

NAME: \_\_\_\_\_ PERIOD: \_\_\_\_\_ DATE: \_\_\_\_\_

# Homework Problem Set

Use the quadratic formula to solve each equation.

1. Solve for  $z$ :  $z^2 - 3z - 8 = 0$ .

$$a = 1, b = -3, c = -8$$

$$z = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-8)}}{2(1)}$$

$$= \frac{3 \pm \sqrt{41}}{2}$$

2. Solve for  $q$ :  $2q^2 - 8 = 3q$

$$a = 2, b = -3, c = -8$$

$$q = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-8)}}{2(2)}$$

$$= \frac{3 \pm \sqrt{73}}{4}$$

3. Solve for  $m$ :  $\frac{1}{3}m^2 + 2m + 8 = 5$ .

$$a = \frac{1}{3}, b = 2, c = 3$$

$$m = \frac{-2 \pm \sqrt{2^2 - 4\left(\frac{1}{3}\right)(3)}}{2\left(\frac{1}{3}\right)}$$

$$= \frac{-2 \pm \sqrt{0}}{\frac{2}{3}} = -3$$

4. Determine the error in Sergio's work below. Then determine the correct answers.

$$0 = 3x^2 - 4x - 5$$

$$x = \frac{-4 \pm \sqrt{(-4)^2 - 4(3)(-5)}}{2(3)}$$

$$x = \frac{-4 \pm \sqrt{16 + 60}}{6}$$

$$x = \frac{-4 \pm \sqrt{76}}{6} = \frac{-4 \pm 2\sqrt{19}}{6} = \frac{-2 \pm \sqrt{19}}{3}$$

$$x = \frac{-2 + \sqrt{19}}{3} \text{ or } x = \frac{-2 - \sqrt{19}}{3}$$

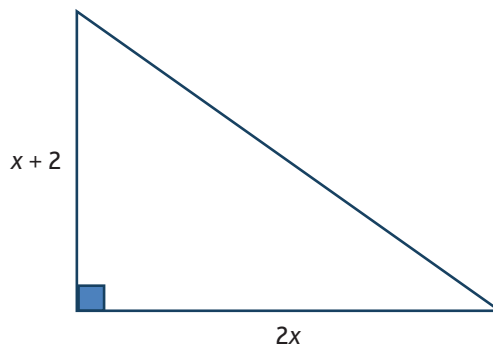
Sergio didn't use  $-b$  in the formula. His final answer should be

$$x = \frac{2 + \sqrt{19}}{3} \text{ or } x = \frac{2 - \sqrt{19}}{3}$$

Solve these quadratic equations, using a different method for each: solve by factoring, solve by completing the square, and solve using the quadratic formula. Before starting, indicate which method you will use for each.

<p>5. Method <u>Factoring</u></p> $3x^2 + 13x - 10 = 0$ $3x^2 - 2x + 15x - 10 = 0$ $x(3x - 2) + 5(3x - 2) = 0$ $(3x - 2)(x + 5) = 0$ $x = \frac{2}{3} \text{ or } x = -5$	<p>6. Method <u>Completing the square</u></p> $x^2 - 12x + 28 = 0$ $(x - 6)^2 + 28 - 36 = 0$ $(x - 6)^2 = 8$ $x - 6 = \pm\sqrt{8}$ $x = 6 \pm 2\sqrt{2}$	<p>7. Method <u>Quadratic Formula</u></p> $2x^2 - 9x - 9 = 0$ $a = 2, b = -9, c = -9$ $x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(-9)}}{2(2)}$ $x = \frac{9 \pm \sqrt{81 + 72}}{4}$ $x = \frac{9 \pm \sqrt{153}}{4}$ $x = \frac{9 \pm 3\sqrt{17}}{4}$
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8. **Geometry Connection** Determine the base and height of the right triangle below. Its area is  $8 \text{ cm}^2$ .



$$A = \frac{1}{2} \cdot \text{base} \cdot \text{height}$$

$$8 = \frac{1}{2} \cdot (2x) \cdot (x + 2)$$

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

$$2x^2 + 4x - 16 = 0$$

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

$$x = 2 \text{ or } x = -4$$

Since length can never be negative the correct value for  $x$  is 2. The height is 4 and the base is 4.

## Practice Exercises

Use the quadratic formula to solve each equation.

9.  $x^2 - 2x = 12 \rightarrow a = \underline{1}$ ,  $b = \underline{-2}$ ,  $c = \underline{-12}$  (Watch the negatives.)

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

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-12)}}{2(1)} =$$
$$\frac{2 \pm \sqrt{52}}{2} = \frac{2 \pm \sqrt{4(13)}}{2} = \frac{2 \pm 2\sqrt{13}}{2} =$$

$$\underline{1 \pm \sqrt{13}}$$

10.  $\frac{1}{2}r^2 - 6r = 2 \rightarrow a = \underline{\frac{1}{2}}$ ,  $b = \underline{-6}$ ,  $c = \underline{-2}$  (Did you remember the negative?)

$$\frac{1}{2}r^2 - 6r - 2 = 0$$

$$r = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(\frac{1}{2})(-2)}}{2(\frac{1}{2})} =$$

$$\frac{6 \pm \sqrt{36+4}}{1} = 6 \pm \sqrt{4(10)} =$$

$$\underline{6 \pm 2\sqrt{10}}$$

11.  $2p^2 + 8p = 7 \rightarrow a = \underline{2}$ ,  $b = \underline{8}$ ,  $c = \underline{-7}$

$$2p^2 + 8p - 7 = 0$$

$$p = \frac{-8 \pm \sqrt{8^2 - 4(2)(-7)}}{2(2)} =$$

$$\frac{-8 \pm \sqrt{64+56}}{4} = \frac{-8 \pm \sqrt{4(30)}}{4} =$$

$$\frac{-8 \pm 2\sqrt{30}}{4} = \frac{-4 \pm \sqrt{30}}{2}$$

12.  $2y^2 + 3y - 5 = 4 \rightarrow a = \underline{2}$ ,  $b = \underline{3}$ ,  $c = \underline{-9}$

$$2y^2 + 3y - 9 = 0$$

$$y = \frac{-3 \pm \sqrt{3^2 - 4(2)(-9)}}{2(2)} = \frac{-3 \pm \sqrt{9+72}}{4} = \frac{-3 \pm \sqrt{81}}{4} = \frac{-3 \pm 9}{4} = \frac{3}{2} \text{ or } -3$$

**Spiral REVIEW—Exponents Rules**

Simplify each expression. Your resulting expression should have no negative exponents.

13.  $x^3 \cdot x^8 = x^{11}$

14.  $2^4 \cdot 2^5 = 2^9$

15.  $12^2 \cdot 12^{15} = 12^{17}$

16.  $\frac{x^5}{x^2} = x^3$

17.  $\frac{2^4}{2^5} = \frac{1}{2}$

18.  $\frac{x^2y^3}{xy^5} = \frac{x}{y^2}$

19.  $\left(\frac{x^5}{x^2}\right)^0 = 1$

20.  $(xy^0z^2)^2 = x^2z^4$

21.  $\frac{x^0y^3}{xy^0} = \frac{y^3}{x}$

22.  $(x^3)^4 = x^{12}$

23.  $(3^52^7)^3 = 3^{15}2^{21}$

24.  $(x^2y^3)^5 = x^{10}y^{15}$

$$25. \frac{x^{-3} \cdot x^8}{x^5 \cdot x^{-4}} = \underline{x^4}$$

$$\frac{x^5}{x}$$

$$26. \left(\frac{x^2}{y}\right)^{-3} = \underline{\frac{x^6}{y^3}}$$

$$\frac{x^{-6}}{y^{-3}}$$

$$27. -5x^{-2}y^3 = \underline{\frac{-5y^3}{x^2}}$$

$$28. \left(\frac{4x^5y}{16xy^{-2}}\right)^{-1} = \underline{\frac{4}{x^4y^3}}$$

$$\frac{4^{-1}x^{-5}y^{-1}}{16^{-1}x^{-1}y^2} = \frac{16x}{4x^5y^3}$$

$$29. 5x^2y^3(2x^{-3}y^4z) = \underline{\frac{10y^7z}{x}}$$

$$10x^{-1}y^7z$$

$$30. 6x^0 \cdot 7x^3 = \underline{42x^3}$$

$$31. \frac{4x^7}{2x^{-2}} = \underline{2x^9}$$

$$32. 6(xyz)^0 = \underline{6}$$

$$33. \frac{ab^3c^4}{a^0b^{11}c^{-4}} = \underline{\frac{ac^8}{b^8}}$$