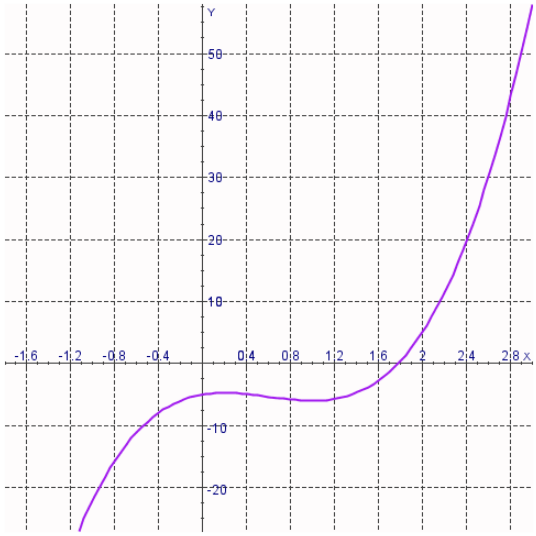
MULTIPLE CHOICE

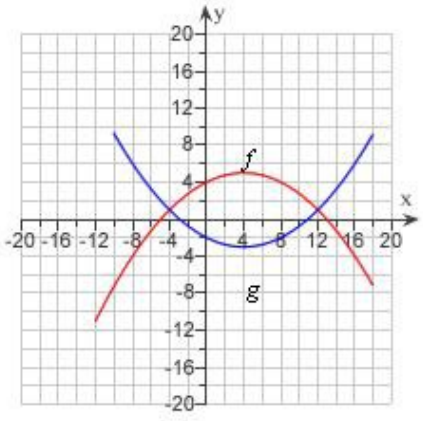
1. The graph of the function f is given. State the value of $f(-0.4)$.



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

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

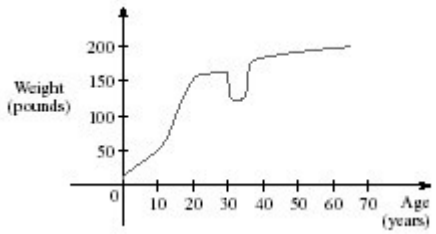


a. 4, 2

b. -1
c. 0
d. $-2, 5$
e. –4, 12

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

3. 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. 35
b. 38
c. 20
d. 54
e. 30

ANS: E PTS: 1 DIF: Medium REF: 1.1.9
MSC: Bimodal NOT: Section 1.1

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

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

ANS: A PTS: 1 DIF: Easy REF: 1.1.21
MSC: Bimodal NOT: Section 1.1

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

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

ANS: E PTS: 1 DIF: Medium REF: 1.1.22

MSC: Bimodal NOT: Section 1.1

6. Find the domain of the function.

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

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

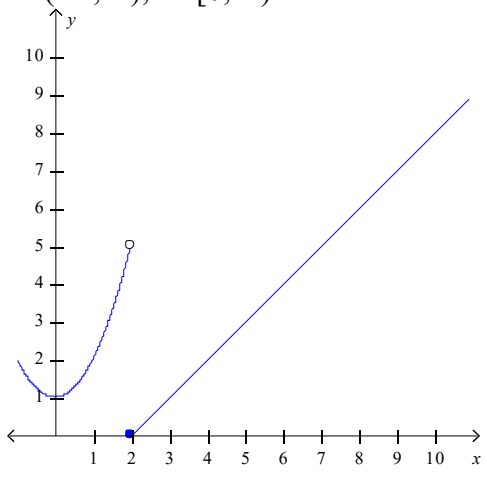
ANS: A PTS: 1 DIF: Easy REF: 1.1.25
MSC: Bimodal NOT: Section 1.1

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

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

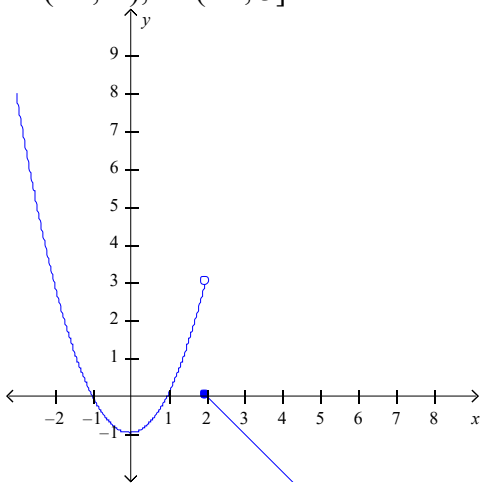
$f(x) =$

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

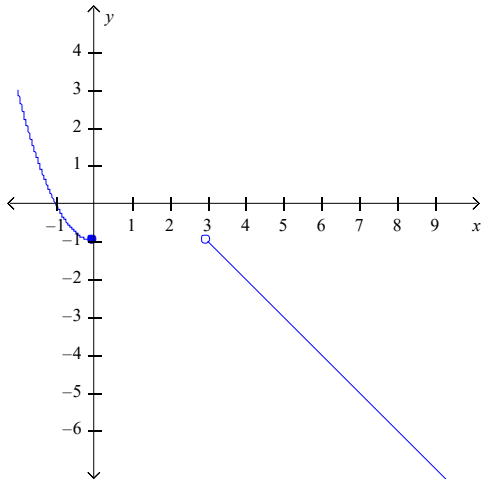


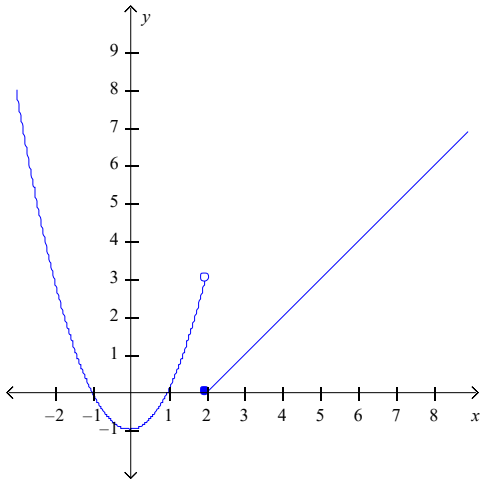
b. ***D***: $(-\infty, \infty)$; ***R***: $(-\infty, 0] \cup (3, \infty)$

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



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





ANS: C PTS: 1 DIF: Medium REF: 1.1.39
MSC: Bimodal NOT: Section 1.1

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

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

ANS: C PTS: 1 DIF: Medium REF: 1.1.45
MSC: Bimodal NOT: Section 1.1

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

ANS: E PTS: 1 DIF: Medium REF: 1.1.47
MSC: Bimodal NOT: Section 1.1

10. An open rectangular box with volume $2\ \text{m}^3$ 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. $S(x) = 2x^2 + \dfrac{-2}{x^2}$

b. $S(x) = x^2 + \dfrac{-2}{x^2}$

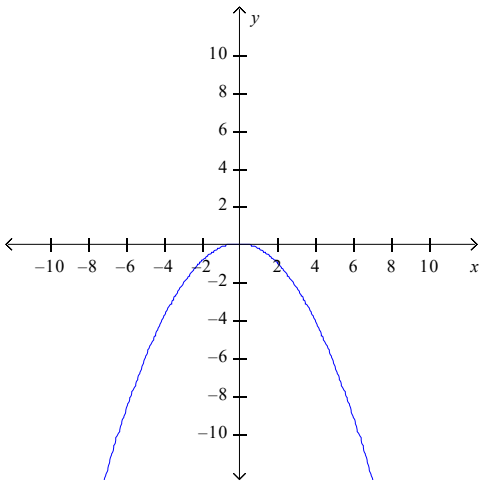
c. $S(x) = 2x + \dfrac{-2}{x}$

d. $S(x) = x^2 + \dfrac{8}{x}$

e. $S(x) = x^2 + \dfrac{8}{x^2}$

ANS: D PTS: 1 DIF: Medium REF: 1.1.51
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: 1.1.55
MSC: Bimodal NOT: Section 1.1

12. 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: A PTS: 1 DIF: Medium REF: 1.1.57a
MSC: Bimodal NOT: Section 1.1

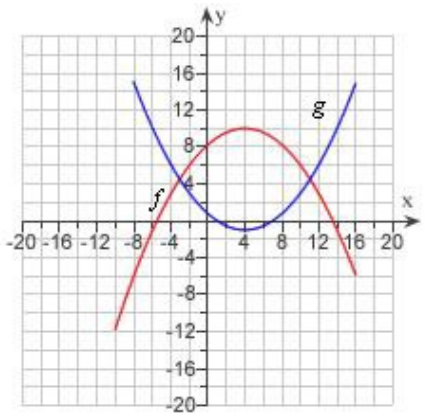
13. Which of the following graphs is neither even nor odd?

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

ANS: C PTS: 1 DIF: Medium REF: 1.1.60
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.

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

$$\left\{ x \middle| x \neq \frac{1}{3} \right\}$$

ANS:

PTS: 1 DIF: Medium REF: 1.1.26
MSC: Numerical Response NOT: Section 1.1

3. Find the domain of the function.

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

ANS: $[-6, 6]$

PTS: 1 DIF: Medium REF: 1.1.27
MSC: Numerical Response NOT: Section 1.1

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

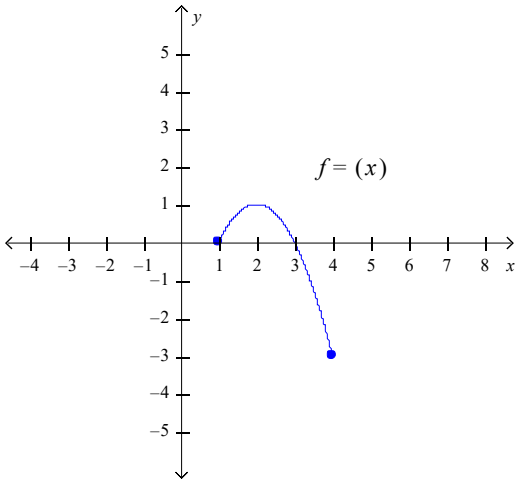
$f(x) = \dfrac{8x^2}{x^4 + 5}$

ANS: even

PTS: 1 DIF: Medium REF: 1.1.56
MSC: Numerical Response NOT: Section 1.1

SHORT ANSWER

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



a. Find $f(1)$.
b. Find the value of x for which (i) $f(x) = 1$ and (ii) $f(x) = 0$.
c. 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: 1.1.3a MSC: Short Answer
NOT: Section 1.1

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

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

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

PTS: 1 DIF: Easy REF: 1.1.19 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: 1.1.63 MSC: Short Answer
NOT: Section 1.1