

2.2**Practice A**

In Exercises 1–12, graph the function. Label the vertex and axis of symmetry.

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

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

3. $g(x) = (x + 2)^2 + 4$

4. $h(x) = (x - 3)^2 - 2$

5. $y = -3(x - 1)^2 + 3$

6. $f(x) = 4(x + 2)^2 - 1$

7. $y = x^2 - 2x + 1$

8. $y = 3x^2 + 6x + 1$

9. $y = -3x^2 + 6x + 4$

10. $f(x) = -x^2 + 6x - 3$

11. $g(x) = -x^2 + 2$

12. $f(x) = 5x^2 - 4$

13. Explain why you cannot use the axes of symmetry to distinguish between the quadratic functions $y = 3x^2 + 12x + 1$ and $y = x^2 + 4x + 5$.

14. Which function represents the parabola with the narrowest graph? Explain your reasoning.

A. $y = x^2 + 3$

B. $y = 0.5x^2 - 2$

C. $y = 3(x + 2)^2$

D. $y = -2x^2 + 1$

In Exercises 15–18, find the minimum or maximum value of the function. Describe the domain and range of the function, and where the function is increasing and decreasing.

15. $y = 5x^2 + 2$

16. $y = 4x^2 - 3$

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

18. $f(x) = -2x^2 + 4x + 9$

19. The number of customers in a grocery store is modeled by the function $y = -x^2 + 10x + 50$, where y is the number of customers in the store and x is the number of hours after 7:00 A.M.

a. At what time is the maximum number of customers in the store?

b. How many customers are in the store at the time in part (a)?

2.2 Practice B

In Exercises 1–12, graph the function. Label the vertex and axis of symmetry.

1. $f(x) = -3(x - 2)^2 - 4$

2. $f(x) = 3(x + 1)^2 + 5$

3. $g(x) = -\frac{1}{2}(x + 3)^2 + 2$

4. $h(x) = \frac{1}{2}(x - 2)^2 - 1$

5. $y = 0.6(x - 2)^2$

6. $f(x) = 0.25x^2 - 1$

7. $y = -x^2 + 8$

8. $y = 7x^2 + 2$

9. $y = 1.5x^2 - 6x + 3$

10. $f(x) = 0.5x^2 + 3x - 1$

11. $y = \frac{5}{2}x^2 - 5x + 1$

12. $f(x) = -\frac{3}{2}x^2 - 6x - 4$

13. A quadratic function is decreasing to the left of $x = 3$ and increasing to the right of $x = 3$. Will the vertex be the highest or lowest point on the graph of the parabola? Explain.

14. The graph of which function has the same axis of symmetry as the graph of $y = 2x^2 - 8x + 3$? Explain your reasoning.

A. $y = -4x^2 + 16x - 5$

B. $y = 2x^2 + 8x + 7$

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

D. $y = -6x^2 + 10x - 1$

In Exercises 15–18, find the minimum or maximum value of the function. Describe the domain and range of the function, and where the function is increasing and decreasing.

15. $y = 3x^2 + 12$

16. $y = -x^2 - 6x$

17. $y = -\frac{1}{3}x^2 - 2x + 3$

18. $f(x) = \frac{1}{2}x^2 + 3x + 7$

19. The height of a bridge is given by $y = -3x^2 + x$, where y is the height of the bridge (in miles) and x is the number of miles from the base of the bridge.

a. How far from the base of the bridge does the maximum height occur?

b. What is the maximum height of the bridge?