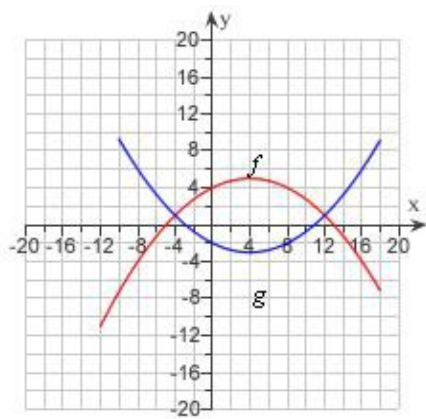


MULTIPLE CHOICE

1. The graphs of $f(x)$ and $g(x)$ are given. For what values of x is $f(x) = g(x)$?



- a. 4, 2
- b. 0
- c. -1
- d. -2, 5
- e. -4, 12

ANS: E PTS: 1 DIF: Medium REF: 1.1.4b
 MSC: Bimodal NOT: Section 1.1

2. Which of the following graphs is neither even nor odd?

- a. $f(x) = \frac{4x^2}{x^4 + 1}$
- b. $f(x) = 8x^3 + 10x^2 + 1$
- c. $f(x) = x^3 - 9x$

ANS: B PTS: 1 DIF: Medium REF: 1.1.77
 MSC: Bimodal NOT: Section 1.1

3. If the point $(7, 3)$ is on the graph of an even function, what other point must also be on the graph?

- a. $(-7, -3)$
- b. $(7, -3)$
- c. $(0, 0)$
- d. $(-7, 3)$
- e. None of these

ANS: D PTS: 1 DIF: Medium REF: 1.1.71a
 MSC: Bimodal NOT: Section 1.1

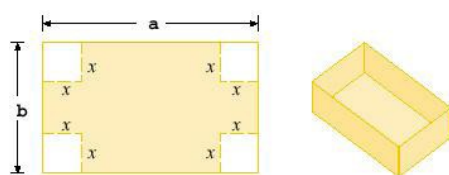
4. If $f(x) = x^2 - x + 6$, evaluate the difference quotient $\frac{f(a+h) - f(a)}{h}$.

- a. $2a - h - 6$
- b. $2a - 6$
- c. h
- d. $2a + h - 6$
- e. none of these

ANS: E PTS: 1 DIF: Medium REF: 1.1.28
 MSC: Bimodal NOT: Section 1.1

5. A box with an open top is to be constructed from a rectangular piece of card board with dimensions $b = 4$ in. by $a = 28$ in. by cutting out equal squares of side x at each corner and then folding up the sides as in the figure.

Express the volume V of the box as a function of x .



- a. $V(x) = x^3 - 64x^2 + 112x$
- b. $V(x) = 4x^3 + 32x^2 + 196x$
- c. $V(x) = 4x^3 + 64x^2 + 112x$
- d. $V(x) = x^3 - 32x^2 + 196x$
- e. $V(x) = 4x^3 - 64x^2 + 112x$

ANS: E PTS: 1 DIF: Medium REF: 1.1.63
 MSC: Bimodal NOT: Section 1.1

6. Find an expression for the function $y = f(x)$ whose graph is the bottom half of the parabola $x + (6 - y)^2 = 0$.

- a. $y = 6 - \sqrt{-x}$
- b. $y = 36 - \sqrt{-x}$
- c. $y = 6 + \sqrt{x}$
- d. $y = 36 - x^2$
- e. $y = 6 - x^2$

ANS: A PTS: 1 DIF: Medium REF: 1.1.53
 MSC: Bimodal NOT: Section 1.1

7. A rectangle has perimeter 14 m. Express the area of the rectangle as a function $A(l)$ of the length l of one of its sides.

- a. $A(l) = 7l - l^2$
- b. $A(l) = l - 7l^2$
- c. $A(l) = 14l - l^2$
- d. $A(l) = 14l + l^2$
- e. $A(l) = 7l + l^2$

ANS: A PTS: 1 DIF: Medium REF: 1.1.57
 MSC: Bimodal NOT: Section 1.1

8. If $f(x) = 4x^2 + 2$, find and simplify $\frac{f(1+h) - f(1)}{h}$, where $h \neq 0$.

- a. $2 + 4h^2$
- b. $4 + 8h$
- c. $4h$
- d. $8 + 4h$

ANS: D PTS: 1 DIF: Easy REF: 1.1.27
 MSC: Bimodal NOT: Section 1.1

9. Find the domain of the function.

$$f(x) = \frac{7x + 4}{x^3}$$

- a. $(-\infty, 0) \cup (0, \infty)$
- b. $\left(-\infty, -\frac{4}{7}\right) \cup \left(-\frac{4}{7}, \infty\right)$
- c. $\left(-\infty, \frac{4}{7}\right) \cup \left(\frac{4}{7}, \infty\right)$
- d. $(-\infty, 0)$

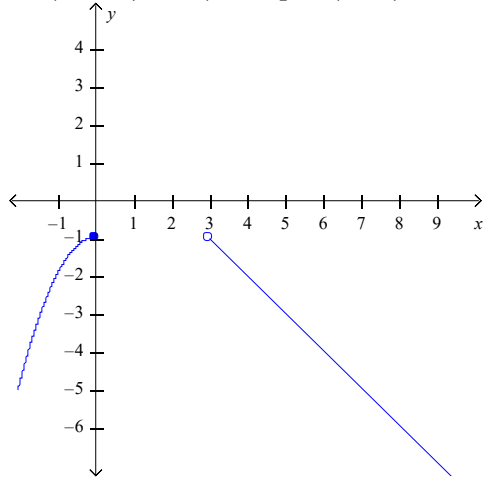
ANS: A PTS: 1 DIF: Easy REF: 1.1.31
 MSC: Bimodal NOT: Section 1.1

10. Find the domain and sketch the graph of the function. What is its range?

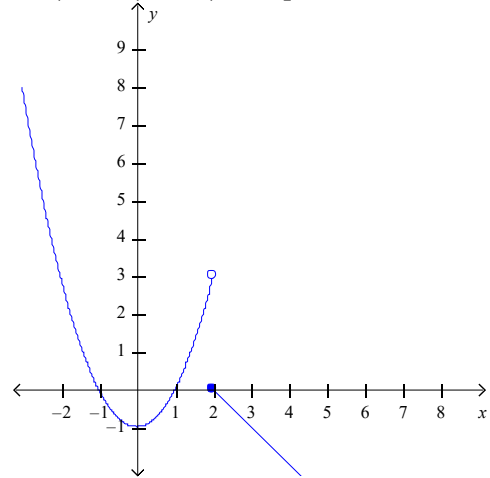
$$\begin{cases} -x+2 & \text{if } x \geq 2 \\ x^2-1 & \text{if } x < 2 \end{cases}$$

$f(x) =$

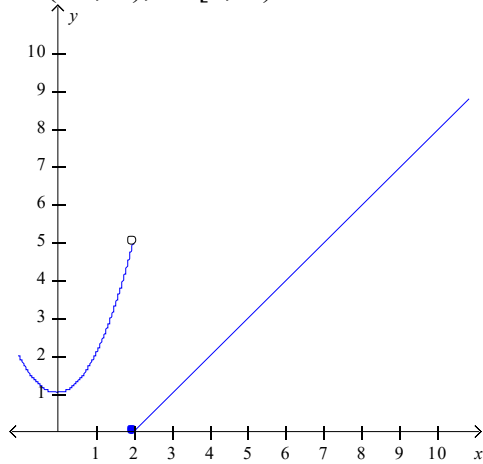
a. $D: (-\infty, \infty); R: (-\infty, 0] \cup (3, \infty)$



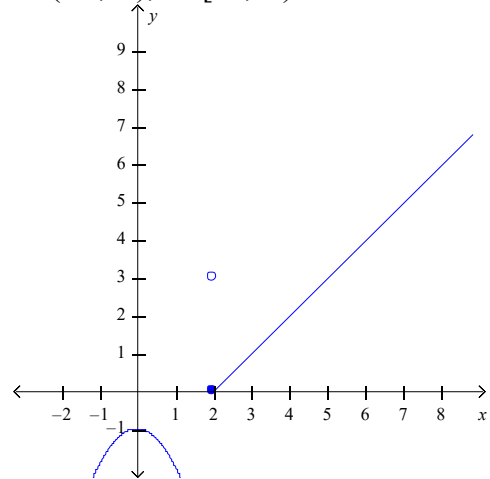
c. $D: (-\infty, \infty); R: (-\infty, 3]$



b. $D: (-\infty, \infty); R: [0, \infty)$



d. $D: (-\infty, \infty); R: [-1, \infty)$



ANS: C

PTS: 1

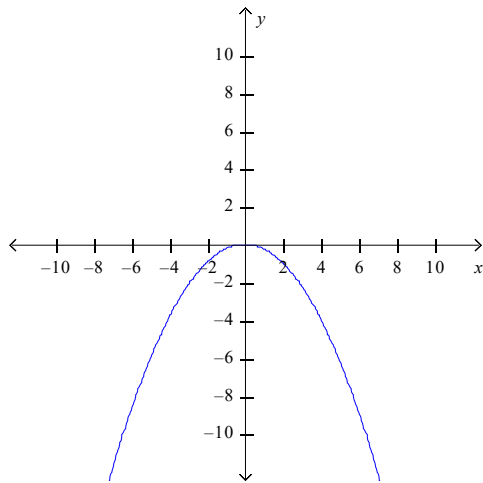
DIF: Medium

REF: 1.1.47

MSC: Bimodal

NOT: Section 1.1

11. Determine whether the function whose graph is given is even, odd, or neither.



- a. Even
- b. Neither
- c. Odd

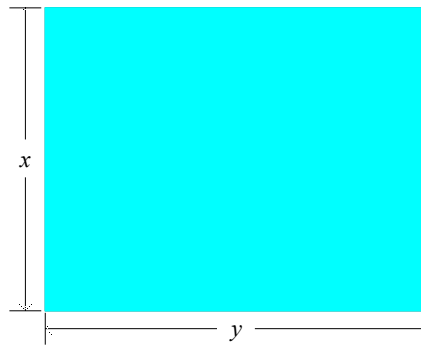
ANS: A PTS: 1 DIF: Medium REF: 1.1.69
 MSC: Bimodal NOT: Section 1.1

12. Find the domain of the function $f(x) = \frac{x}{-2 \sin x - 3}$.

- a. $[2, 3]$
- b. $[-3, -2]$
- c. $\left[-\frac{3}{2}, \infty\right)$
- d. $(-\infty, \infty)$

ANS: D PTS: 1 DIF: Easy REF: 1.1.42
 MSC: Bimodal NOT: Section 1.1

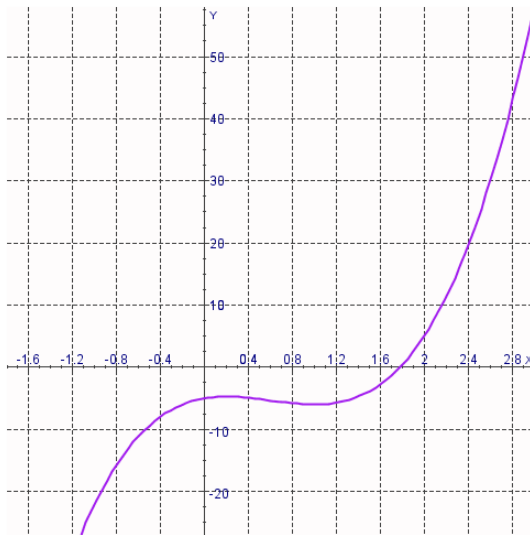
13. Sandy wishes to have a rectangular garden in her backyard. She has 40 ft of fencing with which to enclose her garden. Letting x denote the width of the garden, find a function f in the variable x that gives the area of the garden.



- a. $f(x) = 40x - x^2$, $0 < x < 20$
- b. $f(x) = 20x - x^2$, $0 < x < 20$
- c. $f(x) = 40x - x^2$, $0 < x < 40$
- d. $f(x) = 20x - x^2$, $0 < x < 40$

ANS: B PTS: 1 DIF: Medium REF: 1.1.61
 MSC: Bimodal NOT: Section 1.1

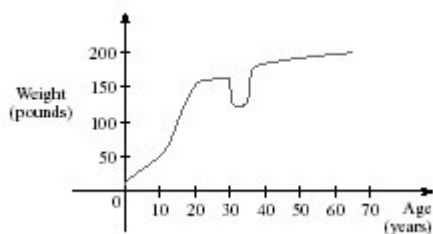
14. The graph of the function f is given. State the value of $f(-0.4)$.



- a. $f(-0.4) = 10$
- b. $f(-0.4) = 0$
- c. $f(-0.4) = -10$
- d. $f(-0.4) = 8$
- e. $f(-0.4) = -8$

ANS: E PTS: 1 DIF: Medium REF: 1.1.3b
 MSC: Bimodal NOT: Section 1.1

15. The graph shown gives the weight of a certain person as a function of age. Find the age at which the person started an exercise program.



- a. 20
- b. 54
- c. 38
- d. 30
- e. 35

ANS: D PTS: 1 DIF: Medium REF: 1.1.11
 MSC: Bimodal NOT: Section 1.1

16. In the function $f(x) = 2x + d$, what must be the value d , if $f(3) = 1$?

- a. $d = 7$
- b. $d = 5$
- c. $d = -5$
- d. $d = -1$
- e. $d = -7$

ANS: C PTS: 1 DIF: Medium REF: 1.1.25
 MSC: Bimodal NOT: Section 1.1

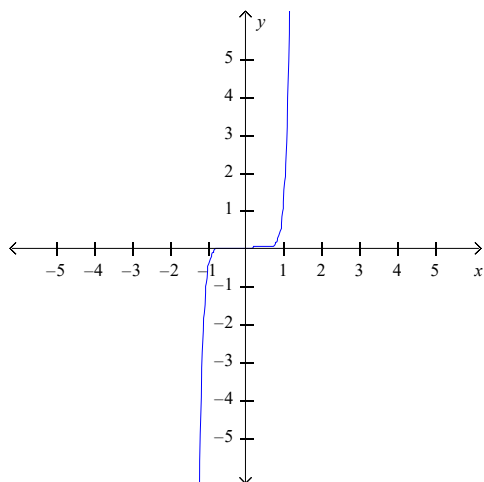
17. An open rectangular box with volume 2 m^3 has a square base. Express the surface area of the box as a function $S(x)$ of the length x of a side of the base.

- a. $S(x) = x^2 + \frac{8}{x^2}$
- b. $S(x) = 2x^2 + \frac{-2}{x^2}$
- c. $S(x) = x^2 + \frac{-2}{x^2}$
- d. $S(x) = 2x + \frac{-2}{x}$
- e. $S(x) = x^2 + \frac{8}{x}$

ANS: E PTS: 1 DIF: Medium REF: 1.1.61

MSC: Bimodal NOT: Section 1.1

18. What is the equation of this graph?



- a. $y = x^2$
- b. $y = \sqrt[3]{x}$
- c. $y = x^6$
- d. $y = x^{11}$
- e. $y = x^8$

ANS: D

PTS: 1

DIF: Medium

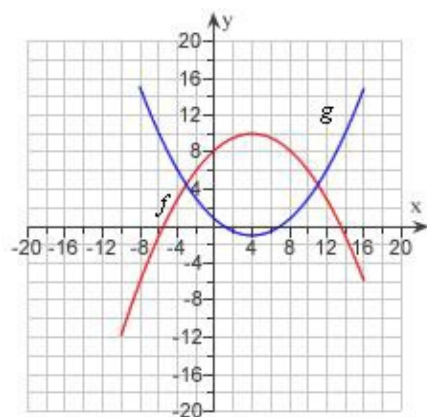
REF: 1.1.40

MSC: Bimodal

NOT: Section 1.1

NUMERIC RESPONSE

1. The graphs of $f(x)$ and $g(x)$ are given.
Find the values of $f(-4)$ and $g(3)$.



ANS: $f(-4) = 3, g(3) = -1$

PTS: 1 DIF: Medium REF: 1.1.4a
MSC: Numerical Response NOT: Section 1.1

2. Find the domain of the function.

$$f(x) = \frac{1}{3x-1}$$

$$\left\{ x \mid x \neq \frac{1}{3} \right\}$$

ANS:

PTS: 1 DIF: Medium REF: 1.1.31
MSC: Numerical Response NOT: Section 1.1

3. Determine whether f is even, odd, or neither.

$$f(x) = \frac{8x^2}{x^4 + 5}$$

ANS: even

PTS: 1 DIF: Medium REF: 1.1.74
MSC: Numerical Response NOT: Section 1.1

4. Find the domain of the function.

$$f(x) = \sqrt{36 - 2x^2}$$

ANS: $[-6, 6]$

PTS: 1 DIF: Medium REF: 1.1.38
MSC: Numerical Response NOT: Section 1.1

5. Find the domain of the function.

$$f(x) = \frac{6}{1 - e^x}$$

ANS: $(-\infty, 0) \cup (0, \infty)$

PTS: 1 DIF: Medium REF: 1.1.42
MSC: Numerical Response NOT: Section 1.1

6. Find the range of the function.

$$h(x) = \sqrt{4 - x^2}$$

ANS: $0 \leq h(x) \leq 2$

PTS: 1 DIF: Medium REF: 1.1.38
 MSC: Numerical Response NOT: Section 1.1

SHORT ANSWER

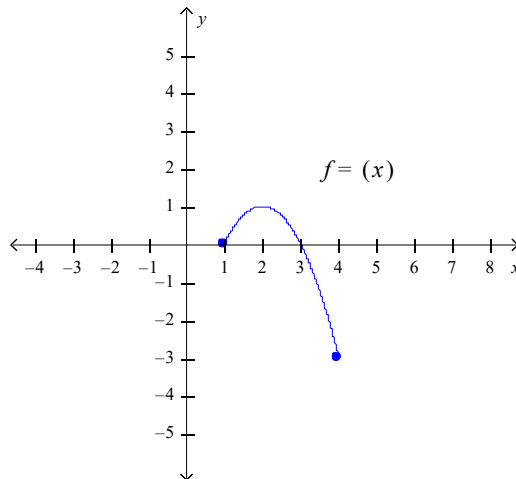
1. If $f(x) = \begin{cases} x^2 + 3 & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$

find $f(-4)$, $f(0)$, and $f(1)$.

ANS:
 $f(-4) = 19$, $f(0) = 3$, $f(1) = 1$.

PTS: 1 DIF: Easy REF: 1.1.25 MSC: Short Answer
 NOT: Section 1.1

2. Refer to the graph of the function f in the following figure.



- Find $f(1)$.
- Find the value of x for which (i) $f(x) = 1$ and (ii) $f(x) = 0$.
- Find the domain and range of f .

ANS:
a. 0
b. (i) 2 (ii) 1, 3
c. D : $[1, 4]$, R : $[-3, 1]$

PTS: 1 DIF: Easy REF: 1.1.3 MSC: Short Answer
 NOT: Section 1.1

3. Determine whether the function is even, odd, or neither.

$$f(x) = 5x^3 + 7x$$

ANS:

Odd

PTS: 1

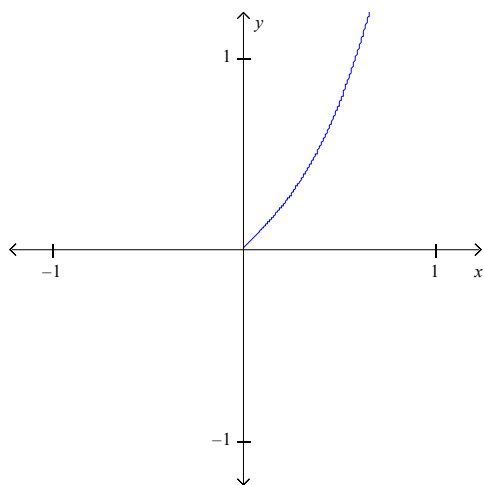
DIF: Medium

REF: 1.1.73

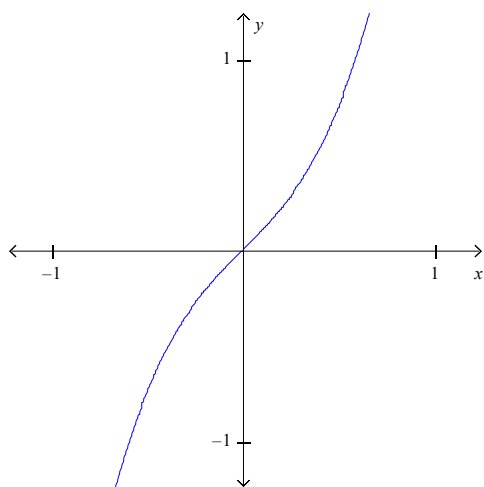
MSC: Short Answer

NOT: Section 1.1

4. The following figure shows a portion of the graph of a function f defined on the interval $[-1, 1]$. Sketch the complete graph of f if it is known f is odd.



ANS:



PTS: 1

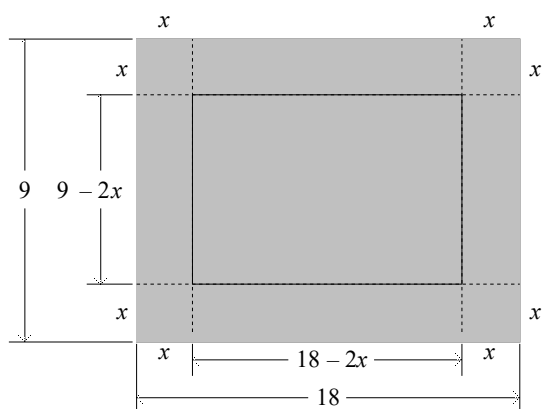
DIF: Medium

REF: 1.1.72

MSC: Short Answer

NOT: Section 1.1

5. By cutting away identical squares from each corner of a rectangular piece of cardboard and folding up the resulting flaps, an open box can be made. If the cardboard is 18 in. long and 9 in. wide and the square cutaways have dimensions of x in. by x in., find a function that gives the volume of the resulting box.



ANS:

$$V = 4x^3 - 54x^2 + 162x$$

PTS: 1

DIF: Medium

REF: 1.1.63

MSC: Short Answer

NOT: Section 1.1