

**Practice: 3-2 WS****/28** Form G

## Quadratic Functions

Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of each function.

1.  $y = 4x^2 - 2$

2.  $y = -x^2 + 4x - 6$

3.  $y = x^2 + 4x + 5$

4.  $y = x^2 - 8x + 12$

5.  $y = -6x^2 + 3$

6.  $y = -3x^2 + 12x - 7$

7.  $y = 2x^2 + x - 14$

8.  $y = -6x^2 - 8x + 10$

9.  $y = -2x^2 + 3x + 6$

Graph each function. Label the axis of symmetry and the vertex.

10.  $f(x) = x^2 - 2x - 1$

11.  $f(x) = -2x^2 + 8x - 10$

12.  $f(x) = 2x^2 - 12x + 19$

13.  $f(x) = -3x^2 - 6x - 8$

14.  $f(x) = 2x^2 + 2x + 1$

15.  $f(x) = -2x^2 + 12x - 2$

16. A punter kicked the football into the air with an upward velocity of 62 ft/s. Its height  $h$  in feet after  $t$  seconds is given by the function  $h = -16t^2 + 62t + 2$ . What is the maximum height the ball reaches? How long will it take the football to reach the maximum height? How long does it take for the ball to hit the ground?
17. A disc is thrown into the air with an upward velocity of 20 ft/s. Its height  $h$  in feet after  $t$  seconds is given by the function  $h = -16t^2 + 20t + 6$ . What is the maximum height the disc reaches? How long will it take the disc to reach the maximum height? How long does it take for the disc to be caught 3 feet off the ground?

**Practice** (continued)

Form G

## Quadratic Functions

Graph each function. Label the axis of symmetry and the vertex.

18.  $f(x) = \frac{3}{2}x^2 + 6x + 2$

19.  $f(x) = \frac{2}{3}x^2 + 8x + 5$

20.  $f(x) = \frac{1}{4}x^2 + 4x - 10$

21.  $f(x) = \frac{1}{2}x^2 - 12x + 11$

22.  $f(x) = -\frac{3}{4}x^2 + 2x + 3$

23.  $f(x) = \frac{5}{4}x^2 - 4x + 1$

**Open-Ended** For Exercises 24–26, give an example of a quadratic function with the given characteristic(s).

24. Its graph opens up and has its vertex at  $(0, -3)$ .25. Its graph lies entirely below the  $x$ -axis.26. Its vertex lies on the  $x$ -axis and the graph opens down.

27. A fountain that is 5 feet tall sprays water into the air with an upward velocity of 22 ft/s. What function gives the height  $h$  of the water in feet  $t$  seconds after it is sprayed upward? What is the maximum height of the water?

28. The parabola shown at the right is of the form  $y = ax^2 + bx + c$ .

a. What is the  $y$ -intercept?

b. What is the axis of symmetry?

c. Use the formula  $x = \frac{-b}{2a}$  to find  $b$ .

d. What is the equation of the parabola?

