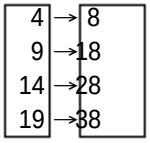
Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the relation represents a function. If it is a function, state the domain and range.

1)



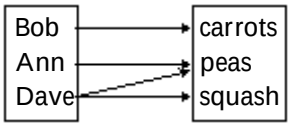
A) function
domain:{8, 18, 28, 38}
range: {4, 9, 14, 19}

B) function
domain: {4, 9, 14, 19}
range: {8, 18, 28, 38}

C) not a function

Answer: B

2)



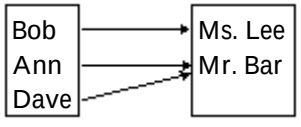
A) function
domain: {carrots, peas, squash}
range: {Bob, Ann, Dave}

B) function
domain: {Bob, Ann, Dave}
range: {carrots, peas, squash}

C) not a function

Answer: C

3)



A) function
domain: {Ms. Lee, Mr. Bar}
range: {Bob, Ann, Dave}

B) function
domain: {Bob, Ann, Dave}
range: {Ms. Lee, Mr. Bar}

C) not a function

Answer: B

4) {(-3, 6), (2, 3), (3, -3), (8, -1)}

A) function
domain: {6, 3, -3, -1}
range: {-3, 2, 3, 8}

B) function
domain: {-3, 2, 3, 8}
range: {6, 3, -3, -1}

C) not a function

Answer: B

5) {(-1, -3), (-2, -2), (-2, 0), (2, 2), (14, 4)}

A) function
domain: {-3, -2, 0, 2, 4}
range: {-1, 2, -2, 14}

B) function
domain: {-1, 2, -2, 14}
range: {-3, -2, 0, 2, 4}

C) not a function

Answer: C

6) {(-4, 11), (-3, 4), (0, -5), (3, 4), (5, 20)}

A) function
domain: {11, 4, -5, 20}
range: {-4, -3, 0, 3, 5}

B) function
domain: {-4, -3, 0, 3, 5}
range: {11, 4, -5, 20}

C) not a function

Answer: B

7) {(2.44, 3.24), (2.444, -3.2), $(\frac{7}{3}, 0)$, (2.33, -2)}

A) function
domain: {3.24, -3.2, 0, -2}
range: {2.44, 2.444, $\frac{7}{3}$, 2.33}

B) function
domain: {2.44, 2.444, $\frac{7}{3}$, 2.33}
range: {3.24, -3.2, 0, -2}

C) not a function

Answer: B

Determine whether the equation defines y as a function of x.

8) $y = x^4$

A) function

B) not a function

Answer: A

9) $y = \frac{1}{x}$

A) function

B) not a function

Answer: A

10) $y = |x|$

A) function

B) not a function

Answer: A

11) $y^2 = 8 - x^2$

A) function

B) not a function

Answer: B

12) $y = \pm\sqrt{1 - 5x}$

A) function

B) not a function

Answer: B

13) $x = y^2$

A) function

B) not a function

Answer: B

14) $y^2 + x = 2$

A) function B) not a function

Answer: B

15) $y = 7x^2 - 2x + 8$

A) function B) not a function

Answer: A

16) $y = \frac{5x + 3}{x + 2}$

A) function B) not a function

Answer: A

17) $x^2 + 2y^2 = 1$

A) function B) not a function

Answer: B

18) $x + 7y = 5$

A) function B) not a function

Answer: A

19) $-4x + x^2 - 58 = y$

A) function B) not a function

Answer: A

Find the value for the function.

20) Find f(4) when $f(x) = x^2 - 4x + 3$.

A) -3 B) 35 C) 3 D) 29

Answer: C

21) Find f(-2) when $f(x) = \frac{x^2 - 7}{x - 1}$.

A) 9 B) $-\frac{4}{3}$ C) $-\frac{11}{3}$ D) 1

Answer: D

22) Find f(-9) when $f(x) = |x| - 6$.

A) 15 B) -15 C) -3 D) 3

Answer: D

23) Find f(0) when $f(x) = \sqrt{x^2 + 2x}$.

A) $\sqrt{6}$ B) 0 C) 2 D) $\sqrt{2}$

Answer: B

24) Find f(-x) when $f(x) = 2x^2 + 3x - 2$.

A) $2x^2 - 3x + 2$ B) $2x^2 - 3x - 2$ C) $-2x^2 - 3x + 2$ D) $-2x^2 - 3x - 2$

Answer: B

25) Find $f(-x)$ when $f(x) = \frac{x}{x^2 + 1}$.

A) $\frac{-x}{x^2 + 1}$ B) $\frac{-x}{x^2 - 1}$ C) $\frac{-x}{-x^2 + 1}$ D) $\frac{x}{-x^2 + 1}$

Answer: A

26) Find $-f(x)$ when $f(x) = 2x^2 + 4x - 4$.

A) $2x^2 - 4x - 4$ B) $-2x^2 - 4x + 4$ C) $2x^2 - 4x + 4$ D) $-2x^2 - 4x - 4$

Answer: B

27) Find $-f(x)$ when $f(x) = |x| + 9$.

A) $|-x| + 9$ B) $|-x| - 9$ C) $-|x| - 9$ D) $-|x| + 9$

Answer: C

28) Find $f(x - 1)$ when $f(x) = 5x^2 - 3x + 1$.

A) $5x^2 + 2x + 3$ B) $5x^2 - 13x + 9$ C) $5x^2 - 13x + 3$ D) $-13x^2 + 5x + 9$

Answer: B

29) Find $f(x + 1)$ when $f(x) = \frac{x^2 - 7}{x + 4}$.

A) $\frac{x^2 + 2x - 6}{x - 3}$ B) $\frac{x^2 + 2x + 8}{x + 5}$ C) $\frac{x^2 - 6}{x + 5}$ D) $\frac{x^2 + 2x - 6}{x + 5}$

Answer: D

30) Find $f(2x)$ when $f(x) = -2x^2 - 3x + 1$.

A) $-8x^2 - 6x + 1$ B) $-8x^2 - 6x + 2$ C) $-4x^2 - 6x + 2$ D) $-4x^2 - 6x + 1$

Answer: A

31) Find $f(2x)$ when $f(x) = \sqrt{2x^2 - 7x}$.

A) $\sqrt{4x^2 - 14x}$ B) $\sqrt{4x^2 - 28x}$ C) $\sqrt{8x^2 - 14x}$ D) $2\sqrt{2x^2 - 7x}$

Answer: C

32) Find $f(x + h)$ when $f(x) = 2x^2 + 3x - 3$.

A) $2x^2 + 2h^2 + 7x + 7h - 3$ B) $2x^2 + 2h^2 + 3x + 3h - 3$

C) $2x^2 + 4xh + 2h^2 + 3x + 3h - 3$ D) $2x^2 + 2xh + 2h^2 + 3x + 3h - 3$

Answer: C

33) Find $f(x + h)$ when $f(x) = \frac{9x + 8}{8x - 3}$.

A) $\frac{9x + 8h}{8x - 3h}$ B) $\frac{9x + 9h + 8}{8x - 3}$ C) $\frac{9x + 17h}{8x + 5h}$ D) $\frac{9x + 9h + 8}{8x + 8h - 3}$

Answer: D

Solve the problem.

34) If $f(x) = 9x^3 + 5x^2 - x + C$ and $f(-2) = 1$, what is the value of C?

A) C = -53 B) C = -13 C) C = 51 D) C = -93

Answer: C

35) If $f(x) = \frac{x - B}{x - A}$, f(4) = 0, and f(9) is undefined, what are the values of A and B?

A) A = -4, B = -9 B) A = 9, B = 4 C) A = 4, B = 9 D) A = -9, B = -4

Answer: B

36) If $f(x) = \frac{x - 4A}{-12x + 3}$ and f(-12) = -4, what is the value of A?

A) A = -144 B) A = -150 C) A = 150 D) A = 144

Answer: D

37) If a rock falls from a height of 80 meters on Earth, the height H (in meters) after x seconds is approximately $H(x) = 80 - 4.9x^2$.

What is the height of the rock when x = 1.5 seconds? Round to the nearest hundredth, if necessary.

A) 72.65 m B) 68.98 m C) 91.03 m D) 69.2 m

Answer: B

38) If a rock falls from a height of 70 meters on Earth, the height H (in meters) after x seconds is approximately $H(x) = 70 - 4.9x^2$.

When does the rock strike the ground? Round to the nearest hundredth, if necessary.

A) 14.29 sec B) 2.92 sec C) 3.78 sec D) 1.71 sec

Answer: C

Find the domain of the function.

39) f(x) = -9x - 2

A) $\{x|x > 0\}$ B) $\{x|x \neq 0\}$ C) $\{x|x \geq 2\}$ D) all real numbers

Answer: D

40) $f(x) = x^2 + 2$

A) $\{x|x > -2\}$ B) $\{x|x \neq -2\}$ C) all real numbers D) $\{x|x \geq -2\}$

Answer: C

41) $f(x) = \frac{x}{x^2 + 14}$

A) $\{x|x \neq -14\}$ B) $\{x|x > -14\}$ C) $\{x|x \neq 0\}$ D) all real numbers

Answer: D

42) $g(x) = \frac{2x}{x^2 - 81}$

A) all real numbers B) $\{x|x \neq 0\}$ C) $\{x|x > 81\}$ D) $\{x|x \neq -9, 9\}$

Answer: D

43) $h(x) = \dfrac{x - 2}{x^3 - 9x}$

A) $\{x \mid x \neq 2\}$ B) $\{x \mid x \neq 0\}$ C) all real numbers D) $\{x \mid x \neq -3, 0, 3\}$

Answer: D

44) $f(x) = \sqrt{24 - x}$

A) $\{x \mid x \neq 24\}$ B) $\{x \mid x \leq 2\sqrt{6}\}$ C) $\{x \mid x \neq 2\sqrt{6}\}$ D) $\{x \mid x \leq 24\}$

Answer: D

45) $\dfrac{x}{\sqrt{x - 2}}$

A) $\{x \mid x > 2\}$ B) $\{x \mid x \geq 2\}$ C) all real numbers D) $\{x \mid x \neq 2\}$

Answer: A

For the given functions f and g, find the requested function and state its domain.

46) $f(x) = 3 - 3x$; $g(x) = -5x + 3$

Find $f + g$.

A) $(f + g)(x) = -8x + 6$; all real numbers B) $(f + g)(x) = -2x$; all real numbers

C) $(f + g)(x) = -5x + 3$; $\{x \mid x \neq \frac{3}{5}\}$ D) $(f + g)(x) = 2x + 6$; $\{x \mid x \neq 3\}$

Answer: A

47) $f(x) = 9x - 5$; $g(x) = 4x - 8$

Find $f - g$.

A) $(f - g)(x) = 13x - 13$; $\{x \mid x \neq 1\}$ B) $(f - g)(x) = 5x - 13$; $\{x \mid x \neq \frac{13}{5}\}$

C) $(f - g)(x) = 5x + 3$; all real numbers D) $(f - g)(x) = -5x - 3$; all real numbers

Answer: C

48) $f(x) = 7x + 3$; $g(x) = 3x + 7$

Find $f \cdot g$.

A) $(f \cdot g)(x) = 21x^2 + 21$; $\{x \mid x \neq 21\}$ B) $(f \cdot g)(x) = 21x^2 + 58x + 21$; all real numbers

C) $(f \cdot g)(x) = 10x^2 + 58x + 10$; all real numbers D) $(f \cdot g)(x) = 21x^2 + 16x + 21$; $\{x \mid x \neq 21\}$

Answer: B

49) $f(x) = 2x + 5$; $g(x) = 6x - 1$

Find $\dfrac{f}{g}$.

A) $(\frac{f}{g})(x) = \dfrac{2x + 5}{6x - 1}$; $\{x \mid x \neq \frac{1}{6}\}$ B) $(\frac{f}{g})(x) = \dfrac{2x + 5}{6x - 1}$; $\{x \mid x \neq -\frac{5}{2}\}$

C) $(\frac{f}{g})(x) = \dfrac{6x - 1}{2x + 5}$; $\{x \mid x \neq -\frac{5}{2}\}$ D) $(\frac{f}{g})(x) = \dfrac{6x - 1}{2x + 5}$; $\{x \mid x \neq \frac{1}{6}\}$

Answer: A

50) $f(x) = 16 - x^2$; $g(x) = 4 - x$

Find $f + g$.

A) $(f + g)(x) = x^3 - 4x^2 - 16x + 64$; all real numbers

B) $(f + g)(x) = -x^2 - x + 20$; $\{x \mid x \neq 4, x \neq -5\}$

C) $(f + g)(x) = 4 + x$; $\{x \mid x \neq -4\}$

D) $(f + g)(x) = -x^2 + x + 12$; all real numbers

Answer: B

51) $f(x) = x + 6$; $g(x) = 7x^2$

Find $f + g$.

A) $(f + g)(x) = 7x^2 + x + 6$; $\{x \mid x \neq -6\}$

B) $(f + g)(x) = 7x^2 + x + 6$; all real numbers

C) $(f + g)(x) = 7x^2 - x - 6$; all real numbers

D) $(f + g)(x) = -7x^2 + x + 6$; all real numbers

Answer: B

52) $f(x) = 2x^3 - 1$; $g(x) = 5x^2 + 2$

Find $f \cdot g$.

A) $(f \cdot g)(x) = 10x^5 + 4x^3 - 5x^2 - 2$; all real numbers

B) $(f \cdot g)(x) = 10x^6 + 4x^3 - 5x^2 - 2$; all real numbers

C) $(f \cdot g)(x) = 2x^3 + 5x^2 - 2$; all real numbers

D) $(f \cdot g)(x) = 10x^5 + 4x^3 - 5x^2 - 2$; $\{x \mid x \neq 0\}$

Answer: A

53) $f(x) = \sqrt{x}$; $g(x) = 5x - 2$

Find $\frac{f}{g}$.

A) $(\frac{f}{g})(x) = \frac{\sqrt{x}}{5x - 2}$; $\{x \mid x \neq 0\}$

B) $(\frac{f}{g})(x) = \frac{\sqrt{x}}{5x - 2}$; $\{x \mid x \geq 0, x \neq \frac{2}{5}\}$

C) $(\frac{f}{g})(x) = \frac{\sqrt{x}}{5x - 2}$; $\{x \mid x \neq \frac{2}{5}\}$

D) $(\frac{f}{g})(x) = \frac{5x - 2}{\sqrt{x}}$; $\{x \mid x \geq 0\}$

Answer: B

54) $f(x) = \sqrt{6 - x}$; $g(x) = \sqrt{x - 2}$

Find $f \cdot g$.

A) $(f \cdot g)(x) = \sqrt{(6 - x)(x - 2)}$; $\{x \mid x \neq 2, x \neq 6\}$

B) $(f \cdot g)(x) = \sqrt{(6 - x)(x - 2)}$; $\{x \mid 2 \leq x \leq 6\}$

C) $(f \cdot g)(x) = \sqrt{(6 - x)(x - 2)}$; $\{x \mid x \geq 0\}$

D) $(f \cdot g)(x) = \sqrt{-x^2 - 12}$; $\{x \mid x \neq 12\}$

Answer: B

55) $f(x) = \frac{7x - 6}{6x - 1}$; $g(x) = \frac{4x}{6x - 1}$

Find $f + g$.

A) $(f + g)(x) = \frac{11x - 6}{6x - 1}$; $\{x \mid x \neq \frac{1}{6}\}$

B) $(f + g)(x) = \frac{11x - 6}{6x - 1}$; $\{x \mid x \neq 0\}$

C) $(f + g)(x) = \frac{11x - 6}{6x - 1}$; $\{x \mid x \neq \frac{1}{6}, x \neq \frac{6}{11}\}$

D) $(f + g)(x) = \frac{3x + 6}{6x - 1}$; $\{x \mid x \neq \frac{1}{6}\}$

Answer: A

56) $f(x) = \sqrt{x + 7}$; $g(x) = \frac{2}{x}$

Find $f \cdot g$.

A) $(f \cdot g)(x) = \frac{\sqrt{2x + 14}}{x}$; $\{x \mid x \geq -7, x \neq 0\}$

B) $(f \cdot g)(x) = \frac{2\sqrt{x + 7}}{x}$; $\{x \mid x \geq -7, x \neq 0\}$

C) $(f \cdot g)(x) = \sqrt{\frac{9}{x}}$; $\{x \mid x \neq 0\}$

D) $(f \cdot g)(x) = \sqrt{\frac{2x + 14}{x}}$; $\{x \mid x \geq -7, x \neq 0\}$

Answer: B

Solve the problem.

57) Given $f(x) = \frac{1}{x}$ and $(\frac{f}{g})(x) = \frac{x - 4}{x^2 - 6x}$, find the function g.

A) $g(x) = \frac{x - 6}{x - 4}$ B) $g(x) = \frac{x + 6}{x + 4}$ C) $g(x) = \frac{x - 4}{x - 6}$ D) $g(x) = \frac{x + 4}{x + 6}$

Answer: A

58) Express the gross salary G of a person who earns $35 per hour as a function of the number x of hours worked.

A) $G(x) = 35x^2$ B) $G(x) = \frac{35}{x}$ C) $G(x) = 35x$ D) $G(x) = 35 + x$

Answer: C

59) Jacey, a commissioned salesperson, earns $140 base pay plus $35 per item sold. Express Jacey's gross salary G as a function of the number x of items sold.

A) $G(x) = 35(x + 140)$ B) $G(x) = 35x + 140$ C) $G(x) = 140(x + 35)$ D) $G(x) = 140x + 35$

Answer: B

Find and simplify the difference quotient of f, $\frac{f(x + h) - f(x)}{h}$, $h \neq 0$, for the function.

60) $f(x) = 5x - 8$

A) 0 B) $5 + \frac{10(x - 8)}{h}$ C) 5 D) $5 + \frac{-16}{h}$

Answer: C

61) $f(x) = x^2 + 3x + 7$

A) $2x + h + 3$

B) 1

C) $2x + h + 7$

D) $\frac{2x^2 + 2x + 2xh + h^2 + h + 14}{h}$

Answer: A

62) $f(x) = \frac{1}{7x}$

A) $\frac{-1}{7x(x + h)}$ B) $\frac{1}{7x}$ C) 0 D) $\frac{-1}{x(x + h)}$

Answer: A

Solve the problem.

63) Suppose that P(x) represents the percentage of income spent on food in year x and I(x) represents income in year x. Determine a function F that represents total food expenditures in year x.

A) $F(x) = (P + I)(x)$ B) $F(x) = (P \cdot I)(x)$ C) $F(x) = (I - P)(x)$ D) $F(x) = (\frac{I}{P})(x)$

Answer: B

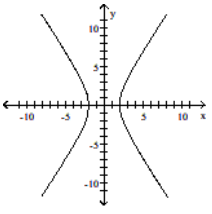
64) A retail store buys 120 VCRs from a distributor at a cost of $200 each plus an overhead charge of $35 per order. The retail markup is 30% on the total price paid. Find the profit on the sale of one VCR.

A) $6,009.00 B) $60.00 C) $59.91 D) $60.09

Answer: D

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

65)



A) function
domain: all real numbers
range: $\{y \mid y \le -2 \text{ or } y \ge 2\}$
intercepts: (-2, 0), (2, 0)
symmetry: y-axis

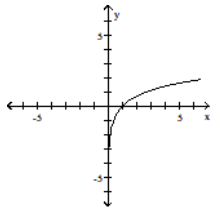
B) function
domain: $\{x \mid -2 \le x \le 2\}$
range: all real numbers
intercepts: (-2, 0), (2, 0)
symmetry: x-axis, y-axis

C) function
domain: $\{x \mid x \le -2 \text{ or } x \ge 2\}$
range: all real numbers
intercepts: (-2, 0), (2, 0)
symmetry: x-axis, y-axis, origin

D) not a function

Answer: D

66)



A) function
domain: {x | x > 0}
range: all real numbers
intercept: (1, 0)
symmetry: none

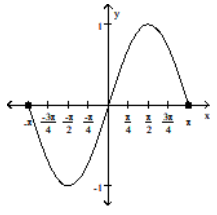
B) function
domain: all real numbers
range: {y | y > 0}
intercept: (1, 0)
symmetry: none

C) function
domain: {x | x > 0}
range: all real numbers
intercept: (0, 1)
symmetry: origin

D) not a function

Answer: A

67)



A) function
domain: $\{x \mid -\pi \le x \le \pi\}$
range: $\{y \mid -1 \le y \le 1\}$
intercepts: $(-\pi, 0)$, $(0, 0)$, $(\pi, 0)$
symmetry: origin

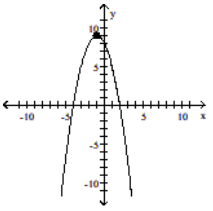
B) function
domain: all real numbers
range: $\{y \mid -1 \le y \le 1\}$
intercepts: $(-\pi, 0)$, $(0, 0)$, $(\pi, 0)$
symmetry: origin

C) function
domain: $\{x \mid -1 \le x \le 1\}$
range: $\{y \mid -\pi \le y \le \pi\}$
intercepts: $(-\pi, 0)$, $(0, 0)$, $(\pi, 0)$
symmetry: none

D) not a function

Answer: A

68)



A) function
domain: all real numbers
range: $\{y \mid y \leq 9\}$
intercepts: (0, -4), (8, 0), (0, 2)
symmetry: none

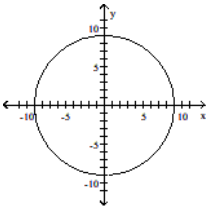
B) function
domain: $\{x \mid x \leq 9\}$
range: all real numbers
intercepts: (-4, 0), (0, 8), (2, 0)
symmetry: y-axis

C) function
domain: all real numbers
range: $\{y \mid y \leq 9\}$
intercepts: (-4, 0), (0, 8), (2, 0)
symmetry: none

D) not a function

Answer: C

69)



A) function
domain: $\{x \mid -9 \leq x \leq 9\}$
range: $\{y \mid -9 \leq y \leq 9\}$
intercepts: (-9, 0), (0, -9), (0, 9), (9, 0)
symmetry: x-axis, y-axis

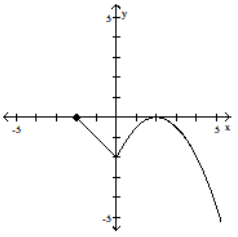
B) function
domain: $\{x \mid -9 \leq x \leq 9\}$
range: $\{y \mid -9 \leq y \leq 9\}$
intercepts: (-9, 0), (0, -9), (0, 9), (9, 0)
symmetry: x-axis, y-axis, origin

C) function
domain: $\{x \mid -9 \leq x \leq 9\}$
range: $\{y \mid -9 \leq y \leq 9\}$
intercepts: (-9, 0), (0, -9), (0, 0), (0, 9), (9, 0)
symmetry: origin

D) not a function

Answer: D

70)



A) function
domain: {x|x ≤ 0}
range: {y|y ≥ -2}
intercepts: (-2, 0), (0, -2), (2, 0)
symmetry: y-axis

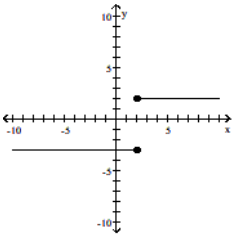
B) function
domain: {x|x ≥ -2}
range: {y|y ≤ 0}
intercepts: (-2, 0), (0, -2), (2, 0)
symmetry: none

C) function
domain: all real numbers
range: all real numbers
intercepts: (-2, 0), (0, -2), (2, 0)
symmetry: none

D) not a function

Answer: B

71)



A) function
domain: all real numbers
range: all real numbers
intercept: (0, -3)
symmetry: none

B) function
domain: {x|x = 2 or x = -3}
range: all real numbers
intercept: (-3, 0)
symmetry: x-axis

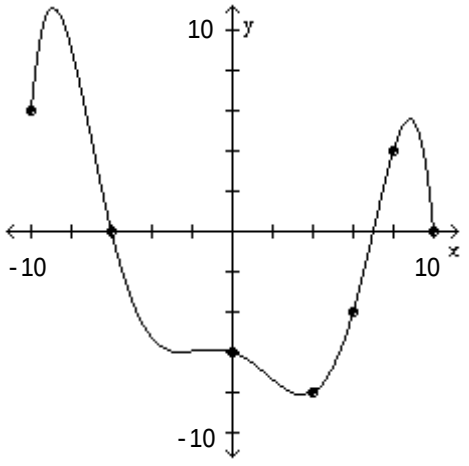
C) function
domain: all real numbers
range: {y|y = 2 or y = -3}
intercept: (0, -3)
symmetry: none

D) not a function

Answer: D

The graph of a function f is given. Use the graph to answer the question.

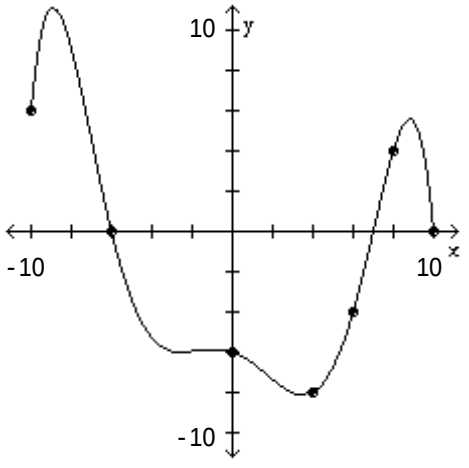
72) Use the graph of f given below to find f(10).



A) 12 B) 10 C) 20 D) 0

Answer: D

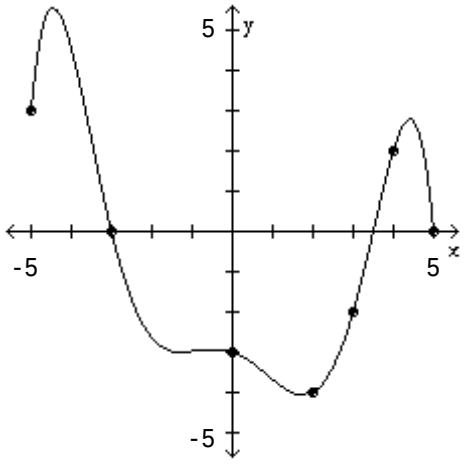
73) Is f(8) positive or negative?



A) positive B) negative

Answer: A

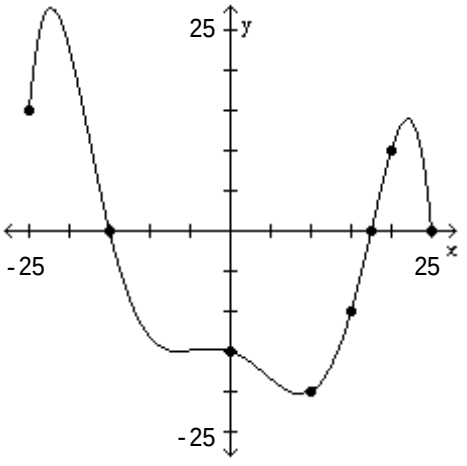
74) Is f(3) positive or negative?



A) positive B) negative

Answer: B

75) For what numbers x is f(x) = 0?

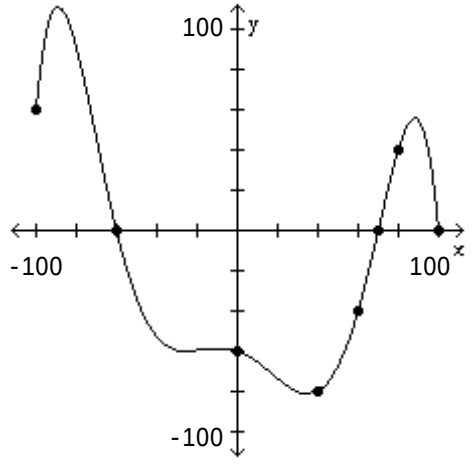


A) -15 B) (-25, -15), (17.5, 25)

C) (-15, 17.5) D) -15, 17.5, 25

Answer: D

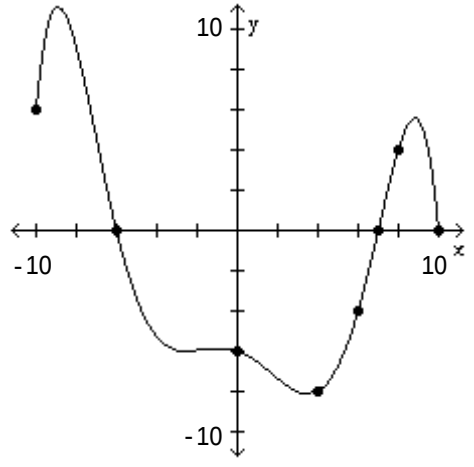
76) For what numbers x is f(x) > 0?



A) (-60, ∞)
B) (-∞ -60)
C) [-100, -60), (70, 100)
D) (-60, 70)

Answer: C

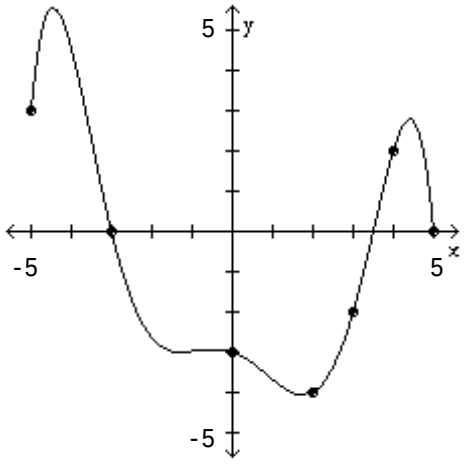
77) For what numbers x is f(x) < 0?



A) (-∞, -6)
B) [-10, -6), (7, 10)
C) (-6, ∞)
D) (-6, 7)

Answer: D

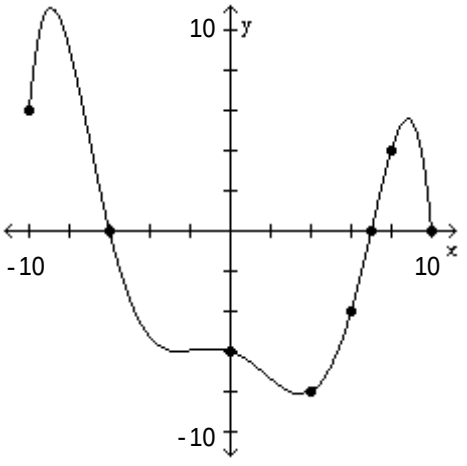
78) What is the domain of f?



A) $\{x \mid x \geq 0\}$ B) all real numbers C) $\{x \mid -4 \leq x \leq 5.5\}$ D) $\{x \mid -5 \leq x \leq 5\}$

Answer: D

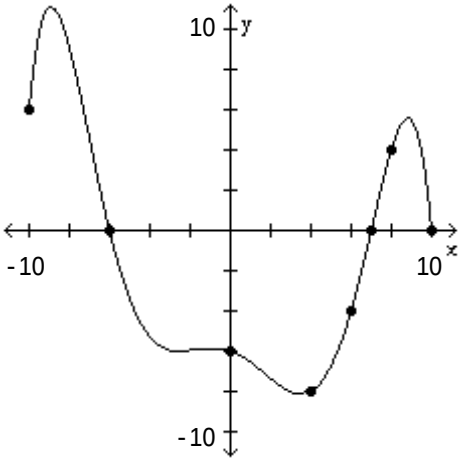
79) What are the x-intercepts?



A) -10, -6, 7, 10 B) -6, 7 C) -6, 7, 10 D) -6

Answer: C

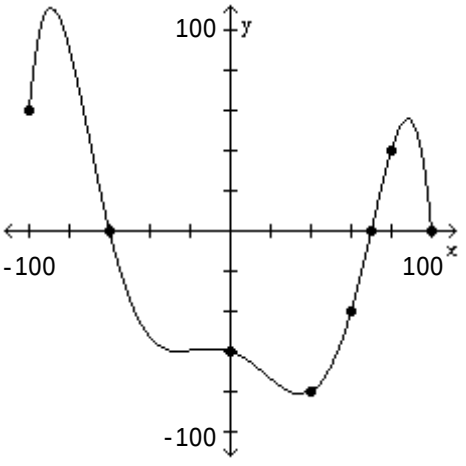
80) What is the y-intercept?



A) -8 B) 10 C) 7 D) -6

Answer: D

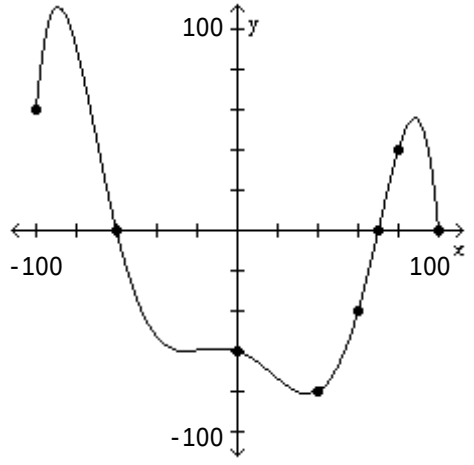
81) How often does the line y = -100 intersect the graph?



A) once B) twice C) three times D) does not intersect

Answer: D

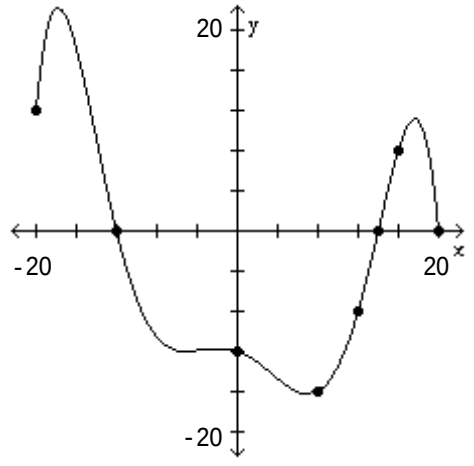
82) How often does the line y = 20 intersect the graph?



A) once B) twice C) three times D) does not intersect

Answer: C

83) For which of the following values of x does f(x) = -16?



A) 0 B) 12 C) -16 D) 8

Answer: D

Answer the question about the given function.

84) Given the function $f(x) = 5x^2 - 10x - 7$, is the point (1, -12) on the graph of f?

A) Yes B) No

Answer: A

85) Given the function $f(x) = -2x^2 - 4x + 3$, is the point (-2, -1) on the graph of f?

A) Yes B) No

Answer: B

86) Given the function $f(x) = -5x^2 + 10x - 1$, if x = 1, what is f(x)? What point is on the graph of f?

A) 4; (1, 4) B) 4; (4, 1) C) -16; (-16, 1) D) -16; (1, -16)

Answer: A

87) Given the function $f(x) = 3x^2 - 6x + 7$, what is the domain of f?

A) all real numbers B) $\{x \mid x \geq 1\}$ C) $\{x \mid x \leq 1\}$ D) $\{x \mid x \geq -1\}$

Answer: A

88) Given the function $f(x) = x^2 + 7x - 18$, list the x-intercepts, if any, of the graph of f.

A) (-9, 0), (2, 0) B) (9, 0), (2, 0) C) (9, 0), (-2, 0) D) (-9, 0), (1, 0)

Answer: A

89) Given the function $f(x) = -5x^2 + 10x + 7$, list the y-intercept, if there is one, of the graph of f.

A) 7 B) -3 C) 12 D) -8

Answer: B

90) Given the function $f(x) = \frac{x^2 - 7}{x - 1}$, is the point (2, - 3) on the graph of f?

A) Yes B) No

Answer: A

91) Given the function $f(x) = \frac{x^2 - 6}{x + 2}$, is the point (-1, 7) on the graph of f?

A) Yes B) No

Answer: B

92) Given the function $f(x) = \frac{x^2 - 8}{x + 3}$, if x = 2, what is f(x)? What point is on the graph of f?

A) $-\frac{4}{5}; (2, -\frac{4}{5})$ B) $\frac{12}{5}; (2, \frac{12}{5})$ C) $\frac{12}{5}; (\frac{12}{5}, 2)$ D) $-\frac{4}{5}; (-\frac{4}{5}, 2)$

Answer: A

93) Given the function $f(x) = \frac{x^2 + 3}{x - 8}$, what is the domain of f?

A) $\{x \mid x \neq -8\}$ B) $\{x \mid x \neq 3\}$ C) $\{x \mid x \neq \frac{3}{8}\}$ D) $\{x \mid x \neq 8\}$

Answer: D

94) Given the function $f(x) = \frac{x^2 + 5}{x - 3}$, list the x-intercepts, if any, of the graph of f.

A) (3, 0) B) (5, 0), (-5, 0) C) $(-\sqrt{5}, 0)$ D) none

Answer: D

95) Given the function $f(x) = \frac{x^2 + 8}{x - 4}$, list the y-intercept, if there is one, of the graph of f.

A) (0, 4) B) (0, - 2) C) (0, -8) D) (- 2, 0)

Answer: B

Solve the problem.

96) If an object weighs m pounds at sea level, then its weight W (in pounds) at a height of h miles above sea level is given approximately by $W(h) = m\left(\frac{4000}{4000 + h}\right)^2$. How much will a man who weighs 165 pounds at sea level weigh on the top of a mountain which is 14,494 feet above sea level? Round to the nearest hundredth of a pound, if necessary.

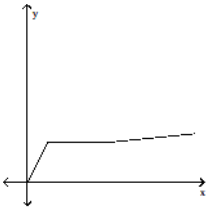
A) 165 pounds B) 164.77 pounds C) 7.72 pounds D) 165.23 pounds

Answer: B

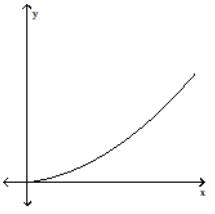
Match the function with the graph that best describes the situation.

97) The amount of rainfall as a function of time, if the rain fell more and more softly.

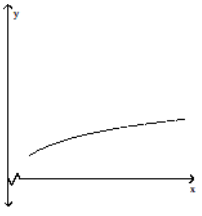
A)



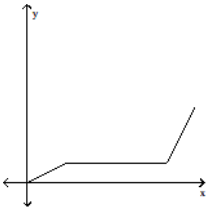
B)



C)



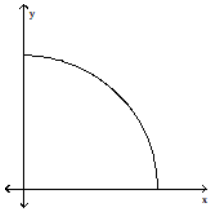
D)



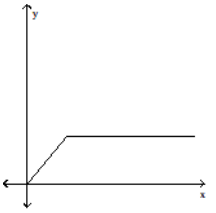
Answer: C

98) The height of an animal as a function of time.

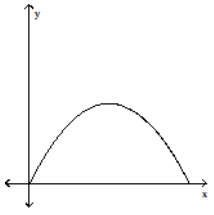
A)



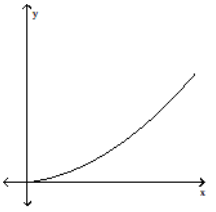
B)



C)



D)

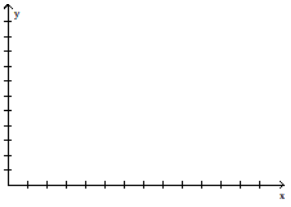


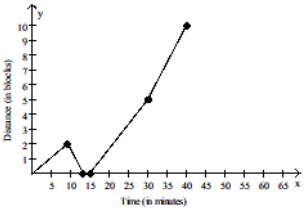
Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

99) Michael decides to walk to the mall to do some errands. He leaves home, walks 2 blocks in 9 minutes at a constant speed, and realizes that he forgot his wallet at home. So Michael runs back in 4 minutes. At home, it takes him 2 minutes to find his wallet and close the door. Michael walks 5 blocks in 15 minutes and then decides to jog to the mall. It takes him 10 minutes to get to the mall which is 5 blocks away. Draw a graph of Michael's distance from home (in blocks) as a function of time.

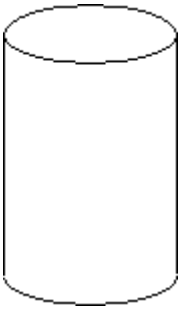




Answer:

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

100) A steel can in the shape of a right circular cylinder must be designed to hold 550 cubic centimeters of juice (see figure). It can be shown that the total surface area of the can (including the ends) is given by $S(r) = 2\pi r^2 + \frac{1,100}{r}$, where r is the radius of the can in centimeters. Using the TABLE feature of a graphing utility, find the radius that minimizes the surface area (and thus the cost) of the can. Round to the nearest tenth of a centimeter.



A) 0 cm B) 5.6 cm C) 4.4 cm D) 3.6 cm

Answer: C

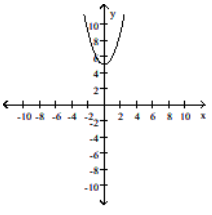
101) The concentration C (arbitrary units) of a certain drug in a patient's bloodstream can be modeled using $C(t) = \frac{t}{(0.423t + 2.366)^2}$, where t is the number of hours since a 500 milligram oral dose was administered. Using the TABLE feature of a graphing utility, find the time at which the concentration of the drug is greatest. Round to the nearest tenth of an hour.

A) 5.6 hours B) 6.4 hours C) 7.1 hours D) 7.9 hours

Answer: A

The graph of a function is given. Decide whether it is even, odd, or neither.

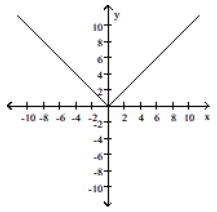
102)



A) even B) odd C) neither

Answer: A

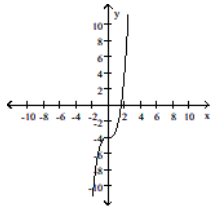
103)



A) even B) odd C) neither

Answer: A

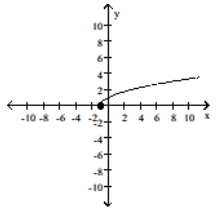
104)



A) even B) odd C) neither

Answer: C

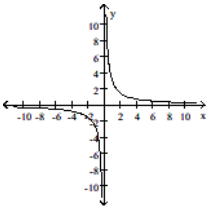
105)



A) even B) odd C) neither

Answer: C

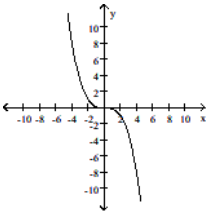
106)



A) even B) odd C) neither

Answer: B

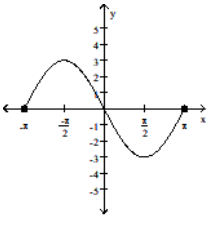
107)



A) even B) odd C) neither

Answer: B

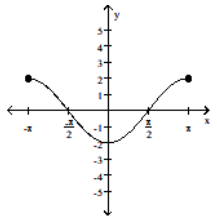
108)



A) even B) odd C) neither

Answer: B

109)



A) even B) odd C) neither

Answer: A

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

110) $f(x) = 5x^3$

A) even B) odd C) neither

Answer: B

111) $f(x) = 5x^4 - x^2$

A) even B) odd C) neither

Answer: A

112) $f(x) = -4x^2 + 8$

A) even B) odd C) neither

Answer: A

113) $f(x) = 2x^3 - 4$

A) even B) odd C) neither

Answer: C

114) $f(x) = \sqrt[3]{x}$

A) even B) odd C) neither

Answer: B

115) $f(x) = \sqrt{x}$

A) even B) odd C) neither

Answer: C

116) $\sqrt[3]{7x^2 + 4}$

A) even B) odd C) neither

Answer: A

117) $f(x) = \frac{1}{x^2}$

A) even B) odd C) neither

Answer: A

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

A) even B) odd C) neither

Answer: B

119) $f(x) = \frac{-x^3}{9x^2 + 7}$

A) even B) odd C) neither

Answer: B

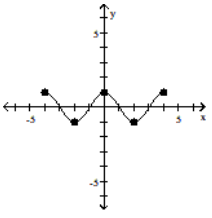
120) $f(x) = \frac{2x}{|x|}$

A) even B) odd C) neither

Answer: B

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

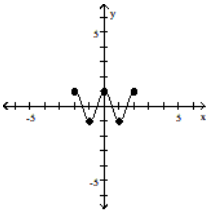
121) (- 4, - 2)



A) constant B) decreasing C) increasing

Answer: B

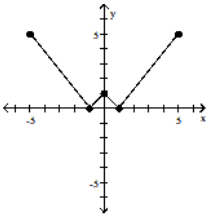
122) (- 1, 0)



A) constant B) decreasing C) increasing

Answer: C

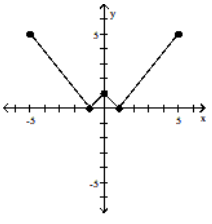
123) (0, 1)



A) increasing B) constant C) decreasing

Answer: C

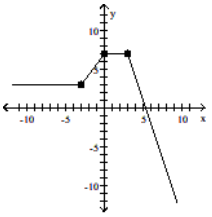
124) (1, 5)



A) decreasing B) increasing C) constant

Answer: B

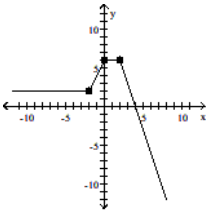
125) (0, 3)



A) constant B) decreasing C) increasing

Answer: A

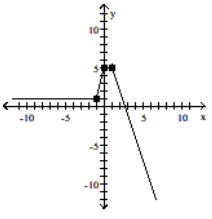
126) (-2, 0)



A) constant B) increasing C) decreasing

Answer: B

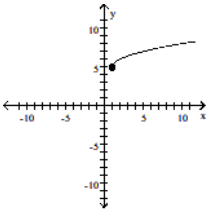
127) (1, ∞)



A) increasing B) decreasing C) constant

Answer: B

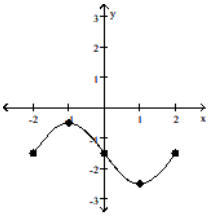
128) (1, ∞)



A) constant B) increasing C) decreasing

Answer: B

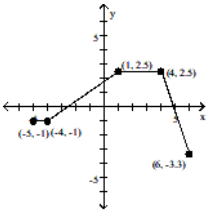
129) (-2, -1)



A) decreasing B) constant C) increasing

Answer: C

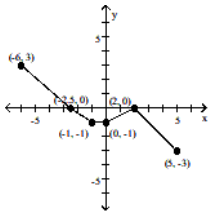
130) (-4, 1)



A) constant B) decreasing C) increasing

Answer: C

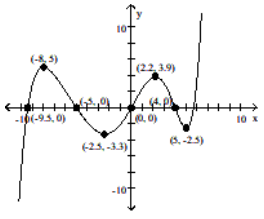
131) (-6, -2.5)



A) increasing B) decreasing C) constant

Answer: B

132) (-2.5, 2.2)

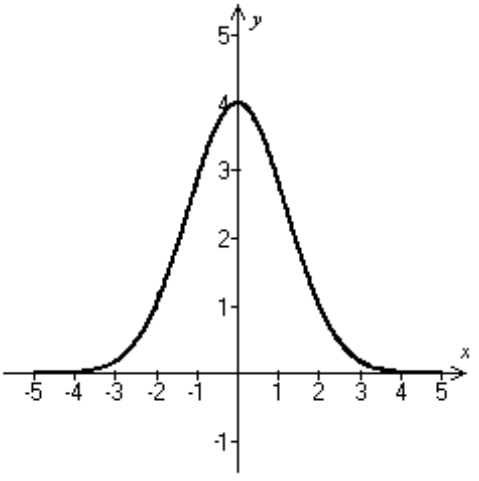


A) increasing B) constant C) decreasing

Answer: A

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

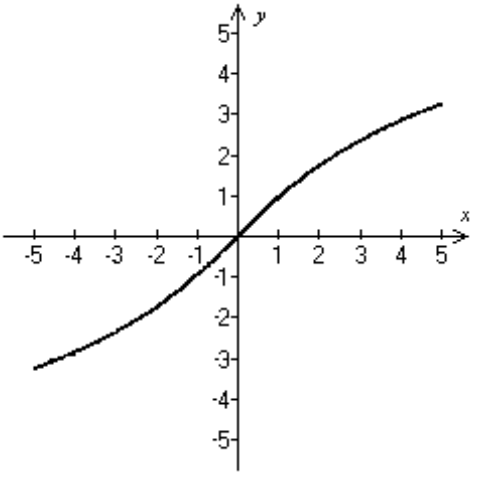
133)



A) Decreasing on $(-\infty, 0)$; increasing on $(0, \infty)$
B) Increasing on $(-\infty, \infty)$
C) Increasing on $(-\infty, 0)$; decreasing on $(0, \infty)$
D) Decreasing on $(-\infty, \infty)$

Answer: C

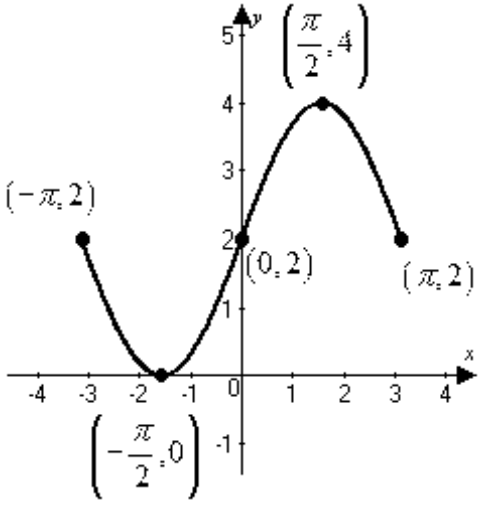
134)



A) Increasing on $(-\infty, 0)$; decreasing on $(0, \infty)$
B) Decreasing on $(-\infty, \infty)$
C) Decreasing on $(-\infty, 0)$; increasing on $(0, \infty)$
D) Increasing on $(-\infty, \infty)$

Answer: D

135)



A) Increasing on $(-\infty, \infty)$

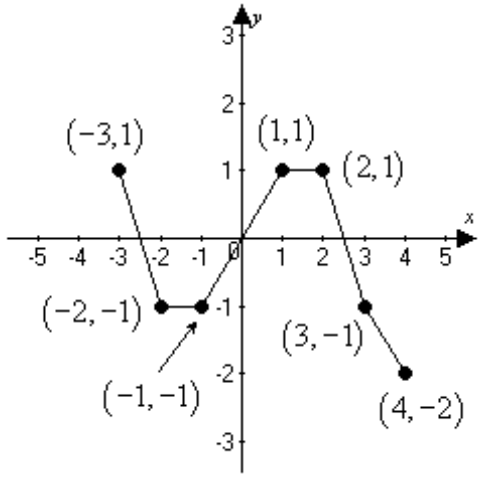
B) Increasing on $\left(-\pi, -\frac{\pi}{2}\right)$ and $\left(\frac{\pi}{2}, \pi\right)$; decreasing on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

C) Decreasing on $\left(-\pi, -\frac{\pi}{2}\right)$ and $\left(\frac{\pi}{2}, \pi\right)$; increasing on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

D) Decreasing on $(-\pi, 0)$; increasing on $(0, \pi)$

Answer: C

136)



A) Decreasing on (-3, -1) and (1, 4); increasing on (-2, 1)

B) Increasing on (-3, -2) and (2, 4); decreasing on (-1, 1); constant on (-2, -1) and (1, 2)

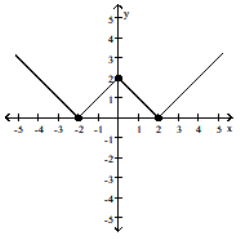
C) Decreasing on (-3, -2) and (2, 4); increasing on (-1, 1)

D) Decreasing on (-3, -2) and (2, 4); increasing on (-1, 1); constant on (-2, -1) and (1, 2)

Answer: D

The graph of a function f is given. Use the graph to answer the question.

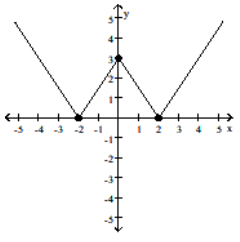
137) Find the numbers, if any, at which f has a local maximum. What are the local maxima?



A) f has a local maximum at x = -2 and 2; the local maximum is 0
B) f has a local maximum at x = 2; the local maximum is 2
C) f has a local maximum at x = 0; the local maximum is 2
D) f has no local maximum

Answer: C

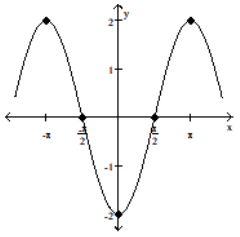
138) Find the numbers, if any, at which f has a local minimum. What are the local minima?



A) f has a local minimum at x = 0; the local minimum is 3
B) f has a local minimum at x = -2 and 2; the local minimum is 0
C) f has a local minimum at x = -2; the local minimum is 0
D) f has no local minimum

Answer: B

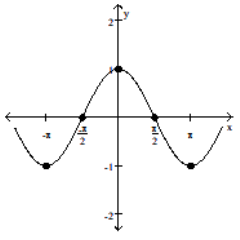
139) Find the numbers, if any, at which f has a local maximum. What are the local maxima?



A) f has a local maximum at x = $-\pi$ and π; the local maximum is 2
B) f has no local maximum
C) f has a local maximum at x = 0; the local maximum is -2
D) f has a local maximum at $-\pi$; the local maximum is 2

Answer: A

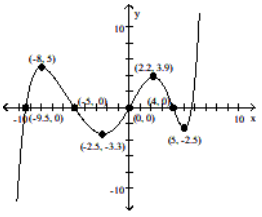
140) Find the numbers, if any, at which f has a local minimum. What are the local minima?



A) f has a local minimum at x = $-\pi$; the local minimum is -1
B) f has a local minimum at x = 0; the local minimum is 1
C) f has a local minimum at x = $-\pi$ and π; the local minimum is -1
D) f has no local minimum

Answer: C

141)



Find the numbers, if any, at which f has a local minimum. What are the local maxima?

A) f has a local minimum at x = -2.5 and 5; the local minimum at -2.5 is -3.3; the local minimum at 5 is -2.5

B) f has a local maximum at x = -2.5 and 5; the local maximum at -2.5 is -3.3; the local maximum at 5 is -2.5

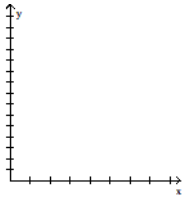
C) f has a local minimum at x = -3.3 and -2.5; the local minimum at -3.3 is -2.5; the local minimum at -2.5 is 5

D) f has a local maximum at x = -3.3 and -2.5; the local maximum at -3.3 is -2.5; the local maximum at -2.5 is 5

Answer: A

Solve the problem.

142) The height s of a ball (in feet) thrown with an initial velocity of 60 feet per second from an initial height of 4 feet is given as a function of time t (in seconds) by $s(t) = -16t^2 + 60t + 4$. What is the maximum height? Round to the nearest hundredth, if necessary.

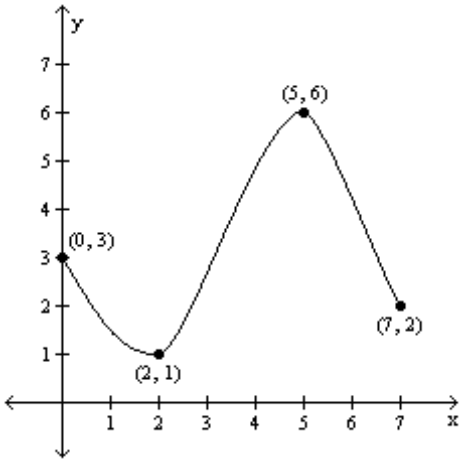


A) -37.25 ft B) 60.25 ft C) 69.63 ft D) 56.5 ft

Answer: B

For the graph of the function y = f(x), find the absolute maximum and the absolute minimum, if it exists.

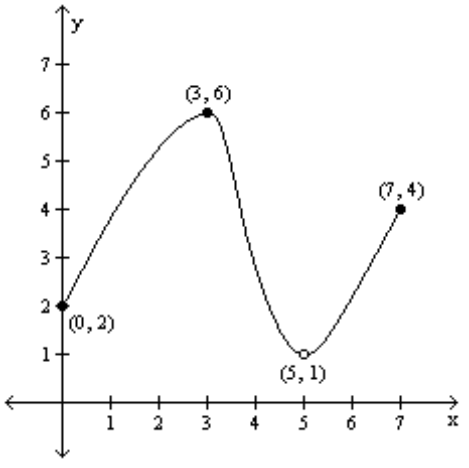
143)



A) Absolute maximum: f(5) = 6; Absolute minimum: f(2) = 1
B) Absolute maximum: f(6) = 5; Absolute minimum: f(1) = 2
C) Absolute maximum: f(2) = 7; Absolute minimum: f(3) = 0
D) Absolute maximum: f(7) = 2; Absolute minimum: f(0) = 3

Answer: A

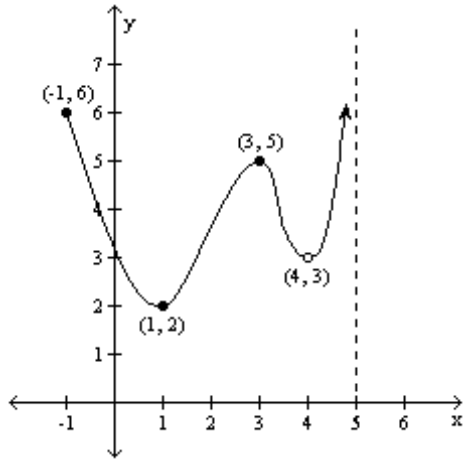
144)



A) Absolute maximum: f(3) = 6; Absolute minimum: f(5) = 1
B) Absolute maximum: f(7) = 4; Absolute minimum: f(0) = 2
C) Absolute maximum: f(3) = 6; Absolute minimum: none
D) Absolute maximum: f(3) = 6; Absolute minimum: f(0) = 2

Answer: C

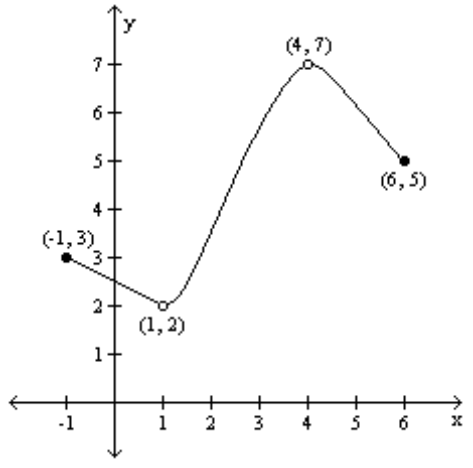
145)



A) Absolute maximum: none; Absolute minimum: none
B) Absolute maximum: none; Absolute minimum: f(1) = 2
C) Absolute maximum: f(-1) = 6; Absolute minimum: f(1) = 2
D) Absolute maximum: f(3) = 5; Absolute minimum: f(1) = 2

Answer: B

146)



A) Absolute maximum: none; Absolute minimum: f(1) = 2
B) Absolute maximum: f(4) = 7; Absolute minimum: f(1) = 2
C) Absolute maximum: f(4) = 7; Absolute minimum: none
D) Absolute maximum: none; Absolute minimum: none

Answer: D

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

147) $f(x) = x^3 - 3x + 3, (-2, 2)$

A) local maximum at (1, 1)
local minimum at (-1, 5)
increasing on (-2, -1)
decreasing on (-1, 1)

B) local maximum at (-1, 5)
local minimum at (1, 1)
increasing on (-2, -1) and (1, 2)
decreasing on (-1, 1)

C) local maximum at (1, 1)
local minimum at (-1, 5)
increasing on (-2, -1) and (1, 2)
decreasing on (-1, 1)

D) local maximum at (-1, 5)
local minimum at (1, 1)
increasing on (-1, 1)
decreasing on (-2, -1) and (1, 2)

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

148) $f(x) = x^3 - 4x^2 + 6;\ (-1, 4)$

Answer: local maximum at (0, 6)
local minimum at (2.67, -3.48)
increasing on (-1, 0) and (2.67, 4)
decreasing on (0, 2.67)

149) $f(x) = x^5 - x^2;\ (-2, 2)$

Answer: local maximum at (0, 0)
local minimum at (0.74, -0.33)
increasing on (-2, 0) and (0.74, 2)
decreasing on (0, 0.74)

150) $f(x) = -0.3x^3 + 0.2x^2 + 4x - 5;\ (-4, 5)$

Answer: local maximum at (2.34, 1.61)
local minimum at (-1.9, -9.82)
increasing on (-1.9, 2.34)
decreasing on (-4, -1.9) and (2.34, 5)

151) $f(x) = 0.15x^4 + 0.3x^3 - 0.8x^2 + 5;\ (-4, 2)$

Answer: local maximum at (0, 5)
local minima at (-2.55, 1.17) and (1.05, 4.65)
increasing on (-2.55, 0) and (1.05, 2)
decreasing on (-4, -2.55) and (0, 1.05)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

152) $f(x) = x^2 + 2x - 3;\ (-5, 5)$

A) local maximum at (1, -4)
C) local minimum at (-1, -4)
B) local maximum at (-1, 4)
D) local minimum at (1, 4)

Answer: C

153) $f(x) = 2 + 8x - x^2;\ (-5, 5)$

A) local maximum at (-4, 50)
B) local minimum at (-4, 18)
C) local maximum at (4, 18)
D) local minimum at (4, 50)

Answer: C

154) $f(x) = x^3 - 3x^2 + 1;\ (-5, 5)$

A) local minimum at (2, -3)
B) local maximum at (0, 1)
local minimum at (2, -3)
C) local minimum at (0, 1)
local maximum at (2, -3)
D) none

Answer: B

155) $f(x) = x^3 - 12x + 2;\ (-5, 5)$

A) local maximum at (-2, 18)
local minimum at (0, 0)
local minimum at (2, -14)
B) local minimum at (0, 0)
C) local maximum at (-2, 18)
local minimum at (2, -14)
D) none

Answer: C

156) $f(x) = x^4 - 5x^3 + 3x^2 + 9x - 3;\ (-5, 5)$

A) local minimum at (-0.57, -6.12)
local maximum at (1.32, 5.64)
local minimum at (3, -3)
B) local minimum at (-1, -6)
local maximum at (1, 6)
local minimum at (3, -3)
C) local minimum at (-0.61, -5.64)
local maximum at (1.41, 6.12)
local minimum at (3, -3)
D) local minimum at (-3, -3)
local maximum at (-1.32, 5.64)
local minimum at (0.57, -6.12)

Answer: A

For the function, find the average rate of change of f from 1 to x:

$\frac{f(x) - f(1)}{x - 1}, x \neq 1$

157) $f(x) = 8x$

A) $\frac{8}{x - 1}$
B) 0
C) 7
D) 8

Answer: D

158) $f(x) = x^2 - 2x$

A) 1
B) $\frac{x^2 - 2x - 1}{x - 1}$
C) x - 1
D) x + 1

Answer: C

159) $f(x) = \frac{6}{x + 5}$

A) $-\frac{1}{x + 5}$
B) $\frac{6}{(x - 1)(x + 5)}$
C) $\frac{6}{x(x + 5)}$
D) $\frac{1}{x + 5}$

Answer: A

160) $f(x) = \sqrt{x + 35}$

A) $\frac{\sqrt{x + 35} + 6}{x - 1}$ B) $\frac{\sqrt{x + 35} + 6}{x + 1}$ C) $\frac{\sqrt{x + 35} - 6}{x + 1}$ D) $\frac{\sqrt{x + 35} - 6}{x - 1}$

Answer: D

Find the average rate of change for the function between the given values.

161) $f(x) = 2x - 6$; from 1 to 3

A) 6 B) -2 C) -6 D) 2

Answer: D

162) $f(x) = x^2 + 6x$; from 3 to 7

A) $\frac{91}{4}$ B) $\frac{64}{7}$ C) 13 D) 16

Answer: D

163) $f(x) = 8x^3 + 7x^2 + 8$; from -9 to 1

A) 5280 B) $\frac{23}{10}$ C) 23 D) 528

Answer: D

164) $f(x) = \sqrt{2x}$; from 2 to 8

A) $\frac{1}{3}$ B) 7 C) $-\frac{3}{10}$ D) 2

Answer: A

165) $f(x) = \frac{3}{x - 2}$; from 4 to 7

A) $\frac{1}{3}$ B) 2 C) 7 D) $-\frac{3}{10}$

Answer: D

166) $f(x) = 4x^2$; from 0 to $\frac{7}{4}$

A) $-\frac{3}{10}$ B) $\frac{1}{3}$ C) 7 D) 2

Answer: C

167) $f(x) = -3x^2 - x$; from 5 to 6

A) -34 B) $-\frac{1}{6}$ C) -2 D) $\frac{1}{2}$

Answer: A

168) $f(x) = x^3 + x^2 - 8x - 7$; from 0 to 2

A) $-\frac{1}{6}$ B) -2 C) -28 D) $\frac{1}{2}$

Answer: B

169) $f(x) = \sqrt{2x - 1}$; from 1 to 5

A) $\frac{1}{2}$ B) -2 C) $-\frac{1}{6}$ D) -28

Answer: A

170) $f(x) = \frac{3}{x + 2}$; from 1 to 4

A) -28 B) -2 C) $-\frac{1}{6}$ D) $\frac{1}{2}$

Answer: C

Find an equation of the secant line containing (1, f(1)) and (2, f(2)).

171) $f(x) = x^3 - x$

A) $y = 6x - 6$ B) $y = -6x + 6$ C) $y = 6x + 6$ D) $y = -6x - 6$

Answer: A

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

A) $y = \frac{1}{5}x + \frac{4}{5}$ B) $y = \frac{4}{5}x + \frac{1}{5}$ C) $y = -\frac{1}{5}x + \frac{6}{5}$ D) $y = \frac{1}{5}x + \frac{3}{2}$

Answer: C

173) $f(x) = \sqrt{x + 24}$

A) $y = (\sqrt{26} - 5)x - \sqrt{26} + 10$ B) $y = (\sqrt{26} - 5)x + \sqrt{26} - 10$

C) $y = (-\sqrt{26} - 5)x - \sqrt{26} + 10$ D) $y = (-\sqrt{26} + 5)x + \sqrt{26} - 10$

Answer: A

Match the graph to the function listed whose graph most resembles the one given.

174)

A) reciprocal function B) square function

C) cube function D) absolute value function

Answer: B

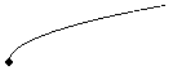
175)

A) constant function B) absolute value function

C) linear function D) reciprocal function

Answer: A

176)



A) square root function
B) cube function
C) cube root function
D) square function

Answer: A

177)

A) square function
B) reciprocal function
C) linear function
D) absolute value function

Answer: D

178)

A) constant function
B) reciprocal function
C) absolute value function
D) linear function

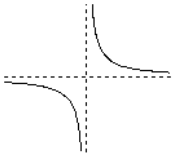
Answer: D

179)

A) cube root function
B) square root function
C) square function
D) cube function

Answer: D

180)



A) square root function
B) reciprocal function
C) absolute value function
D) square function

Answer: B

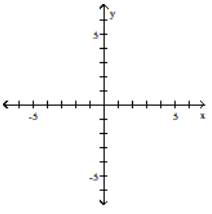
181)

A) cube root function
B) square function
C) square root function
D) cube function

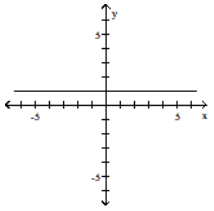
Answer: A

Graph the function.

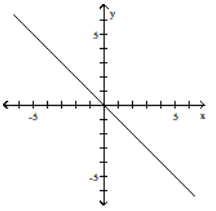
182) f(x) = x



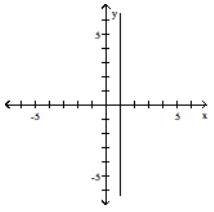
A)



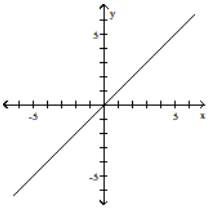
B)



C)

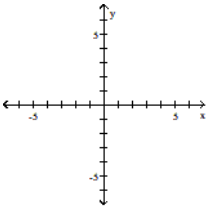


D)

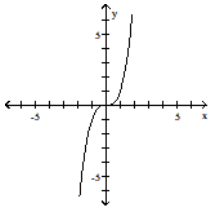


Answer: D

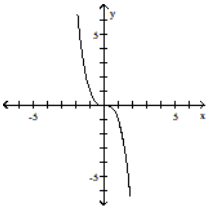
183) $f(x) = x^2$



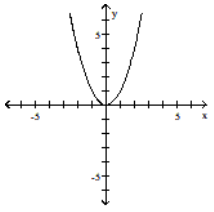
A)



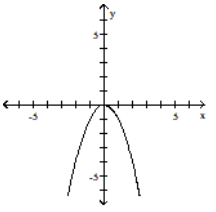
B)



C)

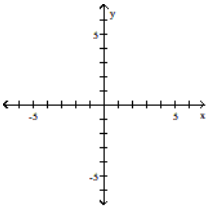


D)

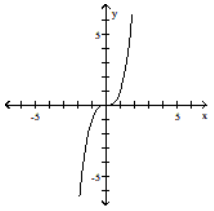


Answer: C

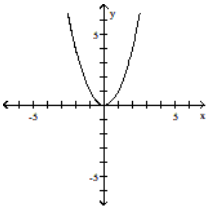
184) $f(x) = x^3$



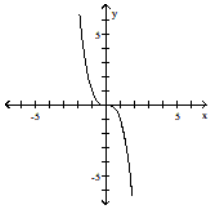
A)



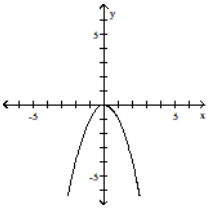
B)



C)

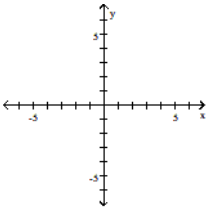


D)

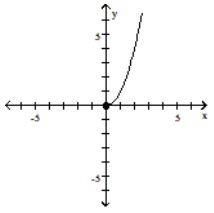


Answer: A

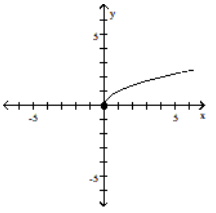
185) $f(x) = \sqrt{x}$



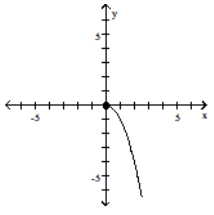
A)



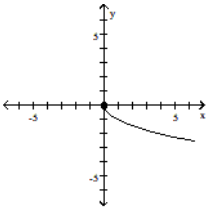
B)



C)

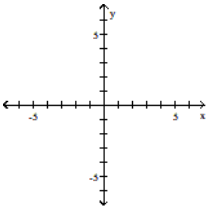


D)

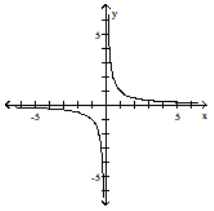


Answer: B

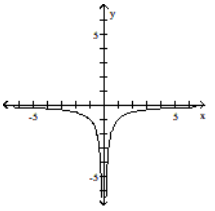
186) $f(x) = \frac{1}{x}$



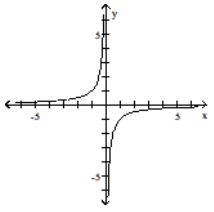
A)



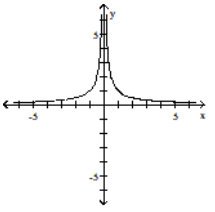
B)



C)

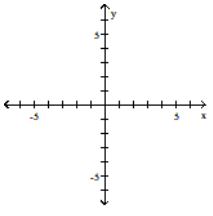


D)

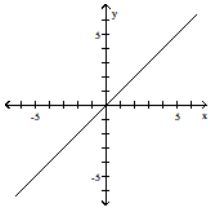


Answer: A

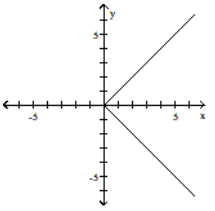
187) f(x) = |x|



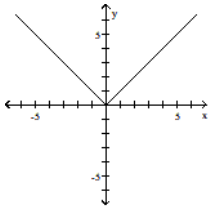
A)



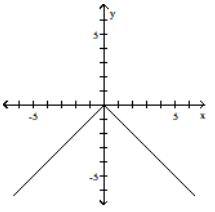
B)



C)

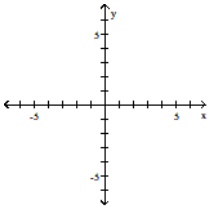


D)

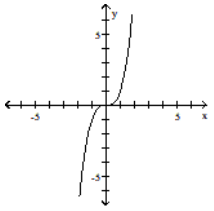


Answer: C

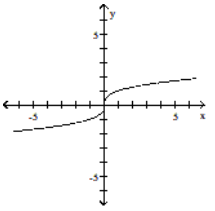
188) $f(x) = \sqrt[3]{x}$



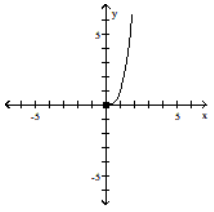
A)



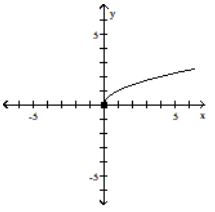
B)



C)

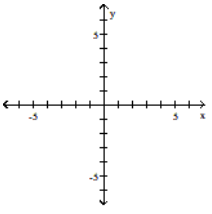


D)

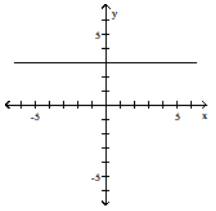


Answer: B

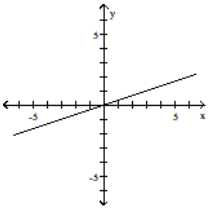
189) f(x) = 3



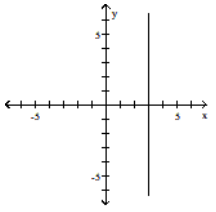
A)



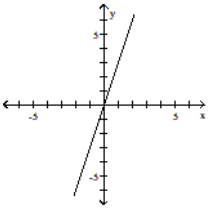
B)



C)



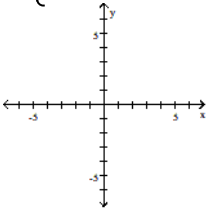
D)



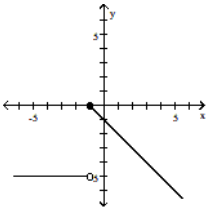
Answer: A

190)

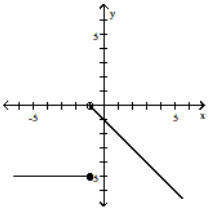
$$f(x) = \begin{cases} x - 1 & \text{if } x < 1 \\ -5 & \text{if } x \geq 1 \end{cases}$$



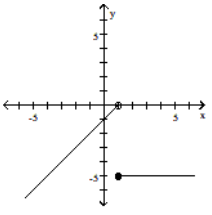
A)



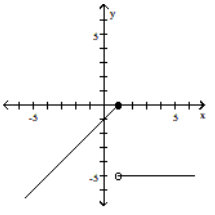
B)



C)



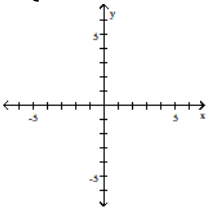
D)



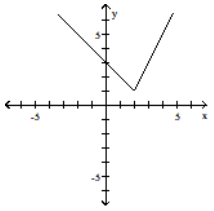
Answer: C

191)

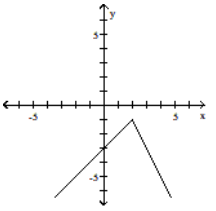
$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$



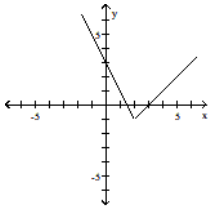
A)



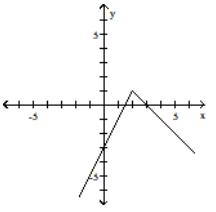
B)



C)



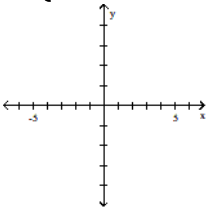
D)



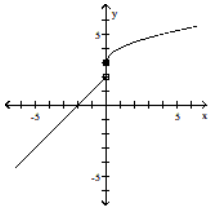
Answer: A

192)

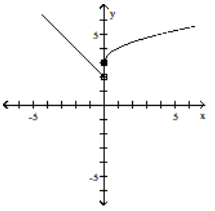
$$f(x) = \begin{cases} -x + 2 & x < 0 \\ \sqrt{x} + 3 & x \geq 0 \end{cases}$$



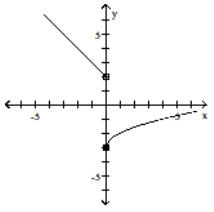
A)



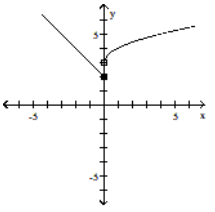
B)



C)



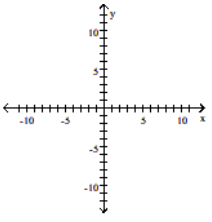
D)



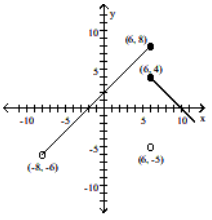
Answer: B

193)

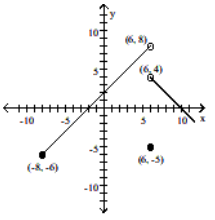
$$f(x) = \begin{cases} x + 1 & \text{if } -8 \le x < 6 \\ -5 & \text{if } x = 6 \\ -x + 10 & \text{if } x > 6 \end{cases}$$



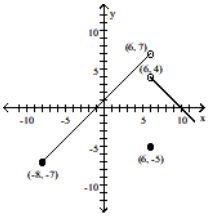
A)



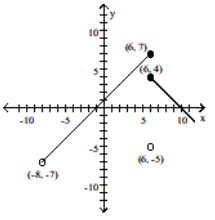
B)



C)



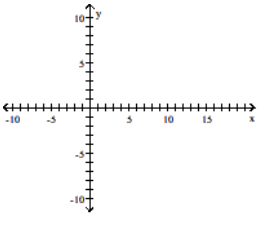
D)



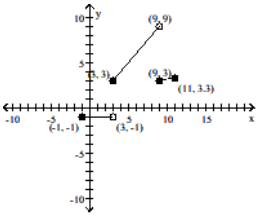
Answer: C

194)

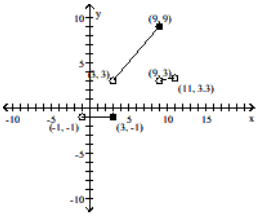
$$f(x) = \begin{cases} 1 & \text{if } -1 \le x < 3 \\ |x| & \text{if } 3 \le x < 9 \\ \sqrt{x} & \text{if } 9 \le x \le 11 \end{cases}$$



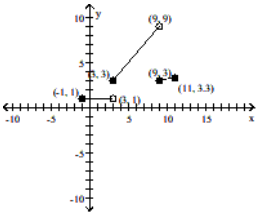
A)



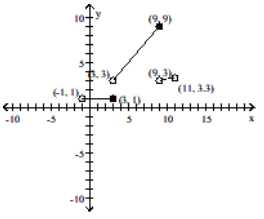
B)



C)



D)



Answer: C

Find the domain of the function.

195)

$$f(x) = \begin{cases} 2x & \text{if } x \neq 0 \\ 2 & \text{if } x = 0 \end{cases}$$

A) $\{x \mid x \neq 0\}$ B) all real numbers C) $\{x \mid x \leq 0\}$ D) $\{0\}$

Answer: B

196)

$$f(x) = \begin{cases} 1 & \text{if } -9 \leq x < -3 \\ |x| & \text{if } -3 \leq x < 9 \\ \sqrt[3]{x} & \text{if } 9 \leq x \leq 33 \end{cases}$$

A) $\{x \mid -9 \leq x < 9 \text{ or } 9 < x \leq 33\}$ B) $\{x \mid 9 \leq x \leq 33\}$

C) $\{x \mid x \geq -9\}$ D) $\{x \mid -9 \leq x \leq 33\}$

Answer: D

Locate any intercepts of the function.

197)

$$f(x) = \begin{cases} -5x + 7 & \text{if } x < 1 \\ 7x - 5 & \text{if } x \geq 1 \end{cases}$$

A) (0, -5), $(\frac{7}{5}, 0)$, $(\frac{5}{7}, 0)$

B) (0, 7), $(\frac{7}{5}, 0)$, $(\frac{5}{7}, 0)$

C) (0, -5)

D) (0, 7)

Answer: D

198)

$$f(x) = \begin{cases} 1 & \text{if } -7 \leq x < -7 \\ |x| & \text{if } -7 \leq x < 7 \\ \sqrt[3]{x} & \text{if } 7 \leq x \leq 26 \end{cases}$$

A) (0, 0), (0, 1)

B) (0, 0), (1, 0)

C) (0, 0)

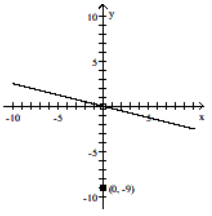
D) none

Answer: C

Based on the graph, find the range of y = f(x).

199)

$$f(x) = \begin{cases} -\frac{1}{4}x & \text{if } x \neq 0 \\ -9 & \text{if } x = 0 \end{cases}$$



A) $(-\infty, 0)$ or $(0, \infty)$

B) (-10, 10)

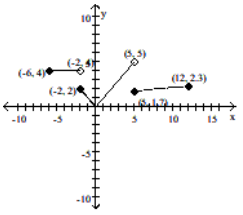
C) $(-\infty, \infty)$

D) $(-\infty, 0)$ or $\{0\}$ or $(0, \infty)$

Answer: A

200)

$$f(x) = \begin{cases} 4 & \text{if } -6 \le x < -2 \\ |x| & \text{if } -2 \le x < 5 \\ \sqrt[3]{x} & \text{if } 5 \le x \le 12 \end{cases}$$

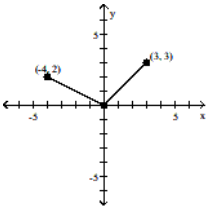


A) $[0, 5)$ B) $[0, 5]$ C) $[0, \infty)$ D) $[0, \sqrt[3]{12}]$

Answer: A

The graph of a piecewise-defined function is given. Write a definition for the function.

201)



A)

$$f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$$

B)

$$f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 \le x \le 0 \\ x & \text{if } 0 < x \le 3 \end{cases}$$

C)

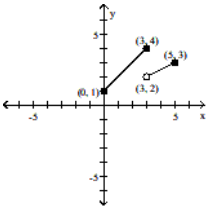
$$f(x) = \begin{cases} \frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$$

D)

$$f(x) = \begin{cases} -2x & \text{if } -4 \le x \le 0 \\ x & \text{if } 0 < x \le 3 \end{cases}$$

Answer: B

202)



A) $f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x + \frac{1}{2} & \text{if } 3 < x \le 5 \end{cases}$

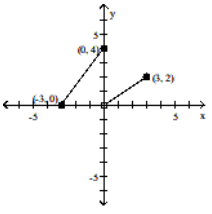
B) $f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x - \frac{1}{2} & \text{if } 3 < x \le 5 \end{cases}$

C) $f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x & \text{if } 3 < x \le 5 \end{cases}$

D) $f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x + 2 & \text{if } 3 < x \le 5 \end{cases}$

Answer: A

203)



A) $f(x) = \begin{cases} \frac{4}{3}x - 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 \le x \le 3 \end{cases}$

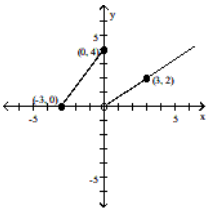
B) $f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } 0 < x \le 3 \end{cases}$

C) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x + 2 & \text{if } 0 < x \le 3 \end{cases}$

D) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$

Answer: D

204)



A) $f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } x > 0 \end{cases}$

B) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } x > 0 \end{cases}$

C) $f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } x \ge 0 \end{cases}$

D) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$

Answer: B

Solve the problem.

205) If f(x) = int(4x), find f(1.8).

A) 8 B) 1 C) 7 D) 2

Answer: C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

206) A gas company has the following rate schedule for natural gas usage in single-family residences:

Monthly service charge	$8.80
Per therm service charge	
1st 25 therms	$0.6686/therm
Over 25 therms	$0.85870/therm

What is the charge for using 25 therms in one month?
What is the charge for using 45 therms in one month?
Construct a function that gives the monthly charge C for x therms of gas.

Answer: $25.52
$42.69

$C(x) = \begin{cases} 8.8 + 0.6686x & \text{if } 0 \le x \le 25 \\ 4.0475 + 0.8587x & \text{if } x > 25 \end{cases}$

207) An electric company has the following rate schedule for electricity usage in single-family residences:

Monthly service charge	$4.93
Per kilowatt service charge	
1st 300 kilowatts	$0.11589/kW
Over 300 kilowatts	$0.13321/kW

What is the charge for using 300 kilowatts in one month?
What is the charge for using 375 kilowatts in one month?
Construct a function that gives the monthly charge C for x kilowatts of electricity.

Answer: $39.70
$49.69

$$C(x) = \begin{cases} 4.93 + 0.11589x & \text{if } 0 \le x \le 300 \\ -0.266 + 0.13321x & \text{if } x > 300 \end{cases}$$

208) One Internet service provider has the following rate schedule for high-speed Internet service:

Monthly service charge	$18.00
1st 50 hours of use	free
Next 50 hours of use	$0.25/hour
Over 100 hours of use	$1.00/hour

What is the charge for 50 hours of high-speed Internet use in one month?
What is the charge for 75 hours of high-speed Internet use in one month?
What is the charge for 135 hours of high-speed Internet use in one month?

Answer: $18.00
$24.25
$65.50

209) The wind chill factor represents the equivalent air temperature at a standard wind speed that would produce the heat loss as the given temperature and wind speed. One formula for computing the equivalent temperature is

$$W(t) = \begin{cases} t & \text{if } 0 \le v < 1.79 \\ 33 - \dfrac{(10.45 + 10\sqrt{v} - v)(33 - t)}{22.04} & \text{if } 1.79 \le v < 20 \\ 33 - 1.5958(33 - t) & \text{if } v \ge 20 \end{cases}$$

where v represents the wind speed (in meters per second) and t represents the air temperature (°C). Compute the wind chill for an air temperature of 15°C and a wind speed of 12 meters per second. (Round the answer to one decimal place.)

Answer: 6.0°C

210) A cellular phone plan had the following schedule of charges:

Basic service, including 100 minutes of calls	$20.00 per month
2nd 100 minutes of calls	$0.075 per minute
Additional minutes of calls	$0.10 per minute

What is the charge for 200 minutes of calls in one month?
What is the charge for 250 minutes of calls in one month?
Construct a function that relates the monthly charge C for x minutes of calls.

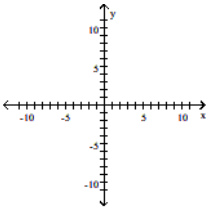
Answer: $27.50
$32.50;

$$C(x) = \begin{cases} 20 & \text{if } 0 \le x \le 100 \\ 12.5 + 0.075x & \text{if } 100 < x \le 200 \\ 7.5 + 0.1x & \text{if } x > 200 \end{cases}$$

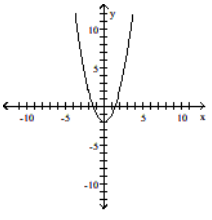
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

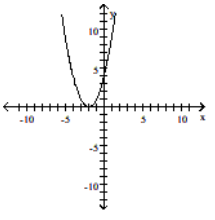
211) $f(x) = x^2 + 2$



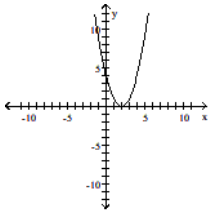
A)



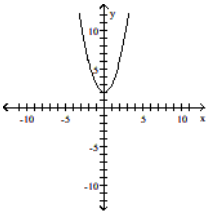
B)



C)

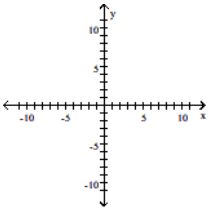


D)

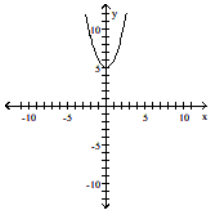


Answer: D

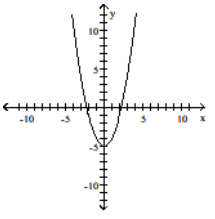
212) $f(x) = (x - 5)^2$



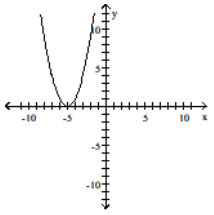
A)



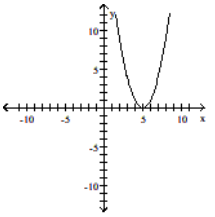
B)



C)

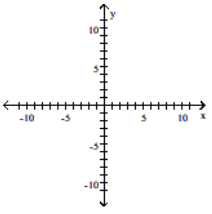


D)

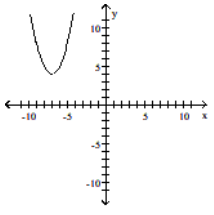


Answer: D

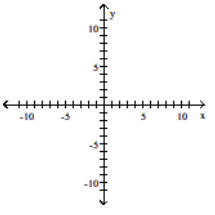
213) $f(x) = (x + 7)^2 + 4$



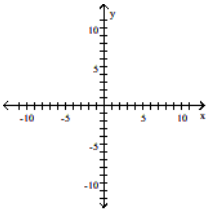
A)



B)



C)



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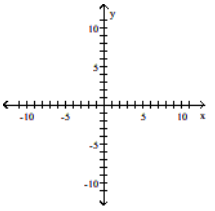
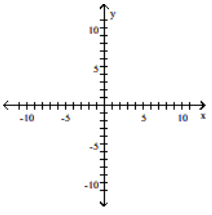
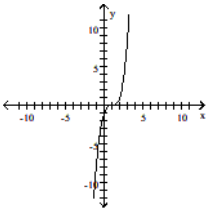


Answer: A

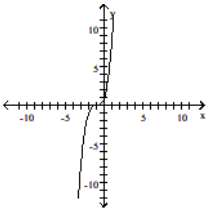
214) $f(x) = x^3 + 1$



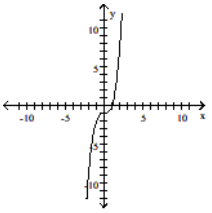
A)



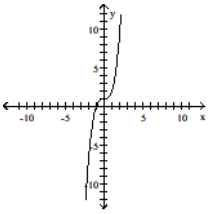
B)



C)

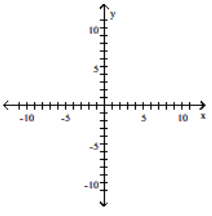


D)

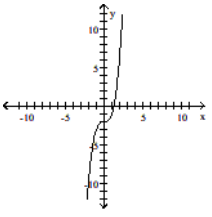


Answer: D

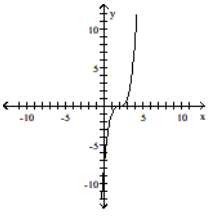
215) $f(x) = (x + 2)^3$



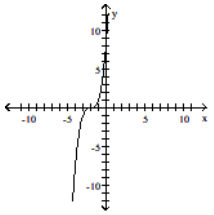
A)



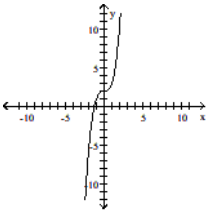
B)



C)

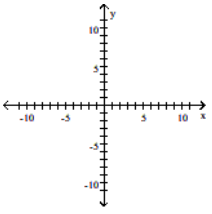


D)

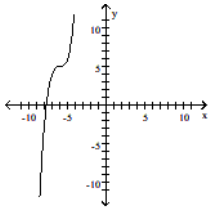


Answer: C

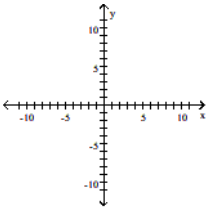
216) $f(x) = (x + 6)^3 + 5$



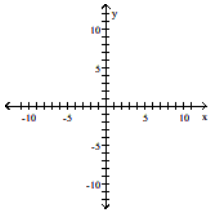
A)



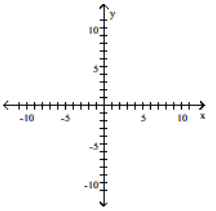
B)



C)

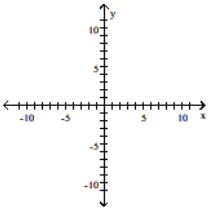


D)

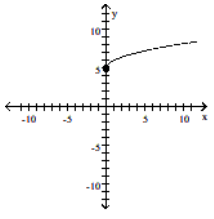


Answer: A

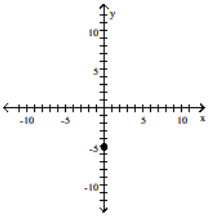
217) $f(x) = \sqrt{x} - 5$



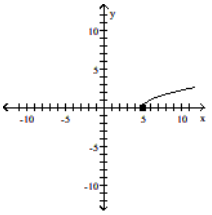
A)



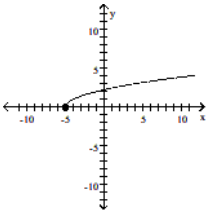
B)



C)

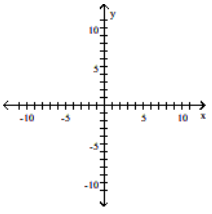


D)

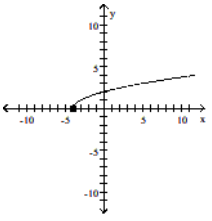


Answer: B

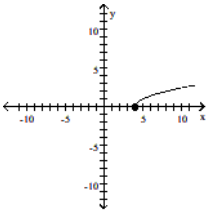
218) $f(x) = \sqrt{x + 4}$



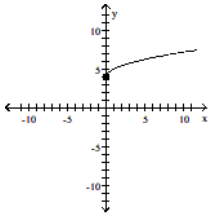
A)



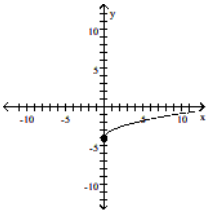
B)



C)

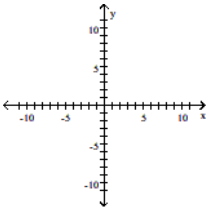


D)

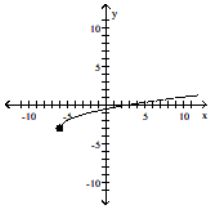


Answer: A

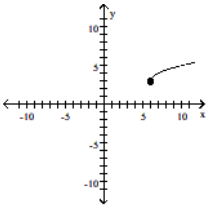
219) $f(x) = \sqrt{x - 6} + 3$



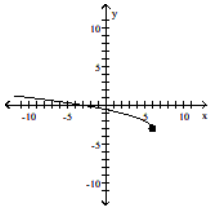
A)



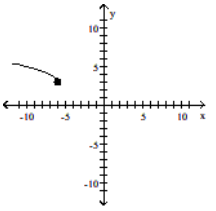
B)



C)

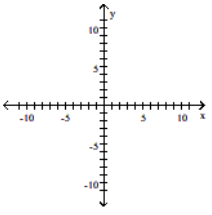


D)

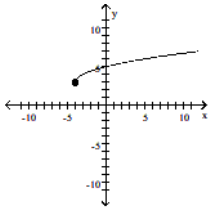


Answer: B

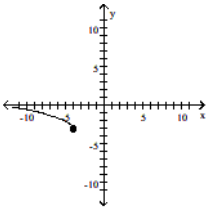
220) $f(x) = \sqrt{x - 4} - 3$



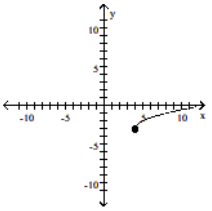
A)



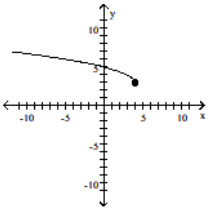
B)



C)

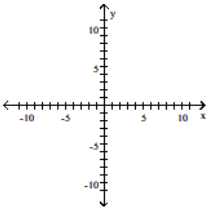


D)

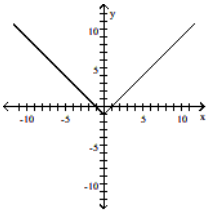


Answer: C

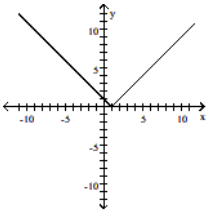
221) f(x) = |x| + 1



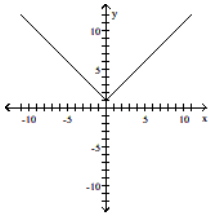
A)



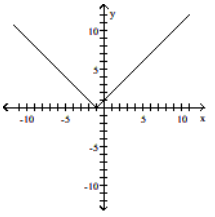
B)



C)

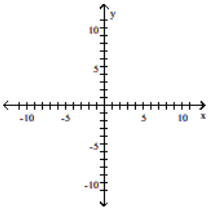


D)

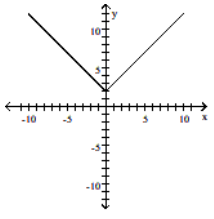


Answer: C

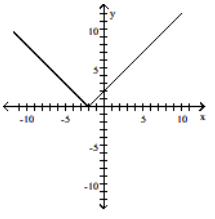
222) f(x) = |x - 2|



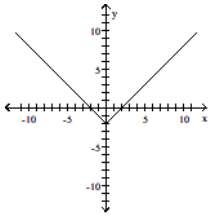
A)



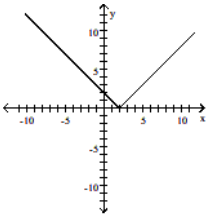
B)



C)

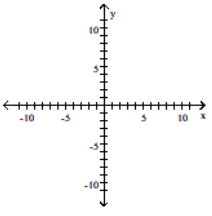


D)

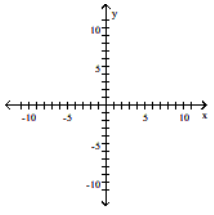


Answer: D

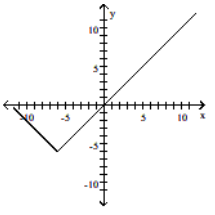
223) f(x) = |x + 6| - 6



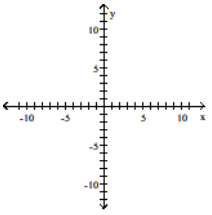
A)



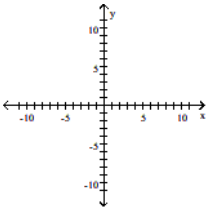
B)



C)

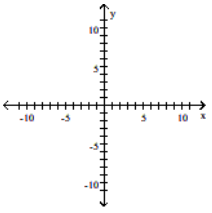


D)

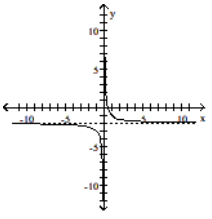


Answer: B

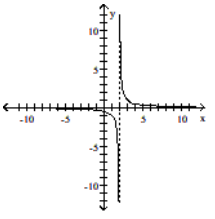
224) $f(x) = \frac{1}{x} + 2$



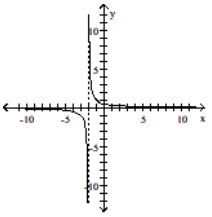
A)



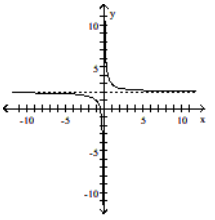
B)



C)

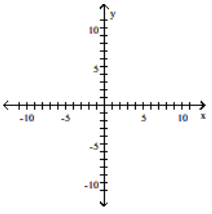


D)

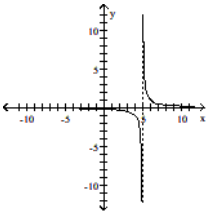


Answer: D

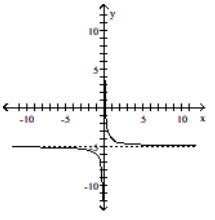
225) $f(x) = \frac{1}{x + 5}$



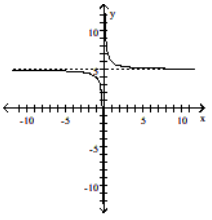
A)



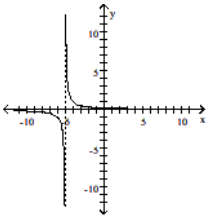
B)



C)

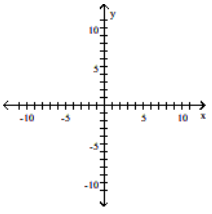


D)

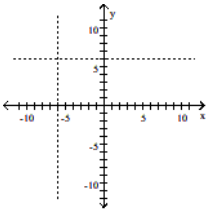


Answer: D

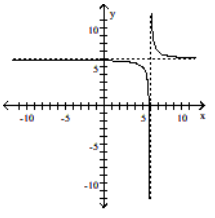
226) $f(x) = \frac{1}{x - 6} + 6$



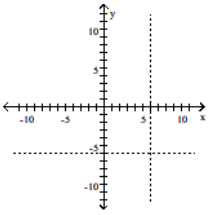
A)



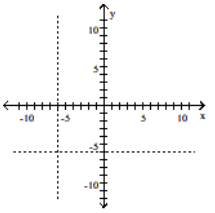
B)



C)



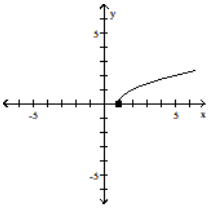
D)



Answer: B

Match the correct function to the graph.

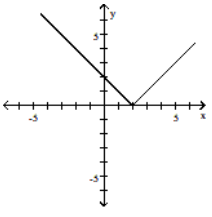
227)



A) y = x - 1 B) y = $\sqrt{x}$ C) y = $\sqrt{x+1}$ D) y = $\sqrt{x-1}$

Answer: D

228)

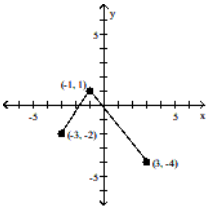


A) y = |1 - x| B) y = |x + 2| C) y = x - 2 D) y = |2 - x|

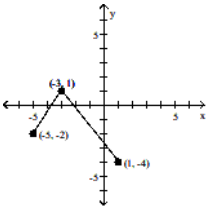
Answer: D

Using transformations, sketch the graph of the requested function.

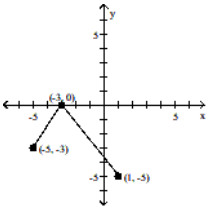
229) The graph of a function f is illustrated. Use the graph of f as the first step toward graphing the function F(x), where F(x) = f(x + 2) - 1.



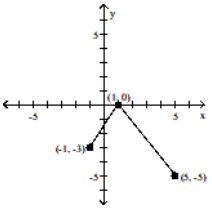
A)



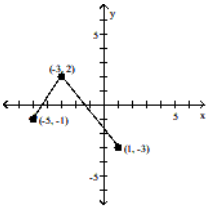
B)



C)



D)



Answer: B

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

230) y = f(x + 3)

A) (2, 1) B) (-1, 4) C) (5, 4) D) (2, 7)

Answer: B

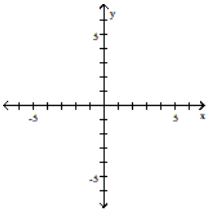
231) f(x) + 6

A) (2, -6) B) (8, 4) C) (-4, 4) D) (2, 10)

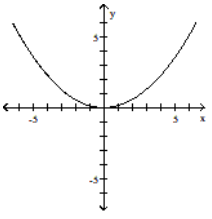
Answer: D

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

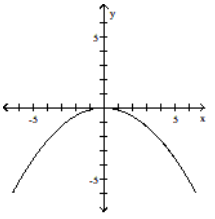
232) $f(x) = 7x^2$



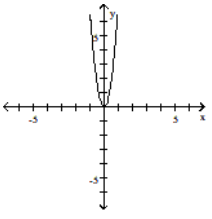
A)



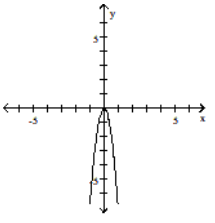
B)



C)

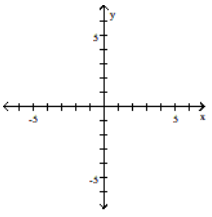


D)

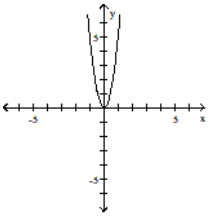


Answer: C

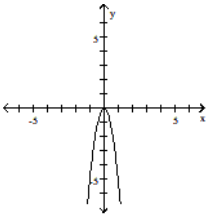
233) $f(x) = \frac{1}{5}x^2$



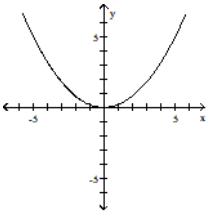
A)



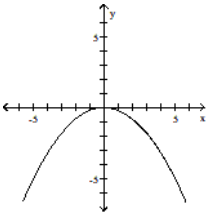
B)



C)

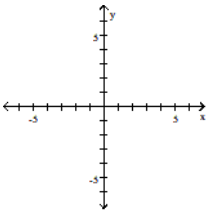


D)

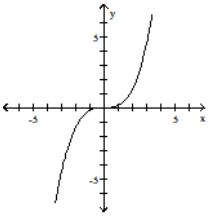


Answer: C

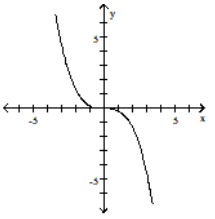
234) $f(x) = 6x^3$



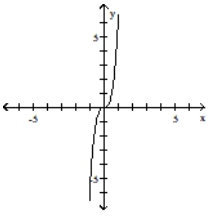
A)



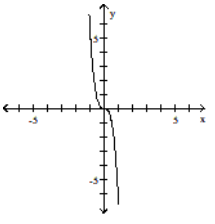
B)



C)

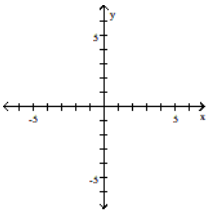


D)

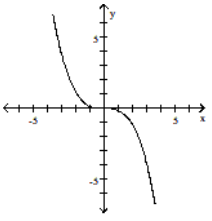


Answer: C

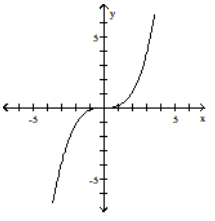
235) $f(x) = \frac{1}{7}x^3$



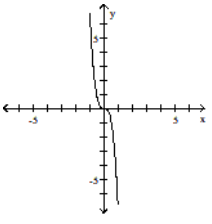
A)



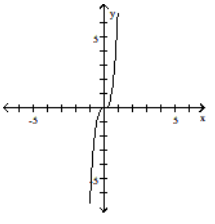
B)



C)

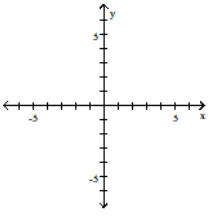


D)

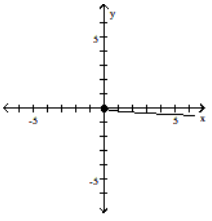


Answer: B

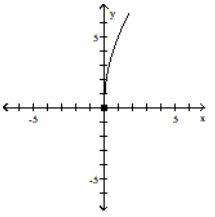
236) $f(x) = 5\sqrt{x}$



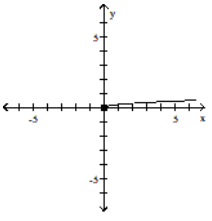
A)



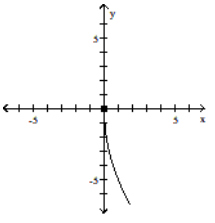
B)



C)

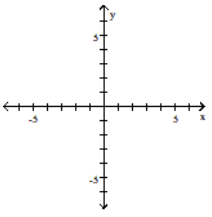


D)

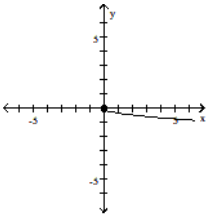


Answer: B

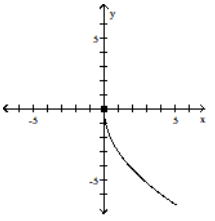
237) $f(x) = \frac{1}{3}\sqrt{x}$



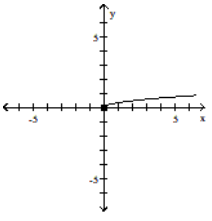
A)



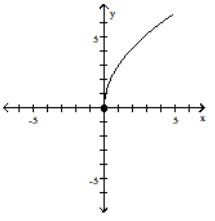
B)



C)

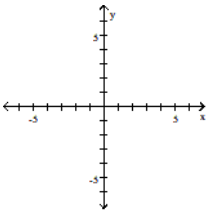


D)

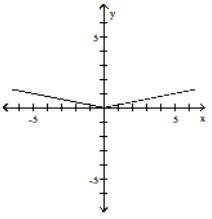


Answer: C

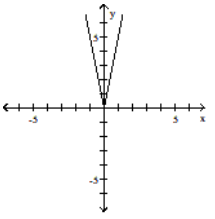
238) f(x) = 5|x|



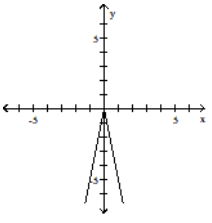
A)



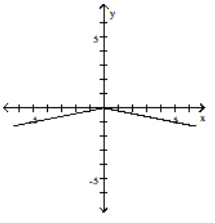
B)



C)

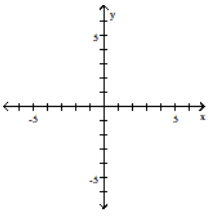


D)

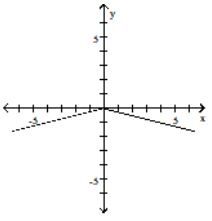


Answer: B

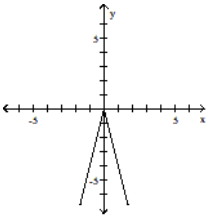
239) $f(x) = \frac{1}{4}|x|$



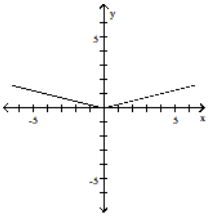
A)



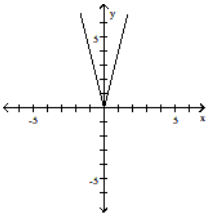
B)



C)

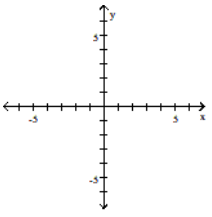


D)

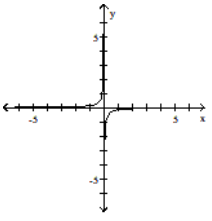


Answer: C

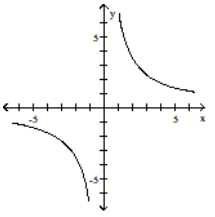
240) $f(x) = \frac{7}{x}$



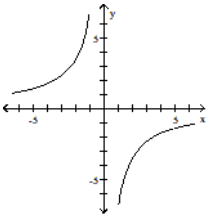
A)



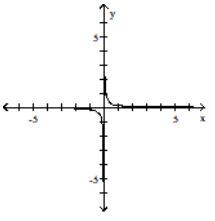
B)



C)

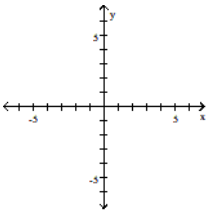


D)

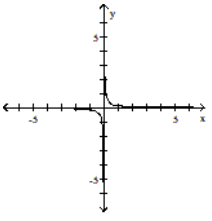


Answer: B

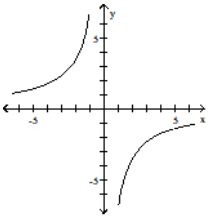
241) $f(x) = \frac{1}{7x}$



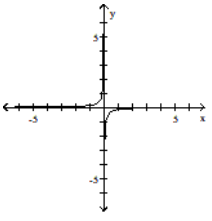
A)



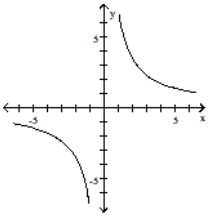
B)



C)

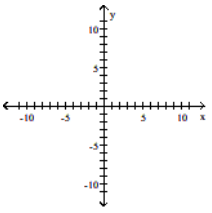


D)

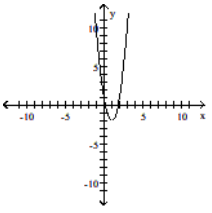


Answer: A

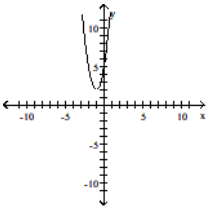
242) $f(x) = 3(x + 1)^2 + 2$



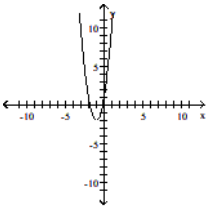
A)



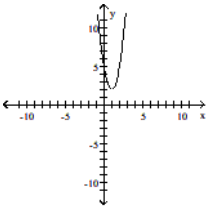
B)



C)



D)



Answer: B

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

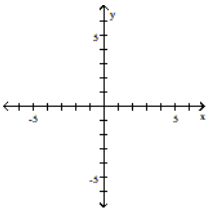
243) y = 4f(x)

A) (5, 3) B) (3, 8) C) (8, 4) D) (2, 16)

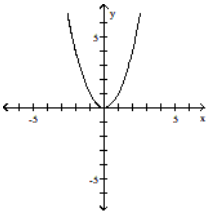
Answer: D

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

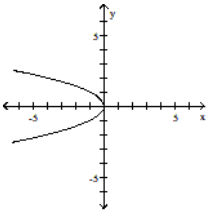
244) $f(x) = -x^2$



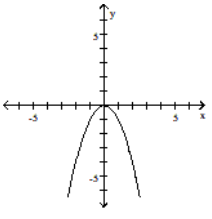
A)



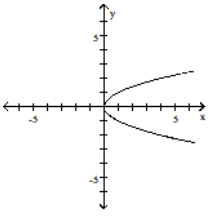
B)



C)

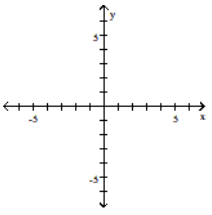


D)

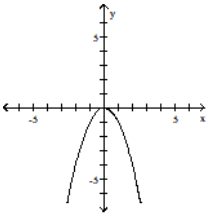


Answer: C

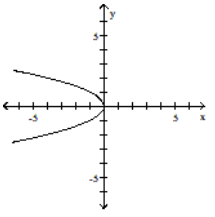
245) $f(x) = (-x)^2$



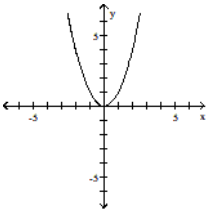
A)



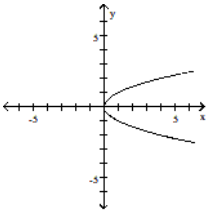
B)



C)

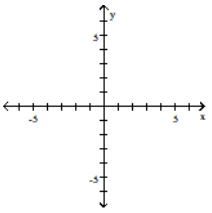


D)

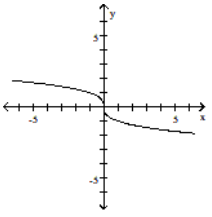


Answer: C

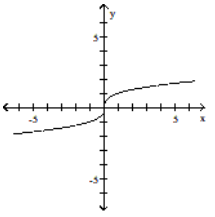
246) $f(x) = -x^3$



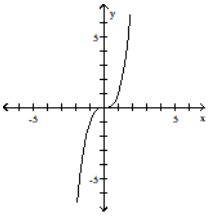
A)



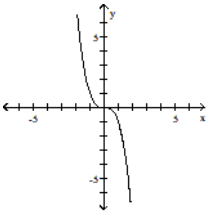
B)



C)

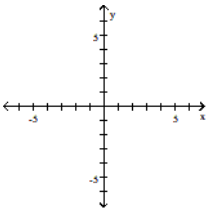


D)

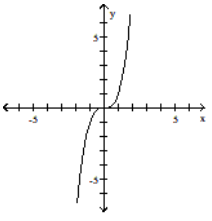


Answer: D

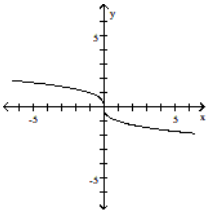
247) $f(x) = (-x)^3$



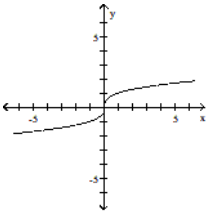
A)



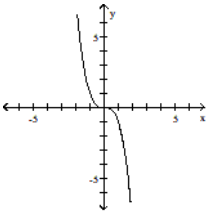
B)



C)

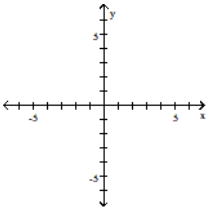


D)

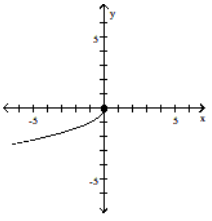


Answer: D

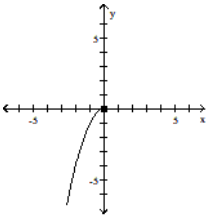
248) $f(x) = -\sqrt{x}$



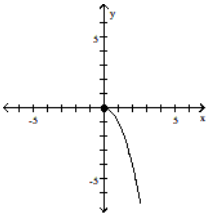
A)



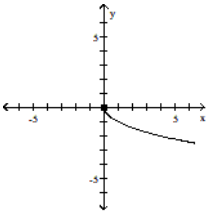
B)



C)

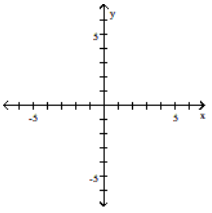


D)

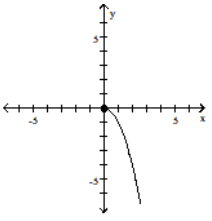


Answer: D

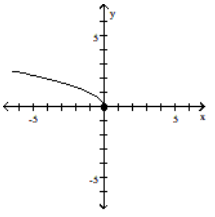
249) $f(x) = \sqrt{-x}$



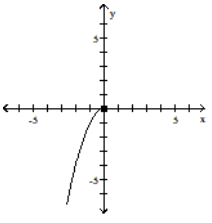
A)



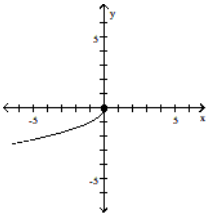
B)



C)

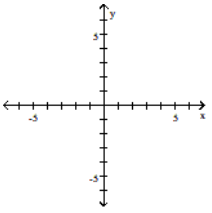


D)

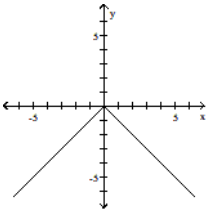


Answer: B

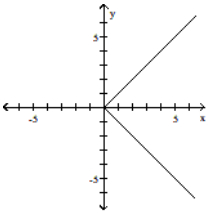
250) f(x) = - |x|



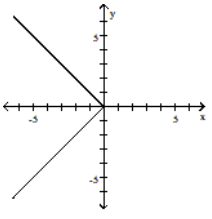
A)



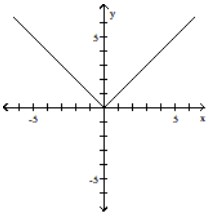
B)



C)

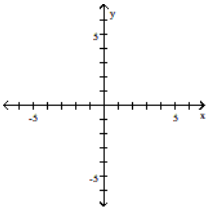


D)

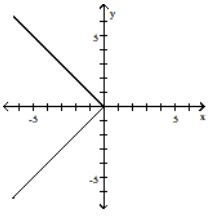


Answer: A

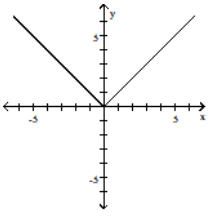
251) f(x) = | - x|



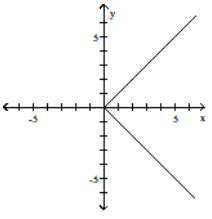
A)



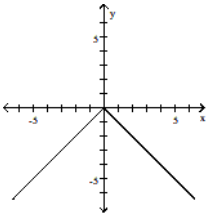
B)



C)

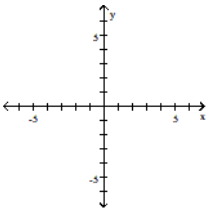


D)

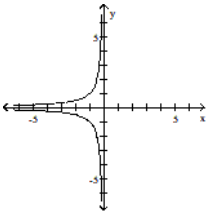


Answer: B

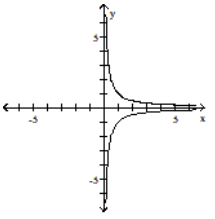
252) $f(x) = -\frac{1}{x}$



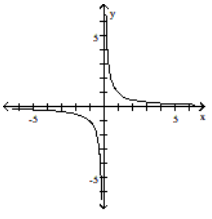
A)



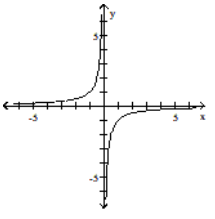
B)



C)

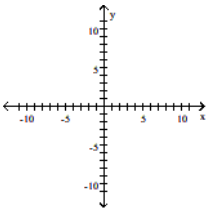


D)

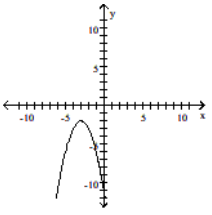


Answer: D

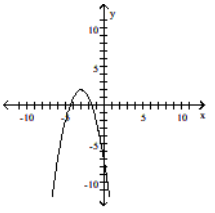
253) $f(x) = -(x + 3)^2 - 2$



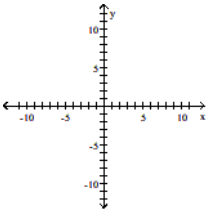
A)



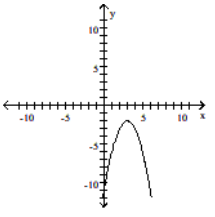
B)



C)

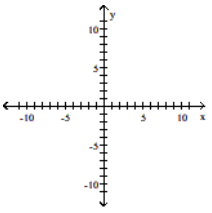


D)

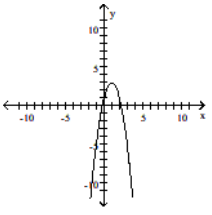


Answer: A

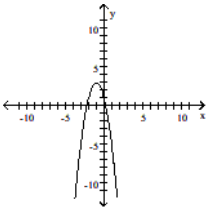
254) $f(x) = -2(x + 1)^2 - 3$



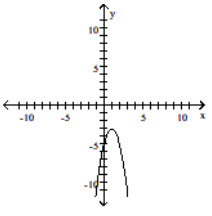
A)



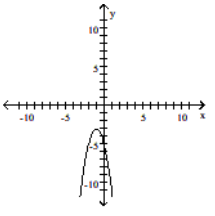
B)



C)



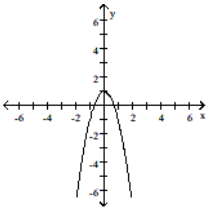
D)



Answer: D

Match the correct function to the graph.

255)



A) $y = -2x^2 + 1$ B) $y = -2x^2 - 1$ C) $y = 1 - x^2$ D) $y = -2x^2$

Answer: A

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

256) The reflection of the graph of y = f(x) across the x-axis

A) (2, -4) B) (-2, 4) C) (2, 4) D) (-2, -4)

Answer: A

257) The reflection of the graph of y = f(x) across the y-axis

A) (-2, -4) B) (2, -4) C) (-2, 4) D) (2, 4)

Answer: C

Find the function.

258) Find the function that is finally graphed after the following transformations are applied to the graph of y = |x|. The graph is shifted right 3 units, stretched by a factor of 3, shifted vertically down 2 units, and finally reflected across the x-axis.

A) $y = -(3|x + 3| - 2)$ B) $y = -(3|x - 3| - 2)$ C) $y = -3|x - 3| - 2$ D) $y = 3|-x - 3| - 2$

Answer: B

259) Find the function that is finally graphed after the following transformations are applied to the graph of $y = \sqrt{x}$. The graph is shifted down 3 units, reflected about the x-axis, and finally shifted left 2 units.

A) $y = -\sqrt{x - 2} + 3$ B) $y = -\sqrt{x + 2} - 3$ C) $y = -\sqrt{x + 2} + 3$ D) $y = \sqrt{-x - 2} - 3$

Answer: B

260) Find the function that is finally graphed after the following transformations are applied to the graph of y = |x|. The graph is shifted down 4 units, reflected about the y-axis, and finally shifted left 6 units.

A) $y = |-x - 6| + 4$ B) $y = -|x + 6| - 4$ C) $y = |-x - 6| - 4$ D) $y = |-x + 6| + 4$

Answer: C

Solve the problem.

261) Elissa wants to set up a rectangular dog run in her backyard. She has 24 feet of fencing to work with and wants to use it all. If the dog run is to be x feet long, express the area of the dog run as a function of x.

A) $A(x) = 11x - x^2$ B) $A(x) = 13x - x^2$ C) $A(x) = 14x^2 - x$ D) $A(x) = 12x - x^2$

Answer: D

262) Bob wants to fence in a rectangular garden in his yard. He has 64 feet of fencing to work with and wants to use it all. If the garden is to be x feet wide, express the area of the garden as a function of x.

A) $A(x) = 33x - x^2$ B) $A(x) = 31x - x^2$ C) $A(x) = 34x^2 - x$ D) $A(x) = 32x - x^2$

Answer: D

263) Sue wants to put a rectangular garden on her property using 76 meters of fencing. There is a river that runs through her property so she decides to increase the size of the garden by using the river as one side of the rectangle. (Fencing is then needed only on the other three sides.) Let x represent the length of the side of the rectangle along the river. Express the garden's area as a function of x.

A) $A(x) = 37x - \frac{1}{4}x^2$ B) $A(x) = 38x^2 - x$ C) $A(x) = 38x - \frac{1}{2}x^2$ D) $A(x) = 39x - 2x^2$

Answer: C

264) A farmer has 1,600 yards of fencing to enclose a rectangular garden. Express the area A of the rectangle as a function of the width x of the rectangle. What is the domain of A?

A) $A(x) = -x^2 + 1{,}600x;\ \{x|0 < x < 1{,}600\}$ B) $A(x) = -x^2 + 800x;\ \{x|0 < x < 1{,}600\}$

C) $A(x) = -x^2 + 800x;\ \{x|0 < x < 800\}$ D) $A(x) = x^2 + 800x;\ \{x|0 < x < 800\}$

Answer: C

265) A rectangular sign is being designed so that the length of its base, in feet, is 10 feet less than 4 times the height, h. Express the area of the sign as a function of h.

A) $A(h) = -10h + 4h^2$ B) $A(h) = -10h + h^2$ C) $A(h) = 10h - 2h^2$ D) $A(h) = -10h^2 + 2h$

Answer: A

266) A rectangle that is x feet wide is inscribed in a circle of radius 36 feet. Express the area of the rectangle as a function of x.

A) $A(x) = x^2\sqrt{2{,}592 - x^2}$ B) $A(x) = x\sqrt{5{,}184 - x^2}$

C) $A(x) = x(5{,}184 - x^2)$ D) $A(x) = x\sqrt{3{,}888 - x}$

Answer: B

267) A wire of length 3x is bent into the shape of a square. Express the area A of the square as a function of x.

A) $A(x) = \frac{3}{4}x^2$ B) $A(x) = \frac{9}{16}x^2$ C) $A(x) = \frac{9}{8}x^2$ D) $A(x) = \frac{1}{16}x^2$

Answer: B

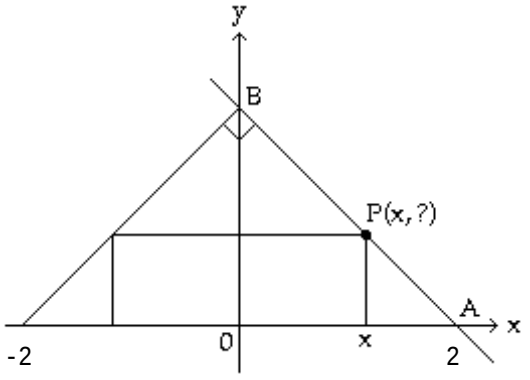
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

268) A right triangle has one vertex on the graph of $y = x^2$ at (x, y), another at the origin, and the third on the (positive) y-axis at (0, y). Express the area A of the triangle as a function of x.

Answer: $A(x) = \frac{1}{2}x^3$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

269) The figure shown here shows a rectangle inscribed in an isosceles right triangle whose hypotenuse is 4 units long. Express the area A of the rectangle in terms of x.



A) $A(x) = 2x(2 - x)$ B) $A(x) = x(2 - x)$ C) $A(x) = 2x^2$ D) $A(x) = 2x(x - 2)$

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

270) A wire 20 feet long is to be cut into two pieces. One piece will be shaped as a square and the other piece will be shaped as an equilateral triangle. Express the total area A enclosed by the pieces of wire as a function of the length x of a side of the equilateral triangle. What is the domain of A?

Answer: $A(x) = \frac{4\sqrt{3} + 9}{16} x^2 - \frac{15}{2}x + 25; \ \{x \mid 0 \le x \le \frac{20}{3}\}$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

271) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the height of the silo is 66 feet and the radius of the hemisphere is r feet, express the volume of the silo as a function of r.

A) $V(r) = \pi(66 - r)r^2 + \frac{2}{3}\pi r^3$ B) $V(r) = \pi(66 - r) + \frac{4}{3}\pi r^2$

C) $V(r) = \pi(66 - r)r^3 + \frac{4}{3}\pi r^2$ D) $V(r) = 66\pi r^2 + \frac{8}{3}\pi r^3$

Answer: A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

272) The volume V of a square-based pyramid with base sides s and height h is $V = \frac{1}{3}s^2h$. If the height is half of the length of a base side, express the volume V as a function of s.

Answer: $V(s) = \frac{1}{6}s^3$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

273) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the radius of the hemisphere is 10 feet and the height of the silo is h feet, express the volume of the silo as a function of h.

A) $V(h) = 100\pi(h - 10) + \frac{2000}{3}\pi$

B) $V(h) = 4100\pi(h - 10) + \frac{500}{7}\pi$

C) $V(h) = 100\pi h + \frac{4000}{3}\pi h^2$

D) $V(h) = 100\pi(h^2 - 10) + \frac{5000}{3}\pi$

Answer: A

274) From a 48-inch by 48-inch piece of metal, squares are cut out of the four corners so that the sides can then be folded up to make a box. Let x represent the length of the sides of the squares, in inches, that are cut out. Express the volume of the box as a function of x.

A) $V(x) = 2x^3 - 144x^2 + 48x$

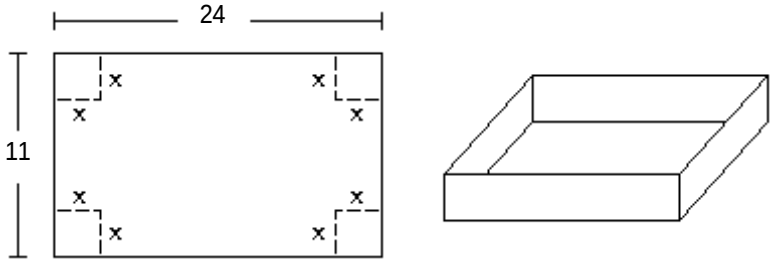
B) $V(x) = 2x^3 - 144x^2$

C) $V(x) = 4x^3 - 192x^2 + 2{,}304x$

D) $V(x) = 4x^3 - 192x^2$

Answer: C

275) A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 11 inches by 24 inches 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) $V(x) = x(11 - 2x)(24 - 2x)$

B) $V(x) = (11 - x)(24 - x)$

C) $V(x) = (11 - 2x)(24 - 2x)$

D) $V(x) = x(11 - x)(24 - x)$

Answer: A

276) A rectangular box with volume 433 cubic feet is built with a square base and top. The cost is $1.50 per square foot for the top and the bottom and $2.00 per square foot for the sides. Let x represent the length of a side of the base. Express the cost the box as a function of x.

A) $C(x) = 3x^2 + \frac{3{,}464}{x}$

B) $C(x) = 4x + \frac{3{,}464}{x^2}$

C) $C(x) = 3x^2 + \frac{1{,}732}{x}$

D) $C(x) = 2x^2 + \frac{3{,}464}{x}$

Answer: A

277) The price p and the quantity x sold of a certain product obey the demand equation:

$p = -\frac{1}{5}x + 200, \{x \mid 0 \le x \le 500\}$

What is the revenue to the nearest dollar when 300 units are sold?

A) $110,000

B) $78,000

C) $20,000

D) $42,000

Answer: D

278) Let P = (x, y) be a point on the graph of $y = \sqrt{x}$. Express the distance d from P to the point (1, 0) as a function of x.

A) $d(x) = x^2 - x + 1$ B) $d(x) = x^2 + 2x + 2$ C) $d(x) = \sqrt{x^2 + 2x + 2}$ D) $d(x) = \sqrt{x^2 - x + 1}$

Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

279) The price p and x, the quantity of a certain product sold, obey the demand equation

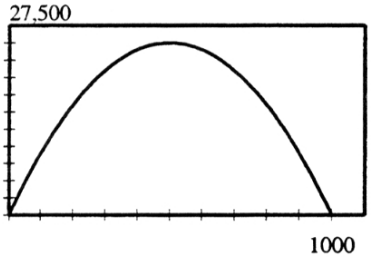
$$p = -\frac{1}{10}x + 100, \{x \mid 0 \le x \le 1000\}$$

a) Express the revenue R as a function of x.
b) What is the revenue if 450 units are sold?
c) Graph the revenue function using a graphing utility.
d) What quantity x maximizes revenue? What is the maximum revenue?
e) What price should the company charge to maximize revenue?

Answer: a. $R(x) = -\frac{1}{10}x^2 + 100x$

b. R(450) = $24,750.00

c.



d. 500; $25,000.00

e. $50.00

280) Two boats leave a dock at the same time. One boat is headed directly east at a constant speed of 35 knots (nautical miles per hour), and the other is headed directly south at a constant speed of 22 knots. Express the distance d between the boats as a function of the time t.

Answer: $d(t) = \sqrt{1709}t$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

281) A rocket is shot straight up in the air from the ground at a rate of 80 feet per second. The rocket is tracked by a range finder that is 431 feet from the launch pad. Let d represent the distance from the rocket to the range finder and t represent the time, in seconds, since "blastoff". Express d as a function of t.

A) $d(t) = 431^2 + (80t)^2$ B) $d(t) = \sqrt{80^2 + (431t)^2}$

C) $d(t) = 431 + 80t^2$ D) $d(t) = \sqrt{431^2 + (80t)^2}$

Answer: D

If y varies directly as x, find a linear function which relates them.

282) y = 5 when x = 40

A) $f(x) = \frac{x}{8}$ B) f(x) = x + 35 C) $f(x) = \frac{x}{5}$ D) f(x) = 8x

Answer: A

283) y = 18 when x = 21

A) f(x) = 3x B) f(x) = $\frac{7}{6}$x C) f(x) = $\frac{6}{7}$x D) f(x) = x - 3

Answer: C

284) y = 2 when x = $\frac{1}{9}$

A) f(x) = $\frac{x}{18}$ B) f(x) = $\frac{x}{2}$ C) f(x) = 18x D) f(x) = x + $\frac{17}{9}$

Answer: C

285) y = 3.6 when x = 0.9

A) f(x) = 4x B) f(x) = 0.25x C) f(x) = x + 2.7 D) f(x) = 0.9x

Answer: A

286) y = 0.6 when x = 1.2

A) f(x) = 0.6x B) f(x) = 0.5x C) f(x) = x - 0.6 D) f(x) = 2x

Answer: B

Solve.

287) The amount of water used to take a shower is directly proportional to the amount of time that the shower is in use. A shower lasting 17 minutes requires 10.2 gallons of water. Find the amount of water used in a shower lasting 12 minutes.

A) 7.8 gallons B) 204 gallons C) 7.2 gallons D) 6.6 gallons

Answer: C

288) If the resistance in an electrical circuit is held constant, the amount of current flowing through the circuit varies directly with the amount of voltage applied to the circuit. When 2 volts are applied to a circuit, 40 milliamperes of current flow through the circuit. Find the new current if the voltage is increased to 15 volts.

A) 300 milliamperes B) 320 milliamperes C) 30 milliamperes D) 285 milliamperes

Answer: A

289) The amount of gas that a helicopter uses is directly proportional to the number of hours spent flying. The helicopter flies for 2 hours and uses 18 gallons of fuel. Find the number of gallons of fuel that the helicopter uses to fly for 5 hours.

A) 10 gallons B) 50 gallons C) 54 gallons D) 45 gallons

Answer: D

Solve the problem.

290) When the temperature stays the same, the volume of a gas is inversely proportional to the pressure of the gas. If a balloon is filled with 246 cubic inches of a gas at a pressure of 14 pounds per square inch, find the new pressure of the gas if the volume is decreased to 41 cubic inches.

A) 78 pounds per square inch B) 84 pounds per square inch

C) 70 pounds per square inch D) $\frac{41}{14}$ pounds per square inch

Answer: B

291) If the force acting on an object stays the same, then the acceleration of the object is inversely proportional to its mass. If an object with a mass of 21 kilograms accelerates at a rate of 9 meters per second per second by a force, find the rate of acceleration of an object with a mass of 7 kilograms that is pulled by the same force.

A) 18 meters per second per second
B) 24 meters per second per second
C) 3 meters per second per second
D) 27 meters per second per second

Answer: D

292) While traveling at a constant speed in a car, the centrifugal acceleration passengers feel while the car is turning is inversely proportional to the radius of the turn. If the passengers feel an acceleration of 6 feet per second per second when the radius of the turn is 50 feet, find the acceleration the passengers feel when the radius of the turn is 100 feet.

A) 4 feet per second per second
B) 5 feet per second per second
C) 6 feet per second per second
D) 3 feet per second per second

Answer: D

293) The amount of time it takes a swimmer to swim a race is inversely proportional to the average speed of the swimmer. A swimmer finishes a race in 30 seconds with an average speed of 5 feet per second. Find the average speed of the swimmer if it takes 25 seconds to finish the race.

A) 8 feet per second
B) 7 feet per second
C) 5 feet per second
D) 6 feet per second

Answer: D

294) If the voltage, V, in an electric circuit is held constant, the current, I, is inversely proportional to the resistance, R. If the current is 300 milliamperes when the resistance is 2 ohms, find the current when the resistance is 12 ohms.

A) 1,800 milliamperes
B) 1,794 milliamperes
C) 100 milliamperes
D) 50 milliamperes

Answer: D

295) The gravitational attraction A between two masses varies inversely as the square of the distance between them. The force of attraction is 9 lb when the masses are 2 ft apart, what is the attraction when the masses are 6 ft apart?

A) 2 lb
B) 3 lb
C) 4 lb
D) 1 lb

Answer: D

Solve.

296) The amount of paint needed to cover the walls of a room varies jointly as the perimeter of the room and the height of the wall. If a room with a perimeter of 60 feet and 6-foot walls requires 3.6 quarts of paint, find the amount of paint needed to cover the walls of a room with a perimeter of 45 feet and 6-foot walls.

A) 2.7 quarts
B) 27 quarts
C) 270 quarts
D) 5.4 quarts

Answer: A

297) The amount of simple interest earned on an investment over a fixed amount of time is jointly proportional to the principle invested and the interest rate. A principle investment of $1,200.00 with an interest rate of 1% earned $60.00 in simple interest. Find the amount of simple interest earned if the principle is $1,400.00 and the interest rate is 5%.

A) $70.00
B) $35,000.00
C) $350.00
D) $300.00

Answer: C

298) The voltage across a resistor is jointly proportional to the resistance of the resistor and the current flowing through the resistor. If the voltage across a resistor is 21 volts for a resistor whose resistance is 3 ohms and when the current flowing through the resistor is 7 amperes, find the voltage across a resistor whose resistance is 2 ohms and when the current flowing through the resistor is 4 amperes.

A) 12 volts B) 28 volts C) 8 volts D) 14 volts

Answer: C

299) The power that a resistor must dissipate is jointly proportional to the square of the current flowing through the resistor and the resistance of the resistor. If a resistor needs to dissipate 20 watts of power when 2 amperes of current is flowing through the resistor whose resistance is 5 ohms, find the power that a resistor needs to dissipate when 4 amperes of current are flowing through a resistor whose resistance is 7 ohms.

A) 112 watts B) 28 watts C) 56 watts D) 196 watts

Answer: A

300) While traveling in a car, the centrifugal force a passenger experiences as the car drives in a circle varies jointly as the mass of the passenger and the square of the speed of the car. If the a passenger experiences a force of 28.8 newtons when the car is moving at a speed of 20 kilometers per hour and the passenger has a mass of 80 kilograms, find the force a passenger experiences when the car is moving at 70 kilometers per hour and the passenger has a mass of 90 kilograms.

A) 396.9 newtons B) 352.8 newtons C) 441 newtons D) 490 newtons

Answer: A

301) The volume V of a given mass of gas varies directly as the temperature T and inversely as the pressure P. A measuring device is calibrated to give $V = 319.2$ in^3 when $T = 570°$ and $P = 25$ lb/in^2. What is the volume on this device when the temperature is 430° and the pressure is 20 lb/in^2?

A) $V = 311$ in^3 B) $V = 21.5$ in^3 C) $V = 301$ in^3 D) $V = 291$ in^3

Answer: C

302) The time in hours it takes a satellite to complete an orbit around the earth varies directly as the radius of the orbit (from the center of the earth) and inversely as the orbital velocity. If a satellite completes an orbit 890 miles above the earth in 17 hours at a velocity of 21,000 mph, how long would it take a satellite to complete an orbit if it is at 1,700 miles above the earth at a velocity of 25,000 mph? (Use 3960 miles as the radius of the earth.)

A) 166.65 hours B) 27.28 hours C) 16.66 hours D) 5.01 hours

Answer: C