3.4 EXERCISES

PRACTICE

Sketch the graphs of the following functions. Pay particular attention to intercepts, if any, and locate these accurately. See Examples 1 through 4.

1. $f(x) = -\frac{x}{2}$
2. $g(x) = 2x^2$
3. $F(x) = x^{\frac{1}{2}}$
4. $h(x) = x^{-1}$
5. $p(x) = -\frac{2}{x}$
6. $q(x) = -\sqrt[3]{x}$
7. $G(x) = -|x|$
8. $k(x) = \frac{1}{x^3}$
9. $G(x) = \frac{\sqrt{x}}{2}$
10. $H(x) = 0.5x^{\frac{1}{3}}$
11. $r(x) = 3|x|$
12. $p(x) = -\frac{1}{x^2}$
13. $W(x) = \frac{x^4}{16}$
14. $k(x) = \frac{x^3}{9}$
15. $h(x) = 2\sqrt[3]{x}$
16. $d(x) = 2x^5$
17. $S(x) = 4x^{-2}$
18. $f(x) = -x^2$
19. $r(x) = \frac{\sqrt[3]{x}}{3}$
20. $s(x) = \frac{|x|}{3}$
21. $t(x) = \frac{x^6}{4}$
22. $f(x) = 2[\![x]\!]$
23. $P(x) = -[\![x]\!]$
24. $m(x) = \left[\!\left[\frac{x}{2}\right]\!\right]$
25. $f(x) = \begin{cases} 3-x & \text{if } x < -2 \\ x^{\frac{1}{3}} & \text{if } x \geq -2 \end{cases}$
26. $g(x) = \begin{cases} -x^2 & \text{if } x \leq 1 \\ x^2 & \text{if } x > 1 \end{cases}$
27. $r(x) = \begin{cases} \frac{1}{x} & \text{if } x < 1 \\ -x & \text{if } x > 1 \end{cases}$
28. $p(x) = \begin{cases} x+1 & \text{if } x < -2 \\ x^3 & \text{if } -2 \leq x < 3 \\ -1-x & \text{if } x \geq 3 \end{cases}$
29. $q(x) = \begin{cases} -1 & \text{if } x \in \mathbb{Z} \\ 1 & \text{if } x \notin \mathbb{Z} \end{cases}$
30. $s(x) = \begin{cases} \frac{x^2}{3} & \text{if } x < 0 \\ -\frac{x^2}{3} & \text{if } x \geq 0 \end{cases}$
31. $v(x) = \begin{cases} x^2 & \text{if } -1 \leq x \leq 1 \\ |x| & \text{if } x < -1 \text{ or } x > 1 \end{cases}$
32. $M(x) = \begin{cases} x & \text{if } x \in \mathbb{Z} \\ -x & \text{if } x \notin \mathbb{Z} \end{cases}$
33. $t(x) = \begin{cases} x^4 & \text{if } x \leq 1 \\ [\![x]\!] & \text{if } x > 1 \end{cases}$
34. $N(x) = \begin{cases} x^2 & \text{if } x \in \mathbb{Z} \\ [\![x]\!] & \text{if } x \notin \mathbb{Z} \end{cases}$

35. $h(x)=\begin{cases}-|x| & \text{if } x<2\\ [\![x]\!] & \text{if } x\geq 2\end{cases}$

36. $u(x)=\begin{cases}[\![x]\!] & \text{if } x\leq 1\\ 2x-2 & \text{if } x>1\end{cases}$

Match the following functions to their graphs.

37. $f(x)=-2x^4$

38. $f(x)=-\dfrac{7}{9x^4}$

39. $f(x)=-4\left[\!\left[\dfrac{x}{4}\right]\!\right]$

40. $f(x)=-\dfrac{7\sqrt[3]{x}}{3}$

41. $f(x)=-\dfrac{8}{9}|x|$

42. $f(x)=-4\sqrt{x}$

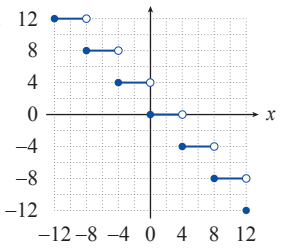
43. $f(x)=\dfrac{3}{7}|x|$

44. $f(x)=\begin{cases}-4x-12 & \text{if } x\leq -3\\ \dfrac{5}{10}x^2 & \text{if } x>-3\end{cases}$

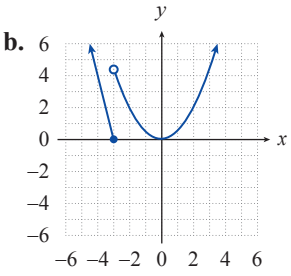
45. $f(x)=\begin{cases}\dfrac{-1}{3}|x| & \text{if } x<2\\ \left[\!\left[\dfrac{x}{2}\right]\!\right] & \text{if } x\geq 2\end{cases}$

46. $f(x)=\begin{cases}-\dfrac{1}{3}|x| & \text{if } x<2\\ \dfrac{x}{2} & \text{if } x\geq 2\end{cases}$

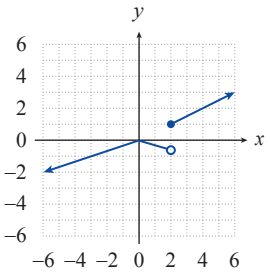
a.



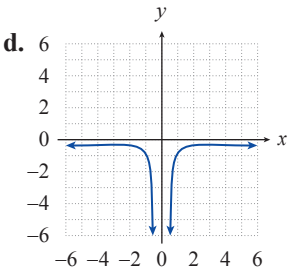
b.



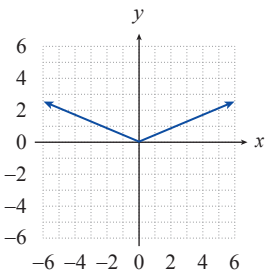
c.



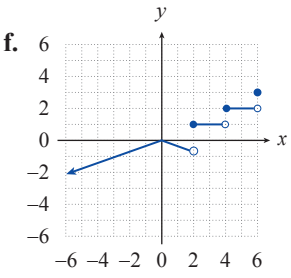
d.



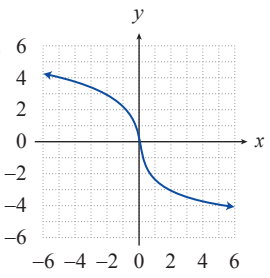
e.



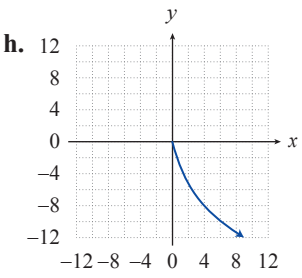
f.



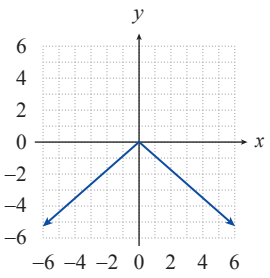
g.



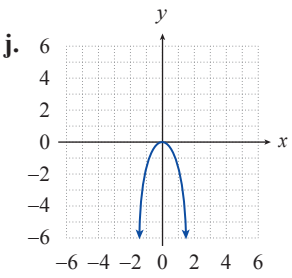
h.



i.



j.



TECHNOLOGY

Use a graphing utility to graph the following functions. Experiment with different viewing windows until you obtain a sketch that seems to capture the meaningful parts of the graph.

47. $f(x) = 10x^5 - x^3$

48. $g(x) = x^5 + x^2$

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

50. $g(x) = \sqrt{x} - x^2$

51. $f(x) = \sqrt{x} + 3x - 1$

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