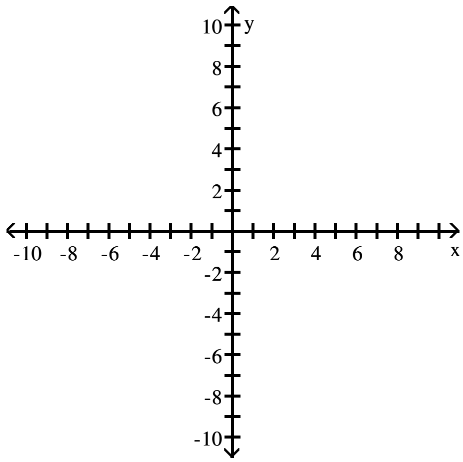
 Name_______________________

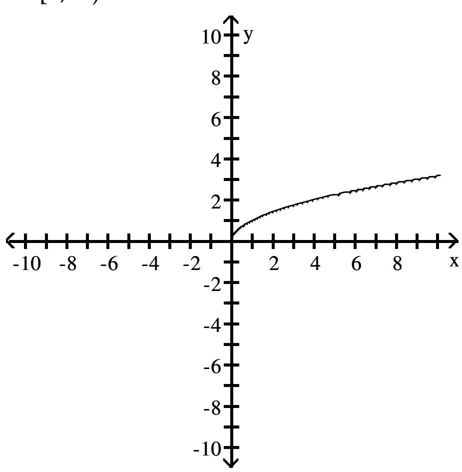
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the domain and graph the function.

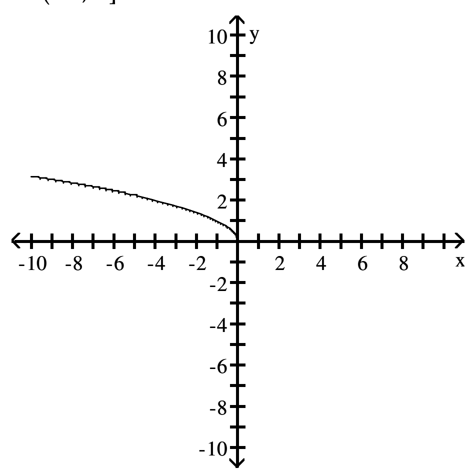
1) $F(x) = \sqrt{-x}$ 1) ________



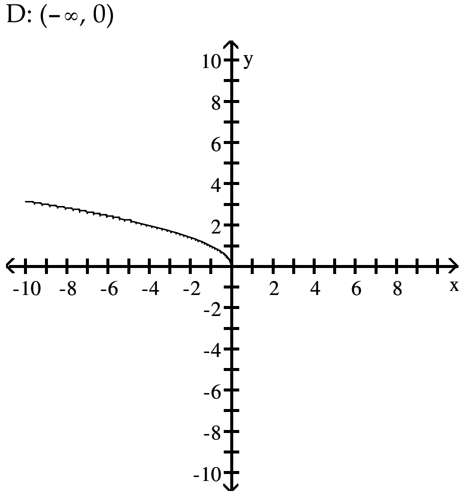
A) D: $[0, \infty)$



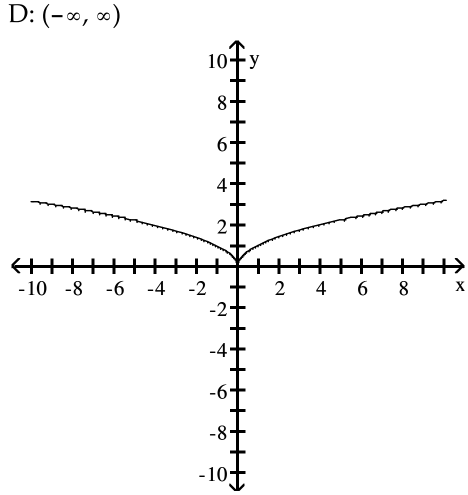
B) D: $(-\infty, 0]$



C) D: $(-\infty, 0)$



D) D: $(-\infty, \infty)$



Find the domain and range of the function.

2) $f(x) = 6 - x^2$ 2) ________

A) D: $(-\infty, \infty)$, R: $(-\infty, \infty)$
B) D: $(-\infty, \infty)$, R: $(-\infty, 6]$
C) D: $(-\infty, \infty)$, R: $[6, \infty)$
D) D: $(-\infty, 6]$, R: $(-\infty, \infty)$

3) $g(z) = \dfrac{-10}{\sqrt{z + 1}}$ 3) ________

A) D: $[1,\infty)$, R: $(-\infty,\infty)$
B) D: $[0,\infty)$, R: $(-\infty,\infty)$
C) D: $(-\infty,-1)$, R: $(0,\infty)$
D) D: $(-1,\infty)$, R: $(-\infty,0)$

Solve the problem.

4) If $f(x) = \sqrt{x + 3}$ and $g(x) = 8x - 7$, find $f(g(x))$.   4) ________

A) $8\sqrt{x - 4}$
B) $2\sqrt{2x + 1}$
C) $8\sqrt{x + 3} - 7$
D) $2\sqrt{2x - 1}$

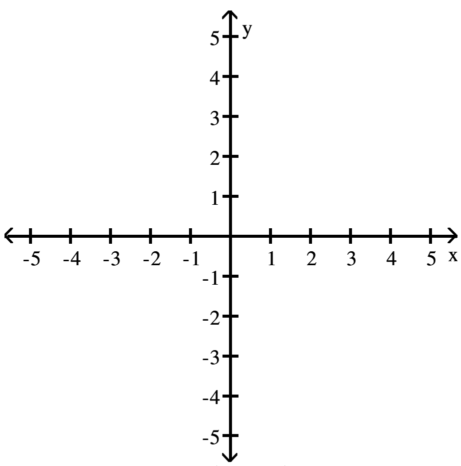
Express the given function as a composite of functions f and g such that y= f(g(x)).

5) $y = |10x + 8|$ 5) ________

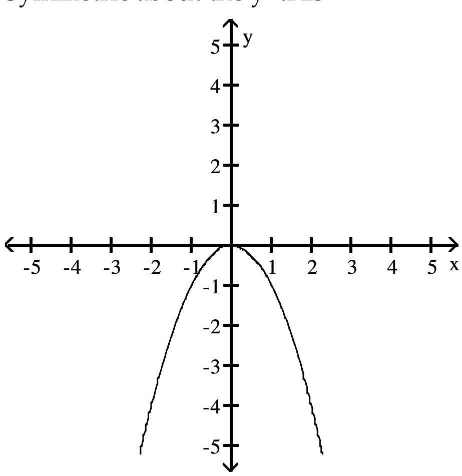
A) $f(x) = |x|$, $g(x) = 10x + 8$
B) $f(x) = -|x|$, $g(x) = 10x + 8$
C) $f(x) = x$, $g(x) = 10x + 8$
D) $f(x) = |-x|$, $g(x) = 10x - 8$

Graph the function. Determine the symmetry, if any, of the function.

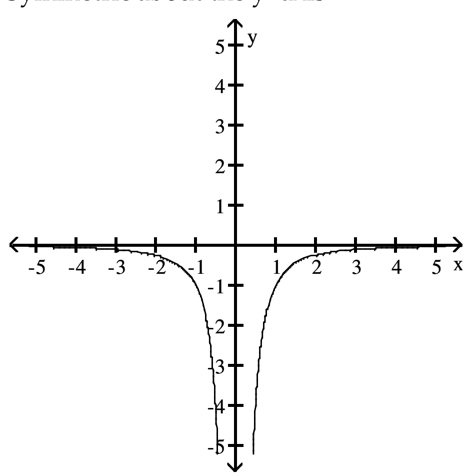
6) $y = -\dfrac{1}{x^2}$ 6) ________



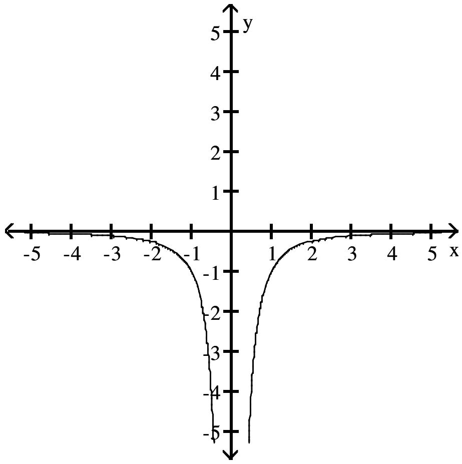
A) Symmetric about the y-axis



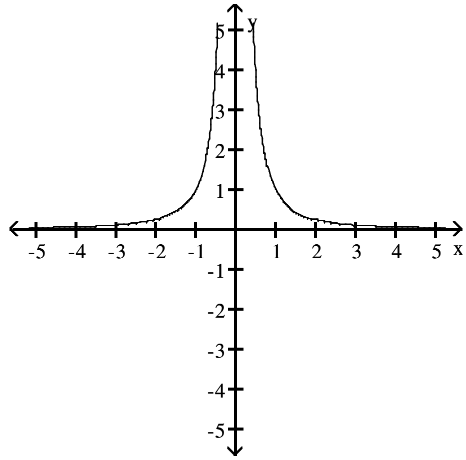
B) Symmetric about the y-axis



C) No symmetry



D) Symmetric about the y–axis



Solve the problem.

7) A marine biologist determines that the size, p, of a population of crabs, after t days can be modeled by the function $p(t) = -0.00009t^3 + 0.024t^2 + 10.5t + 1800$. Assuming that this model continues to be accurate, when will this population become extinct? (Round to the nearest day.) 7) ________

A) 1512 days B) 547 days C) 707 days D) 911 days

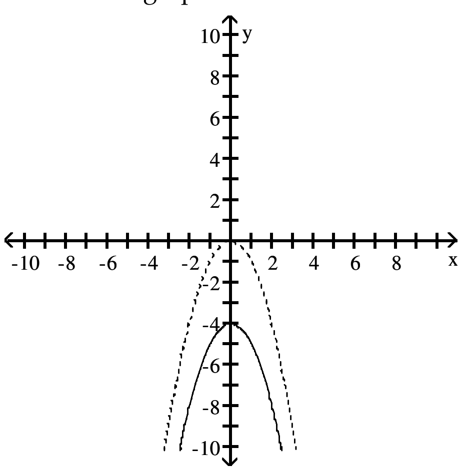
For the given function, simplify the expression $\frac{f(x + h) - f(x)}{h}$.

8) $f(x) = 8x - 17$ 8) ________

A) 8 B) -8 C) $8x$ D) -9

Solve the problem.

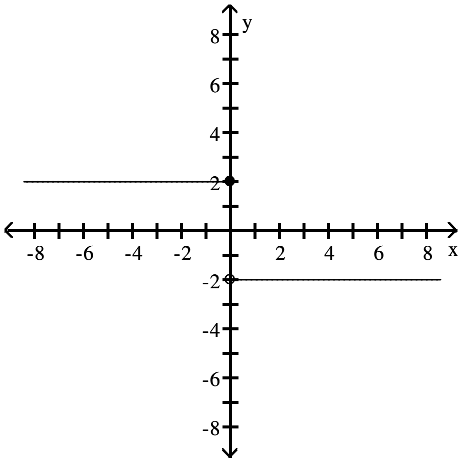
9) The accompanying figure shows the graph of $y = -x^2$ shifted to a new position. Write the equation for the new graph. 9) ________



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

Find a formula for the function graphed.

10) 10) _______



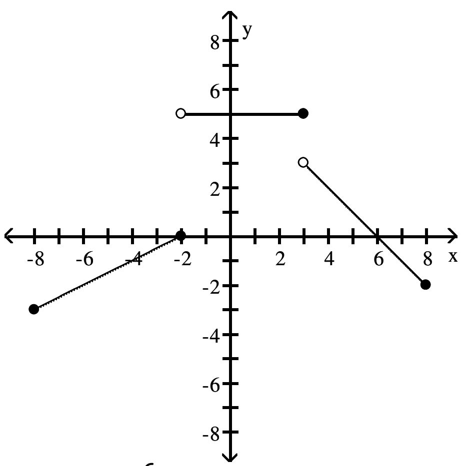
A) $f(x) = \begin{cases} -2, & x \le 0 \\ 2, & x > 0 \end{cases}$

B) $f(x) = \begin{cases} 2x, & x \le 0 \\ -2x, & x > 0 \end{cases}$

C) $f(x) = \begin{cases} 2, & x < 0 \\ -2, & x \ge 0 \end{cases}$

D) $f(x) = \begin{cases} 2, & x \le 0 \\ -2, & x > 0 \end{cases}$

11) 11) _______



A) $f(x) = \begin{cases} \frac{1}{2}x + 1, & -8 \le x \le -2 \\ 5, & -2 < x \le 3 \\ 6 - x, & 3 < x \le 8 \end{cases}$

B) $f(x) = \begin{cases} \frac{1}{2}x + 1, & -8 < x \le -2 \\ 5, & -2 < x \le 3 \\ 6 - x, & 3 < x < 8 \end{cases}$

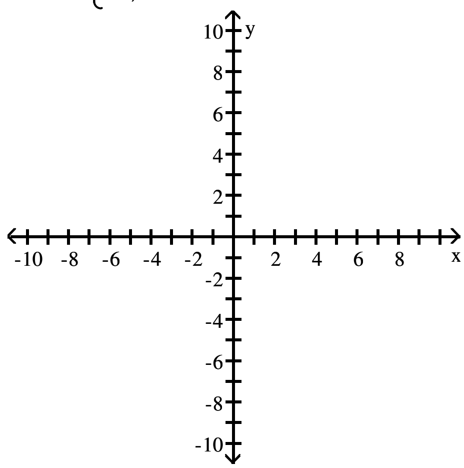
C) $f(x) = \begin{cases} -\frac{1}{2}x + 1, & -8 \le x \le -2 \\ 5, & -2 < x \le 3 \\ x - 6, & 3 < x \le 8 \end{cases}$

D) $f(x) = \begin{cases} \frac{1}{2}x + 1, & -8 \le x \le -2 \\ 5, & -2 < x < 3 \\ 6 - x, & 3 \le x \le 8 \end{cases}$

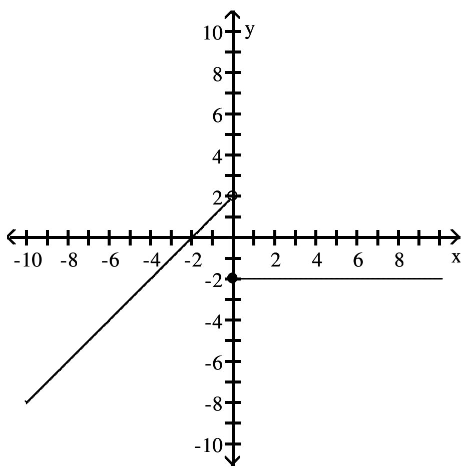
Graph the function.

12) $G(x) = \begin{cases} |x| - 2, & x < 0 \\ -2, & x \geq 0 \end{cases}$

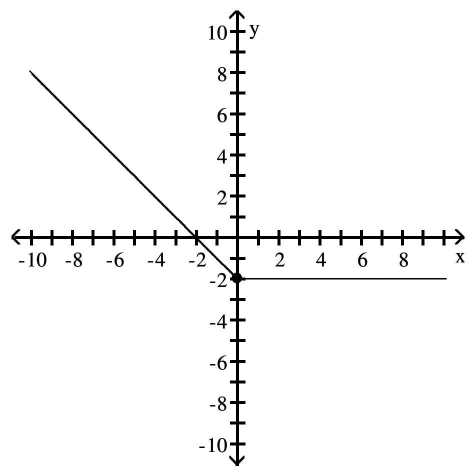
12) _______



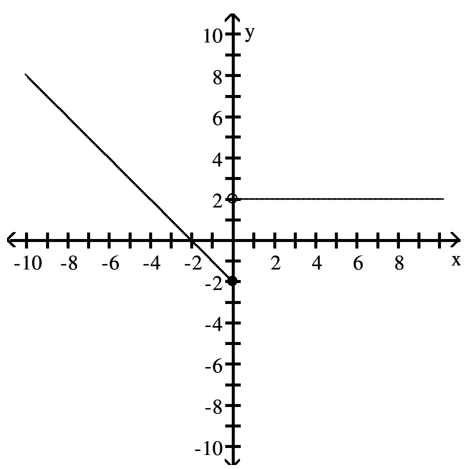
A)



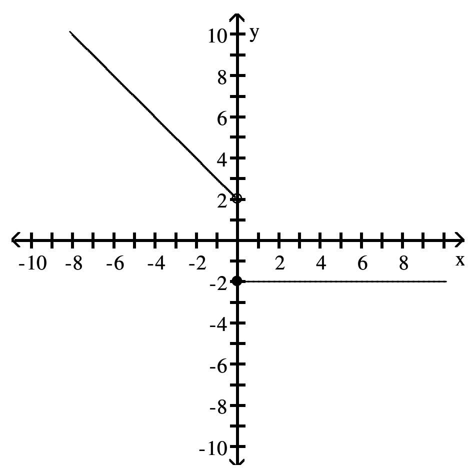
B)



C)

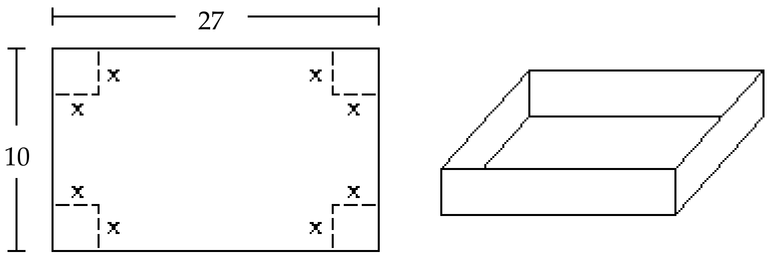


D)



Solve the problem.

13) A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 10 inches by 27 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. 13) _______



A) $V(x) = (10 - x)(27 - x)$
B) $V(x) = (10 - 2x)(27 - 2x)$
C) $V(x) = x(10 - 2x)(27 - 2x)$
D) $V(x) = x(10 - x)(27 - x)$

Find the exact value of the trigonometric function. Do not use a calculator or tables.

14) $\tan\left(\frac{\pi}{6}\right)$ 14) _______

A) $\frac{\sqrt{3}}{2}$
B) $\sqrt{3}$
C) $\frac{\sqrt{3}}{3}$
D) 1

15) $\csc\left(\frac{\pi}{4}\right)$ 15) _______

A) $\frac{\sqrt{2}}{2}$
B) $\sqrt{3}$
C) $\frac{\sqrt{3}}{2}$
D) $\sqrt{2}$

16) $\cos\left(\frac{2\pi}{3}\right)$ 16) _______

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

17) $\sec\left(\frac{\pi}{2}\right)$ 17) _______

A) 1
B) 0
C) -1
D) Undefined

Solve for the angle θ, where $0 \le \theta \le 2\pi$

18) $\sin^2\theta = \frac{1}{4}$ 18) _______

A) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
B) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$
C) $\theta = 0, \pi, 2\pi$
D) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

19) $\cos^2\theta = \frac{3}{4}$ 19) ________

A) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

B) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

C) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

D) $\theta = 0, \pi, 2\pi$

20) $\sin 2\theta - \cos\theta = 0$ 20) ________

A) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

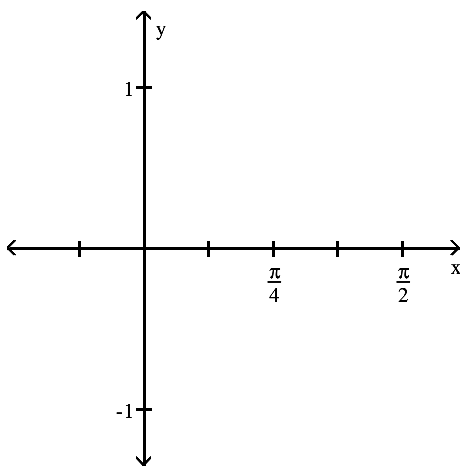
B) $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

C) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

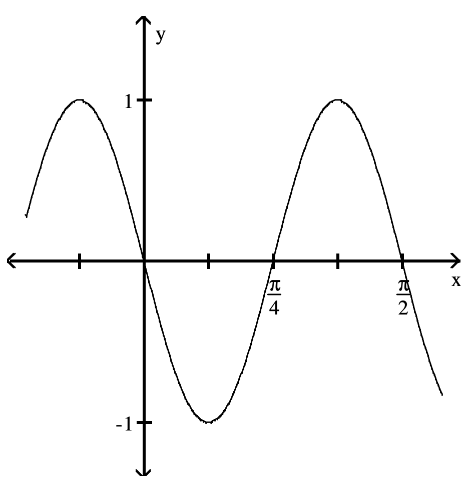
D) $\frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{6}, \frac{11\pi}{6}$

State the period of the function and graph.

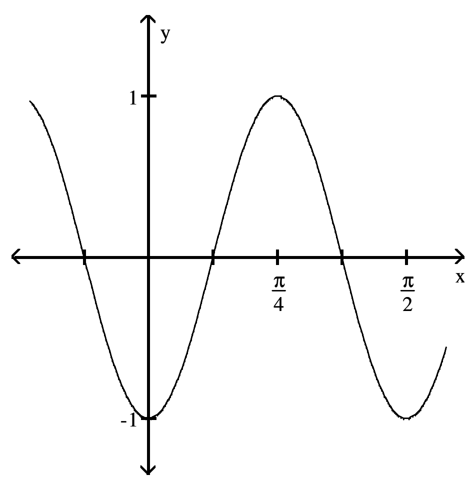
21) $\cos 4x$ 21) ________



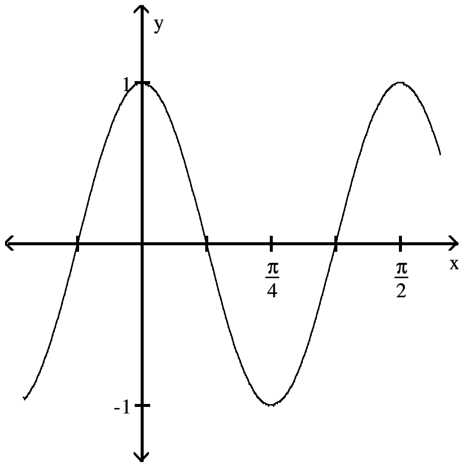
A) Period $\frac{\pi}{2}$



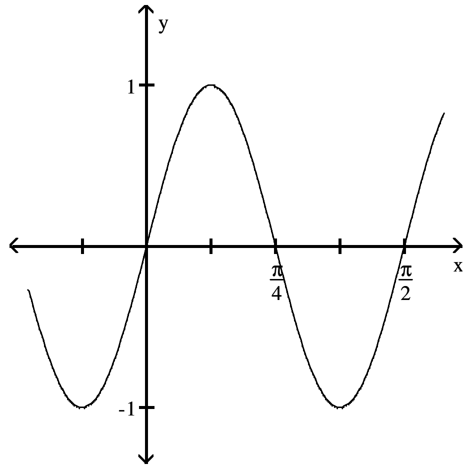
B) Period $\frac{\pi}{2}$



C) Period $\frac{\pi}{2}$

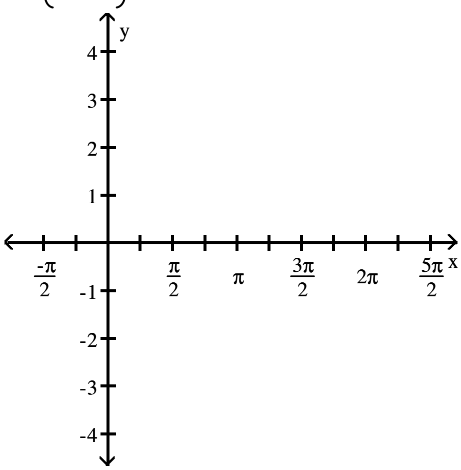


D) Period $\frac{\pi}{2}$

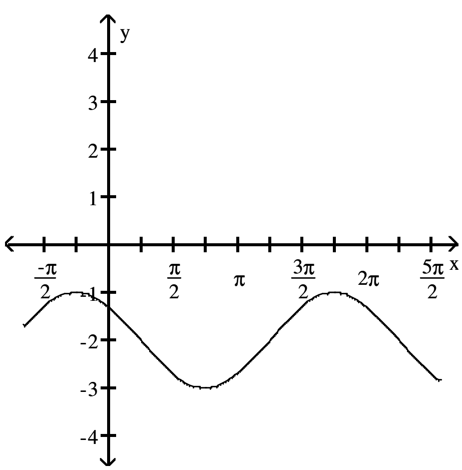


22) $\sin\left(x + \frac{\pi}{4}\right) - 2$

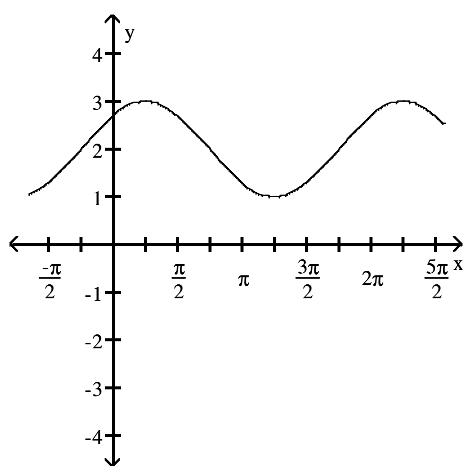
22) _______



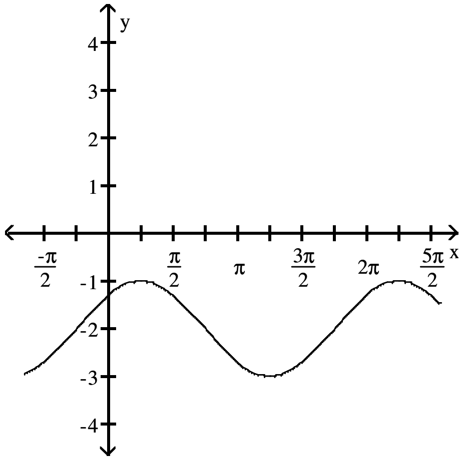
A) Period 2π



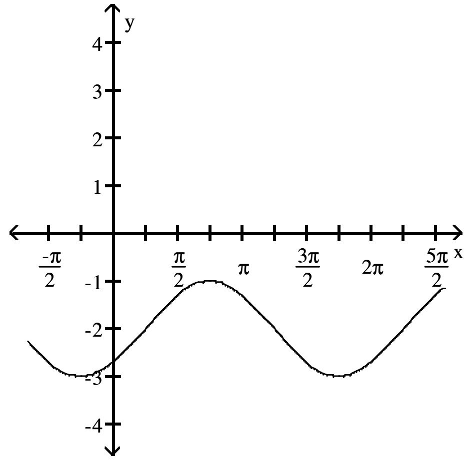
B) Period 2π



C) Period 2π



D) Period 2π



Solve the problem.

23) Given $\lim_{x\to 0^-} f(x) = L_l$, $\lim_{x\to 0^+} f(x) = L_r$, and $L_l \neq L_r$, which of the following statements is true? 23) _______

I. $\lim_{x\to 0} f(x) = L_l$

II. $\lim_{x\to 0} f(x) = L_r$

III. $\lim_{x\to 0} f(x)$ does not exist.

A) I B) II C) III D) none

24) What conditions, when present, are sufficient to conclude that a function f(x) has a limit as x approaches some value of a? 24) _______

A) Either the limit of f(x) as $x\to a$ from the left exists or the limit of f(x) as $x\to a$ from the right exists

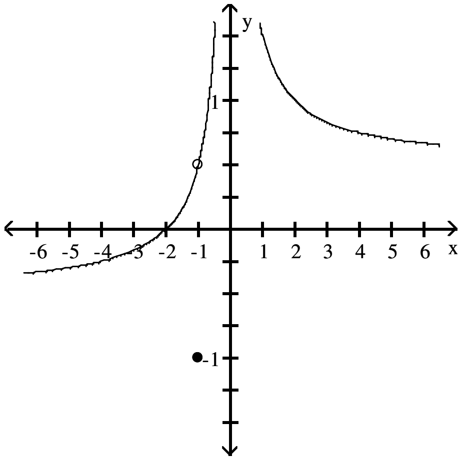
B) The limit of f(x) as $x\to a$ from the left exists, the limit of f(x) as $x\to a$ from the right exists, and these two limits are the same.

C) The limit of f(x) as $x\to a$ from the left exists, the limit of f(x) as $x\to a$ from the right exists, and at least one of these limits is the same as f(a).

D) f(a) exists, the limit of f(x) as $x\to a$ from the left exists, and the limit of f(x) as $x\to a$ from the right exists.

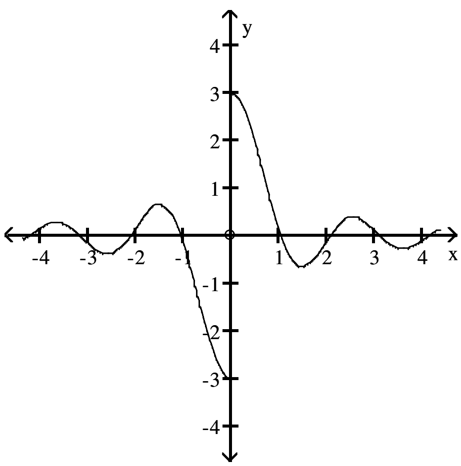
Use the graph to evaluate the limit.

25) $\lim_{x \to -1} f(x)$ 25) _______



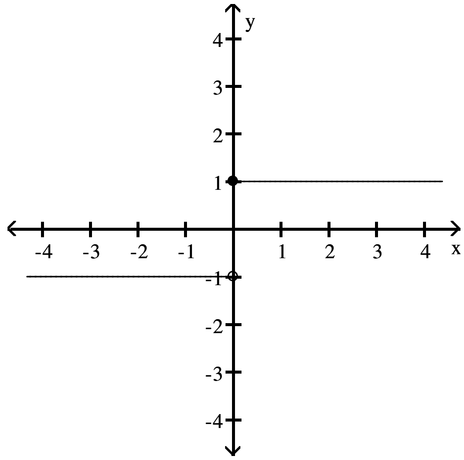
A) $-\frac{1}{2}$ B) ∞ C) $\frac{1}{2}$ D) -1

26) $\lim_{x \to 0} f(x)$ 26) _______



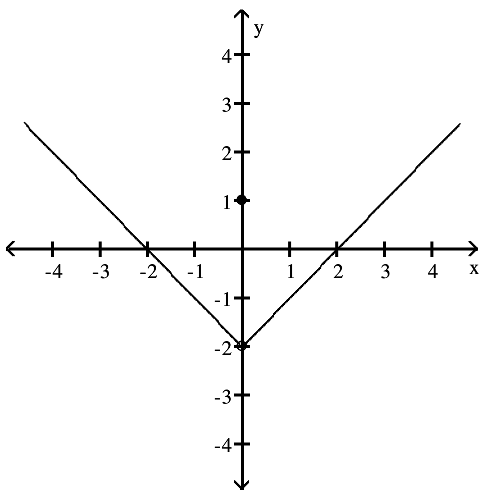
A) 0 B) -3 C) 3 D) does not exist

27) $\lim_{x \to 0} f(x)$ 27) _______



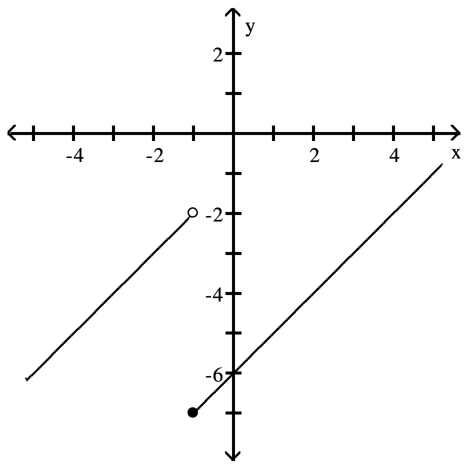
A) -1 B) ∞ C) does not exist D) 1

28) $\lim_{x \to 0} f(x)$ 28) _______



A) 1 B) 0 C) does not exist D) -2

29) Find $\lim_{x \to (-1)^-} f(x)$ and $\lim_{x \to (-1)^+} f(x)$ 29) _______



A) −2; −7 B) −7; −5 C) −5; −2 D) −7; −2

Use the table of values of f to estimate the limit.

30) Let $f(x) = x^2 + 8x - 2$, find $\lim_{x \to 2} f(x)$. 30) _______

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)						

A)

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	5.043	5.364	5.396	5.404	5.436	5.763

; limit = 5.40

B)

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	16.692	17.592	17.689	17.710	17.808	18.789

; limit = 17.70

C)

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	16.810	17.880	17.988	18.012	18.120	19.210

; limit = 18.0

D)

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	5.043	5.364	5.396	5.404	5.436	5.763

; limit = ∞

Provide an appropriate response.

31) Provide a short sentence that summarizes the general limit principle given by the formal notation $\lim_{x \to a} [f(x) \pm g(x)] = \lim_{x \to a} f(x) \pm \lim_{x \to a} g(x) = L \pm M$, given that $\lim_{x \to a} f(x) = L$ and $\lim_{x \to a} g(x) = M$. 31) _______

A) The sum or the difference of two functions is the sum of two limits.
B) The limit of a sum or a difference is the sum or the difference of the functions.
C) The sum or the difference of two functions is continuous.
D) The limit of a sum or a difference is the sum or the difference of the limits.

Find the limit.

32) $\lim_{x \to 11} \sqrt{3}$ 32) _______

A) 3 B) $\sqrt{11}$ C) 11 D) $\sqrt{3}$

33) $\lim_{x \to -10} (2x - 10)$ 33) _______

A) -30 B) 30 C) 10 D) -10

Give an appropriate answer.

34) Let $\lim_{x \to 7} f(x) = -10$ and $\lim_{x \to 7} g(x) = 3$. Find $\lim_{x \to 7} [f(x) \cdot g(x)]$. 34) _______

A) -30 B) -7 C) 3 D) 7

35) Let $\lim_{x \to -6} f(x) = -8$ and $\lim_{x \to -6} g(x) = 5$. Find $\lim_{x \to -6} \frac{f(x)}{g(x)}$. 35) _______

A) -6 B) -13 C) $-\frac{5}{8}$ D) $-\frac{8}{5}$

36) Let $\lim_{x \to 6} f(x) = 121$. Find $\lim_{x \to 6} \sqrt{f(x)}$. 36) _______

A) 3.3166 B) 121 C) 11 D) 6

37) Let $\lim_{x \to -9} f(x) = -5$ and $\lim_{x \to -9} g(x) = -7$. Find $\lim_{x \to -9} \left[\frac{-8f(x) - 2g(x)}{-9 + g(x)}\right]$. 37) _______

A) $-\frac{13}{8}$ B) -9 C) $-\frac{27}{8}$ D) $-\frac{58}{9}$

Find the limit.

38) $\lim_{x \to 1} \frac{3x^2 + 7x - 2}{3x^2 - 4x - 2}$ 38) _______

A) 0 B) $-\frac{8}{3}$ C) Does not exist D) $-\frac{7}{4}$

39) $\lim_{h \to 0} \frac{2}{\sqrt{3h + 4} + 2}$ 39) _______

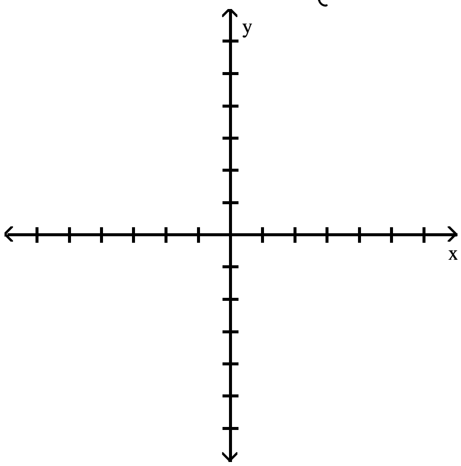
A) 1 B) 2 C) 1/2 D) Does not exist

40) $\lim_{x \to 0} \frac{\sqrt{1 + x} - 1}{x}$ 40) _______

A) 1/2 B) Does not exist C) 1/4 D) 0

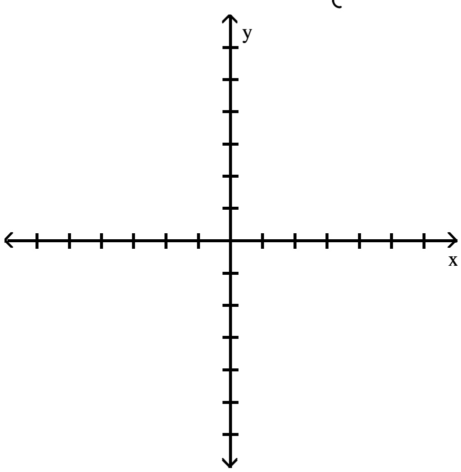
Determine the limit by sketching an appropriate graph.

41) $\lim_{x \to 1^-} f(x)$, where $f(x) = \begin{cases} \sqrt{1 - x^2} & 0 \le x < 1 \\ 1 & 1 \le x < 3 \\ 3 & x = 3 \end{cases}$ 41) _______



A) 0 B) Does not exist C) 3 D) 1

42) $\lim_{x \to -8^+} f(x)$, where $f(x) = \begin{cases} 2x & -8 \le x < 0, \text{ or } 0 < x \le 3 \\ 2 & x = 0 \\ 0 & x < -8 \text{ or } x > 3 \end{cases}$ 42) _______



A) 5 B) Does not exist C) –16 D) –0

Find the limit, if it exists.

43) $\lim_{x \to 0} \dfrac{x^3 + 12x^2 - 5x}{5x}$ 43) _______

A) 5 B) 0 C) Does not exist D) –1

44) $\lim_{x \to 1} \dfrac{x^4 - 1}{x - 1}$ 44) _______

A) 0 B) 2 C) 4 D) Does not exist

45) $\lim_{x \to 3} \frac{x^2 + 6x - 27}{x - 3}$ 45) ________

A) 0 B) 12 C) 6 D) Does not exist

46) $\lim_{h \to 0} \frac{(x + h)^3 - x^3}{h}$ 46) ________

A) $3x^2$ B) 0 C) Does not exist D) $3x^2 + 3xh + h^2$

47) $\lim_{x \to 8} \frac{|8 - x|}{8 - x}$ 47) ________

A) -1 B) 1 C) 0 D) Does not exist

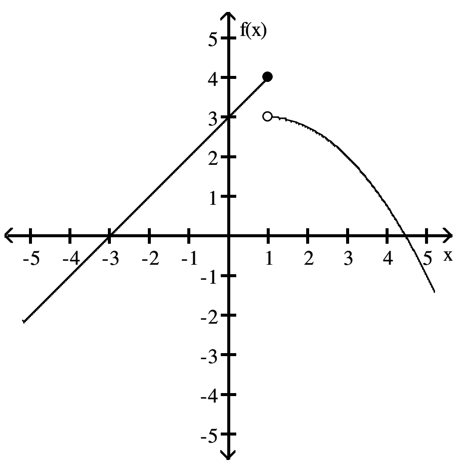
Provide an appropriate response.

48) If $x^3 \le f(x) \le x$ for x in $[-1,1]$, find $\lim_{x \to 0} f(x)$ if it exists. 48) ________

A) does not exist B) 0 C) -1 D) 1

For the function f whose graph is given, determine the limit.

49) Find $\lim_{x \to 1^+} f(x)$. 49) ________



A) 4 B) 3 C) does not exist D) $3\frac{1}{2}$

Find the limit.

50) $\lim_{x \to -2} \frac{1}{x + 2}$ 50) ________

A) $-\infty$ B) ∞ C) Does not exist D) 1/2

51) $\lim_{x \to -1^-} \frac{1}{x + 1}$ 51) ________

A) ∞ B) -1 C) $-\infty$ D) 0

52) $\lim_{x \to 2^+} \frac{3}{x^2 - 4}$ 52) ________

A) ∞ B) 0 C) $-\infty$ D) 1

Find all vertical asymptotes of the given function.

53) $h(x) = \frac{x + 6}{x^2 - 49}$ 53) ________

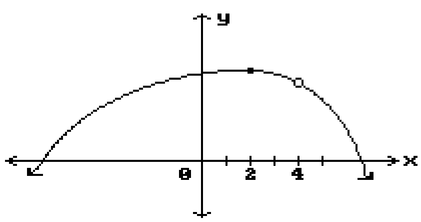
A) $x = 49, x = -6$
B) $x = -7, x = 7, x = -6$
C) $x = -7, x = 7$
D) $x = 0, x = 49$

54) $f(x) = \frac{x + 6}{x^2 + 1}$ 54) ________

A) $x = -1, x = 1, x = -6$
B) $x = -1, x = -6$
C) $x = -1, x = 1$
D) none

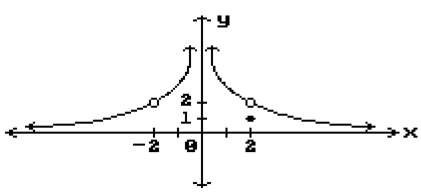
Find all points where the function is discontinuous.

55) 55) ________



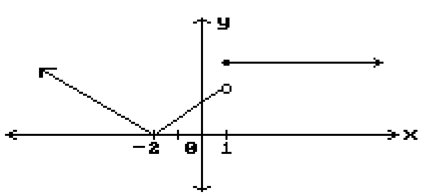
A) $x = 4$ B) None C) $x = 4, x = 2$ D) $x = 2$

56) 56) ________



A) $x = 2$
B) $x = -2, x = 0, x = 2$
C) $x = -2, x = 0$
D) $x = 0, x = 2$

57) 57) ________

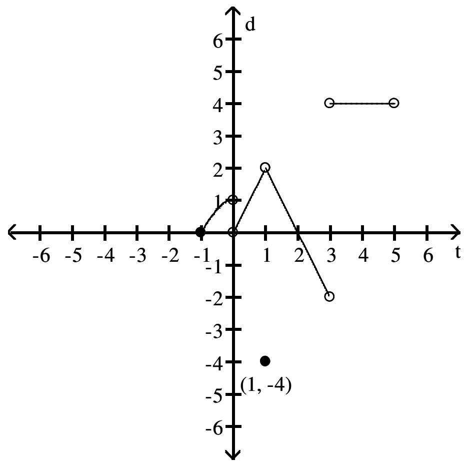


A) $x = 1$ B) None C) $x = -2, x = 1$ D) $x = -2$

Provide an appropriate response.

58) Is f continuous at f(1)? 58) _______

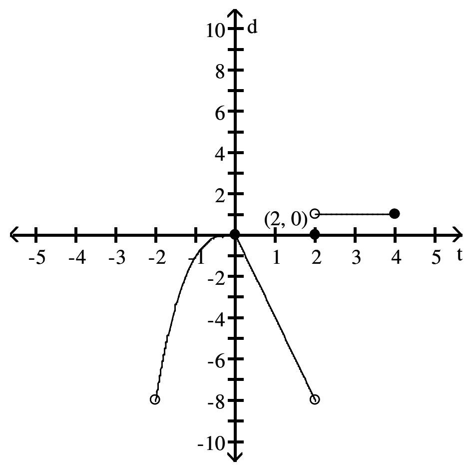
$$f(x) = \begin{cases} -x^2 + 1, & -1 \le x < 0 \\ 2x, & 0 < x < 1 \\ -4, & x = 1 \\ -2x + 4 & 1 < x < 3 \\ 4, & 3 < x < 5 \end{cases}$$



A) Yes B) No

59) Is f continuous at x = 0? 59) _______

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



A) No B) Yes

Find the intervals on which the function is continuous.

60) $y = \sqrt{x^2 - 2}$ 60) _______

A) continuous on the intervals $(-\infty, -\sqrt{2}]$ and $[\sqrt{2}, \infty)$

B) continuous everywhere

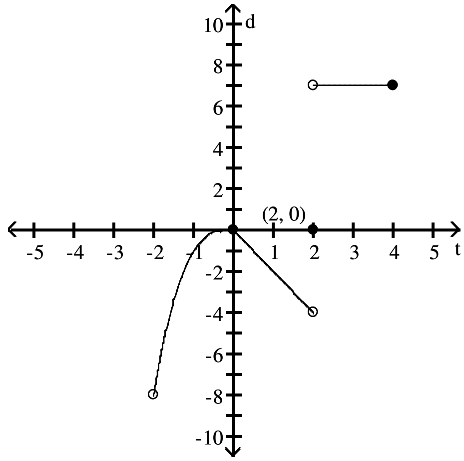
C) continuous on the interval $[-\sqrt{2}, \sqrt{2}]$

D) continuous on the interval $[\sqrt{2}, \infty)$

Provide an appropriate response.

61) Is f continuous on (–2, 4]? 61) _______

$$f(x) = \begin{cases} x^3, & -2 < x \le 0 \\ -2x, & 0 \le x < 2 \\ 7, & 2 < x \le 4 \\ 0, & x = 2 \end{cases}$$



A) No B) Yes

Find the limit, if it exists.

62) $\lim\limits_{x \to 0} \sqrt{x} - 2$ 62) _______

A) 0 B) Does not exist C) 2 D) –2

63) $\lim\limits_{x \to 2} \sqrt{x - 5}$ 63) _______

A) –1.7320508 B) 0 C) Does not exist D) 1.73205081

64) $\lim\limits_{x \to 5^+} \dfrac{5\sqrt{(x-5)^3}}{x - 5}$ 64) _______

A) $5\sqrt{5}$ B) 0 C) 5 D) Does not exist

A function f(x), a point x_0, the limit of f(x) as x approaches x_0, and a positive number ε is given. Find a number δ > 0 such that for all x, $0 < |x - x_0| < \delta \Rightarrow |f(x) - L| < \varepsilon$.

65) $f(x) = 5x - 6$, $L = -1$, $x_0 = 1$, and $\varepsilon = 0.01$ 65) _______

A) 0.004 B) 0.002 C) 0.01 D) 0.001

Answer Key
Testname: M150_E1_PRAC

1) B
2) B
3) D
4) D
5) A
6) B
7) B
8) A
9) D
10) D
11) A
12) B
13) C
14) C
15) D
16) A
17) D
18) B
19) C
20) C
21) C
22) C
23) C
24) B
25) C
26) D
27) C
28) D
29) A
30) C
31) D
32) D
33) A
34) A
35) D
36) C
37) C
38) B
39) C
40) A
41) A
42) C
43) D
44) C
45) B
46) A
47) D
48) B
49) B
50) C

51) C
52) A
53) C
54) D
55) A
56) B
57) A
58) B
59) B
60) A
61) A
62) D
63) C
64) B
65) B