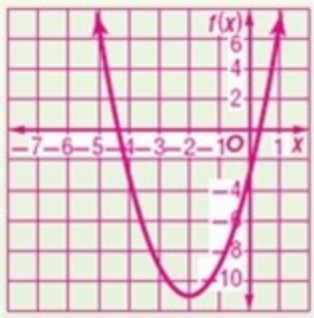
Mid-Chapter Quiz: Lessons 4-1 through 4-4

1. Find the y-intercept, the equation of the axis of symmetry, and the x-coordinate of the vertex for $f(x) = 2x^2 + 8x - 3$. Then graph the function by making a table of values.

ANSWER:

y-intercept = –3; axis of symmetry $x = -2$; x-coordinate of vertex = –2



2. Determine whether $f(x) = 5 - x^2 + 2x$ has a maximum or a minimum value. Then find this maximum or minimum value and state the domain and range of the function.

ANSWER:

max.; 6; D = {all real numbers};
$\mathbb{R} = \{f(x) | f(x) \leq 6\}$

3. **MULTIPLE CHOICE** For which equation is the axis of symmetry $x = 5$?

A $f(x) = x^2 - 5x + 3$

B $f(x) = x^2 - 10x + 7$

C $f(x) = x^2 + 10x - 3$

D $f(x) = x^2 + 5x + 2$

ANSWER:

B

4. **PHYSICAL SCIENCE** From 4 feet above the ground, Maya throws a ball upward with a velocity of 18 feet per second. The height $h(t)$ of the ball t seconds after Maya throws the ball is given by $h(t) = -16t^2 + 18t + 4$. Find the maximum height reached by the ball and the time that this height is reached.

ANSWER:

9.0625 feet at 0.5625 seconds

5. Solve $3x^2 - 17x + 5 = 0$ by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located.

ANSWER:

between 0 and 1, and between 5 and 6

Use a quadratic equation to find two real numbers that satisfy each situation, or show that no such numbers exist.

6. Their sum is 15, and their product is 36.

ANSWER:

3 and 12

7. Their sum is 7, and their product is 15.

ANSWER:

Let x, be the first number. Then $7 - x$ is the other number. $x(7 - x) = 15$; $-x^2 + 7x - 15 = 0$. Since the graph of the related function does not intersect the x-axis, this equation has no real solutions. Therefore, no such numbers exist.

Mid-Chapter Quiz: Lessons 4-1 through 4-4

8. **MULTIPLE CHOICE** Using the graph of the function $f(x) = x^2 + 6x - 7$, what are the solutions to the equation $x^2 + 6x - 7 = 0$?

F $-1, 6$

G $1, -6$

H $-1, 7$

J $1, -7$

ANSWER:
J

9. **BASEBALL** A baseball is hit upward with a velocity of 40 feet per second. Ignoring the height of the baseball player, how long does it take for the ball to fall to the ground? Use the formula $h(t) = v_0t - 16t^2$ where $h(t)$ is the height of an object in feet, v_0 is the object's initial velocity in feet per second, and t is the time in seconds.

ANSWER:
2.5 seconds

Solve each equation by factoring.

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

ANSWER:
$\{-3, 4\}$

11. $3x^2 + 7x + 2 = 0$

ANSWER:
$\left\{-2, -\frac{1}{3}\right\}$

12. $x^2 - 2x - 15 = 0$

ANSWER:
$\{-3, 5\}$

13. $2x^2 + 5x - 3 = 0$

ANSWER:
$\left\{-3, \frac{1}{2}\right\}$

14. Write a quadratic equation in standard form with roots -6 and $\frac{1}{4}$.

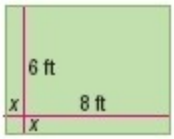
ANSWER:
$0 = 4x^2 + 23x - 6$

15. **TRIANGLES** Find the dimensions of a triangle if the base is $\frac{2}{3}$ the measure of the height and the area is 12 square centimeters.

ANSWER:
base = 4 cm, height = 6 cm

Mid-Chapter Quiz: Lessons 4-1 through 4-4

16. **PATIO** Eli is putting a cement slab in his backyard. The original slab was going to have dimensions of 8 feet by 6 feet. He decided to make the slab larger by adding x feet to each side. The area of the new slab is 120 square feet.



a. Write a quadratic equation that represents the area of the new slab.

b. Find the new dimensions of the slab.

ANSWER:

a. $120 = x^2 + 14x + 48$

b. 12 feet by 10 feet

Simplify.

17. $\sqrt{-81}$

ANSWER:

$9i$

18. $\sqrt{-25x^4y^5}$

ANSWER:

$5x^2y^2i\sqrt{y}$

19. $(15-3i)-(4-12i)$

ANSWER:

$11 + 9i$

20. i^{37}

ANSWER:

i

21. $(5-3i)(5+3i)$

ANSWER:

34

22. $\dfrac{3-i}{2+5i}$

ANSWER:

$\dfrac{1}{29} - \dfrac{17}{29}i$

23. The impedance in one part of a series circuit is $3 + 4j$ ohms and the impedance in another part of the circuit is $6 - 7j$ ohms. Add these complex numbers to find the total impedance in the circuit.

ANSWER:

$9 - 3j$ ohms