4.1 EXERCISES

SKILL PRACTICE

1. **VOCABULARY** Copy and complete: The graph of a quadratic function is called a(n) __?__.

2. **WRITING** *Describe* how to determine whether a quadratic function has a minimum value or a maximum value.

EXAMPLE 1
on p. 236
for Exs. 3–12

USING A TABLE Copy and complete the table of values for the function.

3. $y = 4x^2$

x	−2	−1	0	1	2
y	?	?	?	?	?

4. $y = -3x^2$

x	−2	−1	0	1	2
y	?	?	?	?	?

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

x	−4	−2	0	2	4
y	?	?	?	?	?

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

x	−6	−3	0	3	6
y	?	?	?	?	?

MAKING A GRAPH Graph the function. *Compare* the graph with the graph of $y = x^2$.

7. $y = 3x^2$

8. $y = 5x^2$

9. $y = -2x^2$

10. $y = -x^2$

11. $f(x) = \frac{1}{3}x^2$

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

EXAMPLE 2
on p. 237
for Exs. 13–18

13. $y = 5x^2 + 1$

14. $y = 4x^2 + 1$

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

16. $g(x) = -2x^2 - 5$

17. $f(x) = \frac{3}{4}x^2 - 5$

18. $g(x) = -\frac{1}{5}x^2 - 2$

ERROR ANALYSIS *Describe* and correct the error in analyzing the graph of $y = 4x^2 + 24x - 7$.

19.

The x-coordinate of the vertex is:

$x = \frac{b}{2a} = \frac{24}{2(4)} = 3$ ✗

20.

The y-intercept of the graph is the value of c, which is 7. ✗

EXAMPLE 3
on p. 238
for Exs. 21–32

MAKING A GRAPH Graph the function. Label the vertex and axis of symmetry.

21. $y = x^2 + 2x + 1$

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

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

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

25. $g(x) = -x^2 - 2x - 1$

26. $f(x) = -6x^2 - 4x - 5$

27. $y = \frac{2}{3}x^2 - 3x + 6$

28. $y = -\frac{3}{4}x^2 - 4x - 1$

29. $g(x) = -\frac{3}{5}x^2 + 2x + 2$

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

31. $y = \frac{8}{5}x^2 - 4x + 5$

32. $y = -\frac{5}{3}x^2 - x - 4$