 81 = 0$$

$$(L - 27)(L + 3) = 0$$

$$L = 27, L = -3$$

$$\begin{array}{r} -81 \\ -27 \times 3 \\ -24 \end{array}$$

$$\begin{array}{r} 81 \\ 27 \times 3 \end{array}$$