



Skill Building

2.5

In Problems 7–18, match each graph to one of the following functions:

A. $y = x^2 + 2$

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

C. $y = |x| + 2$

D. $y = -|x| + 2$

E. $y = (x - 2)^2$

F. $y = -(x + 2)^2$

G. $y = |x - 2|$

H. $y = -|x + 2|$

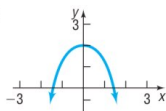
I. $y = 2x^2$

J. $y = -2x^2$

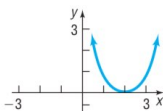
K. $y = 2|x|$

L. $y = -2|x|$

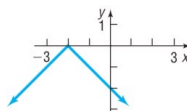
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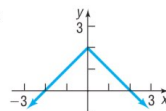
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9.

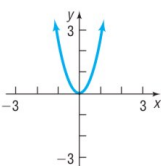


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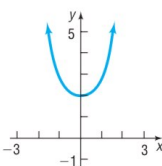


100 CHAPTER 2 Functions and Their Graphs

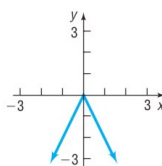
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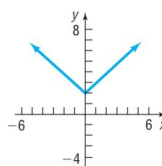
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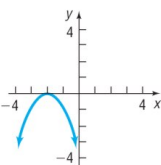
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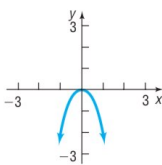
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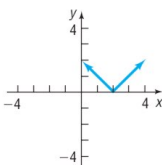
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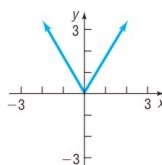
16.



17.



18.



In Problems 19–26, write the function whose graph is the graph of $y = x^3$, but is:

19. Shifted to the right 4 units

20. Shifted to the left 4 units

21. Shifted up 4 units

22. Shifted down 4 units

23. Reflected about the y -axis24. Reflected about the x -axis

25. Vertically stretched by a factor of 4

26. Horizontally stretched by a factor of 4

In Problems 27–30, find the function that is finally graphed after each of the following transformations is applied to the graph of $y = \sqrt{x}$ in the order stated.

27. (1) Shift up 2 units
(2) Reflect about the x -axis
(3) Reflect about the y -axis

28. (1) Reflect about the x -axis
(2) Shift right 3 units
(3) Shift down 2 units

29. (1) Reflect about the x -axis
(2) Shift up 2 units
(3) Shift left 3 units

30. (1) Shift up 2 units
(2) Reflect about the y -axis
(3) Shift left 3 units

31. If $(1, 3)$ is a point on the graph of $y = f(x)$, which of the following points must be on the graph of $y = -f(x)$?

- (a) $(6, 3)$ (b) $(6, -3)$
(c) $(3, -6)$ (d) $(-3, 6)$

32. If $(3, 6)$ is a point on the graph of $y = f(x)$, which of the following points must be on the graph of $y = f(-x)$?

- (a) $(6, 3)$ (b) $(6, -3)$
(c) $(3, -6)$ (d) $(-3, 6)$

33. If $(1, 3)$ is a point on the graph of $y = f(x)$, which of the following points must be on the graph of $y = 2f(x)$?

- (a) $(1, \frac{3}{2})$ (b) $(2, 3)$
(c) $(1, 6)$ (d) $(\frac{1}{2}, 3)$

34. If $(4, 2)$ is a point on the graph of $y = f(x)$, which of the following points must be on the graph of $y = f(2x)$?

- (a) $(4, 1)$ (b) $(8, 2)$
(c) $(2, 2)$ (d) $(4, 4)$

35. Suppose that the x -intercepts of the graph of $y = f(x)$ are -5 and 3 .

- (a) What are the x -intercepts of the graph of $y = f(x + 2)$?
(b) What are the x -intercepts of the graph of $y = f(x - 2)$?

36. Suppose that the x -intercepts of the graph of $y = f(x)$ are -8 and 1 .

- (a) What are the x -intercepts of the graph of $y = f(x + 4)$?
(b) What are the x -intercepts of the graph of $y = f(x - 3)$?