Complete parts *a*–*c* for each quadratic function.

a. Find the *y*-intercept, the equation of the axis of symmetry, and the *x*-coordinate of the vertex.

b. Make a table of values that includes the vertex.

c. Use this information to graph the function.

1. $f(x) = x^2 + 4x - 7$
2. $f(x) = -2x^2 + 5x$
3. $f(x) = -x^2 - 6x - 9$

1–3. See Chapter 4 Answer Appendix.

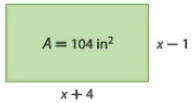
Determine whether each function has a maximum or minimum value. State the maximum or minimum value of each function.

4. $f(x) = x^2 + 10x + 25$ **min.; 0**
5. $f(x) = -x^2 + 6x$ **max.; 9**

Solve each equation using the method of your choice. Find exact solutions.

6. $x^2 - 8x - 9 = 0$ **−1, 9**
7. $-4.8x^2 + 1.6x + 24 = 0$ $\frac{1 \pm \sqrt{181}}{6}$
8. $12x^2 + 15x - 4 = 0$ $\frac{-15 \pm \sqrt{417}}{24}$
9. $x^2 - 7x - \frac{17}{4} = 0$ $\frac{7 \pm \sqrt{66}}{2}$
10. $4x^2 + x = 3$ $-1, \frac{3}{4}$
11. $-9x^2 + 40x + 84 = 0$ $-\frac{14}{9}, 6$

15. The rectangle below has an area of 104 square inches. Find the value of x and the dimensions of the rectangle. **$x = 9$; 8 inches by 13 inches**



Simplify.

16. $(3 - 4i) - (9 - 5i)$ **$-6 + i$**
17. $\frac{4i}{4 - i}$ $-\frac{4}{17} + \frac{16}{17}i$

18. **MULTIPLE CHOICE** Which value of c makes the trinomial $x^2 - 12x + c$ a perfect square trinomial? **H**

F 6

G 12

H 36

J 144

Complete parts *a*–*c* for each quadratic equation.

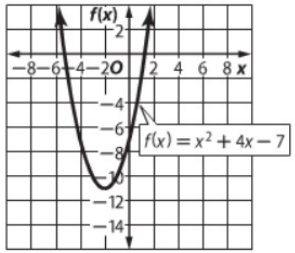
Practice Test

1a. *y*-intercept : −7; axis of symmetry: $x = -2$; *x*-coordinate of vertex: −2

1b.

x	f(x)
−4	−7
−3	−10
−2	−11
−1	−10
0	−7

1c.

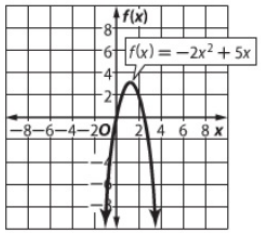


2a. *y*-intercept: 0; axis of symmetry: $x = \frac{5}{4}$; *x*-coordinate of vertex: $\frac{5}{4}$

2b.

x	f(x)
0	0
1	3
$\frac{5}{4}$	$\frac{25}{8}$
2	2
3	−3

2c.

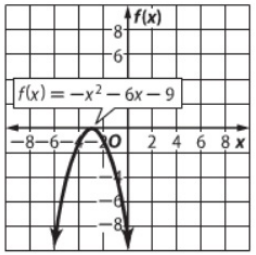


3a. *y*-intercept : −9; axis of symmetry: $x = -3$; *x*-coordinate of vertex: −3

3b.

x	f(x)
−5	−4
−4	−1
−3	0
−2	−1
−1	−4

3c.



11. $-9x^2 + 40x + 84 = 0$ $-\frac{14}{9}$, 6

12. **PHYSICAL SCIENCE** Parker throws a ball off the top of a building. The building is 350 feet high and the initial velocity of the ball is 30 feet per second. Find out how long it will take the ball to hit the ground by solving the equation $-16t^2 - 30t + 350 = 0$.
about 3.83 seconds

13. **MULTIPLE CHOICE** Which equation below has roots at -6 and $\frac{1}{5}$? C

A $0 = 5x^2 - 29x - 6$

B $0 = 5x^2 + 31x + 6$

C $0 = 5x^2 + 29x - 6$

D $0 = 5x^2 - 31x + 6$

14a. about 1.4 seconds and 5.6 seconds

14. **PHYSICS** A ball is thrown into the air vertically with a velocity of 112 feet per second. The ball was released 6 feet above the ground. The height above the ground t seconds after release is modeled by $h(t) = -16t^2 + 112t + 6$.

a. When will the ball reach 130 feet? b. See margin.

b. Will the ball ever reach 250 feet? Explain.

c. In how many seconds after its release will the ball hit the ground? about 7 seconds

Complete parts *a–c* for each quadratic equation.

a. Find the value of the discriminant.

b. Describe the number and type of roots.

c. Find the exact solution by using the Quadratic Formula. 19–21. See margin.

19. $6x^2 + 7x = 0$

20. $5x^2 = -6x + 1$

21. $2x^2 + 5x - 8 = -13$

Write each quadratic function in vertex form. Then identify the vertex, axis of symmetry, and direction of opening. 22–24. See Chapter 4 Answer Appendix.

22. $3x^2 + 6x = 2 + y$

23. $x^2 + 9x + \frac{81}{4} = y$

24. Graph the quadratic inequality $0 < -3x^2 + 4x + 1$

Solve each inequality by using a graph or algebraically.

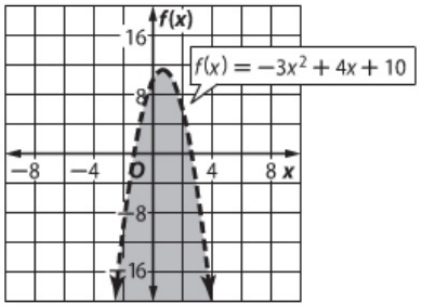
25. $x^2 + 6x > -5$ $\{x \mid x < -5 \text{ or } x > -1\}$

26. $4x^2 - 19x \leq -12$ $\left\{x \mid \frac{3}{4} \leq x \leq 4\right\}$

22. $y = 3(x + 1)^2 - 5$; vertex: $(-1, -5)$; axis of symmetry: $x = -1$; opens up

23. $y = \left(x + \frac{9}{2}\right)^2$; vertex: $\left(-\frac{9}{2}, 0\right)$; axis of symmetry: $x = -\frac{9}{2}$; opens up

24.



19a. 49

19b. 2 rational roots

19c. $-\frac{7}{6}$, 0

20a. 56

20b. 2 irrational roots

20c. $\frac{-3 \pm \sqrt{14}}{5}$

21a. -15

21b. 2 complex roots

21c. $\frac{-5 \pm i\sqrt{15}}{4}$

(9) $x^2 + 10x + 25$

$25 - 50 + 25 = 0$

Minimum: 0

$a = 1$

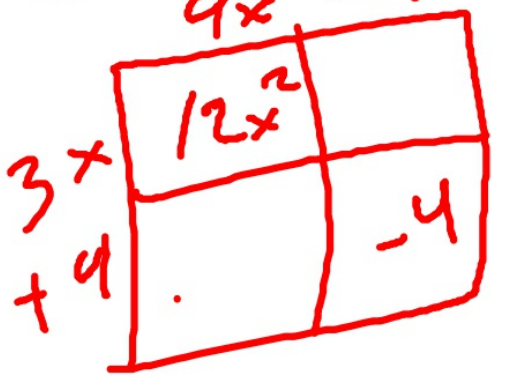
$b = 10$

$c = 25$

$x = \frac{-10}{2(1)} = -5$

$x = -5$

(8) $12x^2 + 15x - 4 = 0$



7

$-10(-4.8x^2 + 1.6x + 24) = 0$

$\frac{48x^2}{8} - \frac{16x}{8} - \frac{240}{8} = 0$

$\frac{6x^2}{2} - \frac{2x}{2} - \frac{30}{2} = \frac{0}{2}$

$3x^2 - x - 15 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$