

8.7 Writing Quadratic Functions.

Express each equation in factored form and identify the solution of the equation.

1) $x^2 + 11x + 24 = 0$

$$(x + 3)(x + 8) = 0$$

Factor form.

$$\begin{array}{r} x + 3 = 0 \\ -3 \quad -3 \\ \hline x = -3 \end{array}$$

$$\begin{array}{r} x + 8 = 0 \\ -8 \quad -8 \\ \hline x = -8 \end{array}$$

2) $x^2 - 10x + 24 = 0$

$$(x - 6)(x - 4) = 0$$

Factor form.

$$\begin{array}{r} x - 6 = 0 \\ +6 \quad +6 \\ \hline x = 6 \end{array}$$

$$\begin{array}{r} x - 4 = 0 \\ +4 \quad +4 \\ \hline x = 4 \end{array}$$

3) $x^2 + 6x - 7 = 0$

$$(x + 7)(x - 1) = 0$$

$$\begin{array}{r} x + 7 = 0 \\ -7 \quad -7 \\ \hline x = -7 \end{array}$$

$$\begin{array}{r} x - 1 = 0 \\ +1 \quad +1 \\ \hline x = 1 \end{array}$$

4) $x^2 - 2x - 15 = 0$

$$(x + 3)(x - 5) = 0$$

$$\begin{array}{r} x + 3 = 0 \\ -3 \quad -3 \\ \hline x = -3 \end{array}$$

$$\begin{array}{r} x - 5 = 0 \\ +5 \quad +5 \\ \hline x = 5 \end{array}$$

$$5) \quad x^2 - 10x + 9 = 0$$

$$(x - 1)(x - 9) = 0$$

$$\begin{array}{r} x - 1 = 0 \\ \hline x = 1 \end{array} \quad \begin{array}{r} x - 9 = 0 \\ \hline x = 9 \end{array}$$

$$6) \quad x^2 + x - 72 = 0$$

$$(x + 9)(x - 8) = 0$$

$$x + 9 = 0$$

$$x - 8 = 0$$

$$\begin{array}{r} -9 - 9 \\ \hline x = -9 \end{array} \quad \begin{array}{r} +8 + 8 \\ \hline x = 8 \end{array}$$

The solutions of a quadratic equation are given. Write the quadratic equation in factored form and in standard form.

7) $8, -6$ factored form.

$$(x - 8)(x + 6) = 0$$

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$$x^2 + 6x - 8x - 48$$

$$(x^2 - 2x - 48) \text{ standard form.}$$

8) $7, 2$

$$(x - 7)(x - 2) = 0$$

$$x^2 - 2x - 7x + 14$$

$$(x^2 - 9x + 14)$$

$$9) -4, 7$$

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

$$x^2 - 7x + 4x - 28$$

$$x^2 - 3x - 28$$

$$10) 5, -5$$

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

$$~~x^2 - 5x + 5x - 25~~$$

$$x^2 - 25$$

$$11) 3, 2$$

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

$$x^2 - 2x - 3x + 6$$

$$x^2 - 5x + 6$$

$$12) -2, -6$$

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

$$x^2 + 2x + 6x + 12$$

$$x^2 + 8x + 12$$

$$13) -4, 2$$

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

$$x^2 - 2x + 4x - 8$$

$$x^2 + 2x - 8$$

$$14) 2, 3$$

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

$$x^2 - 3x - 2x + 6$$

$$x^2 - 5x + 6$$

$$15) \quad -4, -4$$

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

$$x^2 + 4x + 4x + 16$$

$$x^2 + 8x + 16$$

$$(x+4)^2$$

$$x^2 + 8x + 16$$

$$16) \quad -2, 2$$

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

$$x^2 - 2x + 2x - 4$$

$$x^2 - 4$$

$$f(x) = ax^2 + bx + c = 0 \quad \text{Quadratic function.}$$

$$\underline{ax^2 + bx + c =} \quad \text{Quadratic expression}$$

$$ax^2 + bx + c = 0 \quad \text{Quadratic equation.}$$

$$1) \quad x^2 - 15x - 154$$

$$(x+7)(x-22)$$

$$\begin{array}{r} x+7=0 \\ -7-7 \\ \hline x=-7 \end{array}$$

$$\begin{array}{r} x-22=0 \\ +22+22 \\ \hline x=22 \end{array}$$