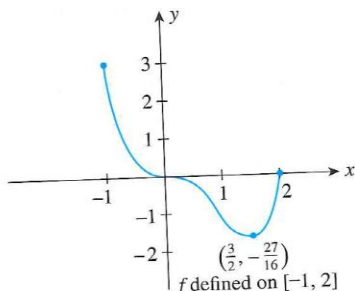
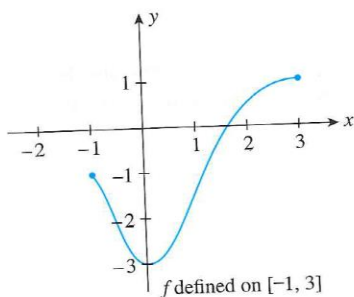


7.



8.



In Exercises 9–38, find the absolute maximum value and the absolute minimum value, if any, of each function.

9.  $f(x) = 2x^2 + 3x - 4$     10.  $g(x) = -x^2 + 4x + 3$

11.  $h(x) = x^{1/3}$     12.  $f(x) = x^{2/3}$

13.  $f(x) = \frac{1}{1+x^2}$     14.  $f(x) = \frac{x}{1+x^2}$

15.  $f(x) = x^2 - 2x - 3$  on  $[-2, 3]$

16.  $g(x) = x^2 - 2x - 3$  on  $[0, 4]$

17.  $f(x) = -x^2 + 4x + 6$  on  $[0, 5]$

18.  $f(x) = -x^2 + 4x + 6$  on  $[3, 6]$

19.  $f(x) = x^3 + 3x^2 - 1$  on  $[-3, 2]$

20.  $g(x) = x^3 + 3x^2 - 1$  on  $[-3, 1]$

21.  $g(x) = 3x^4 + 4x^3$  on  $[-2, 1]$

22.  $f(x) = \frac{1}{2}x^4 - \frac{2}{3}x^3 - 2x^2 + 3$  on  $[-2, 3]$

23.  $f(x) = \frac{x+1}{x-1}$  on  $[2, 4]$     24.  $g(t) = \frac{t}{t-1}$  on  $[2, 4]$

25.  $f(x) = 4x + \frac{1}{x}$  on  $[1, 4]$

26.  $f(x) = 9x - \frac{1}{x}$  on  $[1, 3]$

27.  $f(x) = \frac{1}{2}x^2 - 2\sqrt{x}$  on  $[0, 3]$

28.  $g(x) = \frac{1}{8}x^2 - 4\sqrt{x}$  on  $[0, 9]$

29.  $f(x) = \frac{1}{x}$  on  $(0, \infty)$     30.  $g(x) = \frac{1}{x+1}$  on  $(0, \infty)$

31.  $f(x) = 3x^{2/3} - 2x$  on  $[0, 3]$

32.  $g(x) = x^2 + 2x^{2/3}$  on  $[-2, 2]$

33.  $f(x) = x^{2/3}(x^2 - 4)$  on  $[-1, 2]$

34.  $f(x) = x^{2/3}(x^2 - 4)$  on  $[-1, 3]$

35.  $f(x) = \frac{x}{x^2 + 2}$  on  $[-1, 2]$

36.  $f(x) = \frac{1}{x^2 + 2x + 5}$  on  $[-2, 1]$

37.  $f(x) = \frac{x}{\sqrt{x^2 + 1}}$  on  $[-1, 1]$

38.  $g(x) = x\sqrt{4 - x^2}$  on  $[0, 2]$

39. A stone is thrown straight up from the roof of an 80-ft building. The height (in feet) of the stone at any time  $t$  (in seconds), measured from the ground, is given by

$$h(t) = -16t^2 + 64t + 80$$

What is the maximum height the stone reaches?

40. **MAXIMIZING PROFITS** Lynbrook West, an apartment complex, has 100 two-bedroom units. The monthly profit (in dollars) realized from renting out  $x$  apartments is given by

$$P(x) = -10x^2 + 1760x - 50,000$$

To maximize the monthly rental profit, how many units should be rented out? What is the maximum monthly profit realizable?

41. **STRIKE OUTS** The rate at which major league players were striking out in the years 2009 through 2013 is approximately

$$f(t) = 0.136t^2 + 0.127t + 18.1 \quad (0 \leq t \leq 4)$$

percent in year  $t$ , where  $t = 0$  corresponds to 2009.

a. What was the lowest rate of strikeouts over the years under consideration? When did it occur?

b. What was the highest rate of strikeouts. When did it occur?

Source: USA Today.

42. **END OF THE IPOD ERA** Apple introduced the first iPod in October 2001. Sales of the portable music player grew slowly in the early years but began to grow rapidly after 2005. But the iPod era is coming to a close. Smartphones with music and video players are replacing the iPod, along with the category of device it helped to create. Sales of the iPod worldwide from 2007 through 2011 (in millions) were approximately

$$N(t) = -2.65t^2 + 13.13t + 39.9 \quad (0 \leq t \leq 4)$$

in year  $t$ , where  $t = 0$  corresponds to 2007. Show that the worldwide sales of the iPod peaked sometime in 2009.

What was the approximate largest number of iPods sold worldwide from 2007 through 2011?

Source: Popular Mechanics.