

***Calculus for Business Economics Life Sciences and
Social Sciences 14th edition Barnett Test Bank***

SKU: 9780134668574-TEST-BANK

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**Provide an appropriate response.**

1) Given that $f(x) = \frac{x}{7-x}$, find $f\left(-\frac{4}{5}\right)$. Express the answer as a simplified fraction.

1) _____

A) $-\frac{4}{39}$

B) $-\frac{39}{4}$

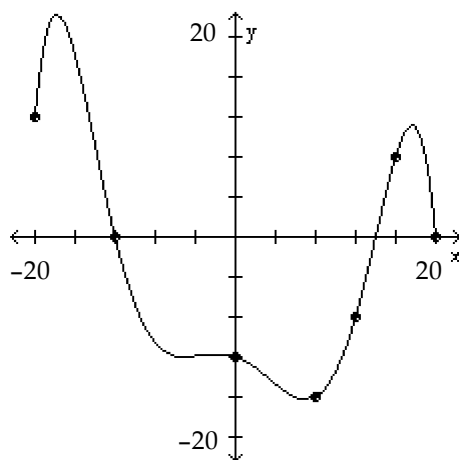
C) $\frac{39}{4}$

D) $\frac{4}{39}$

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

2) Use the graph of f given below to find $f(8)$.

2) _____



A) 12

B) -16

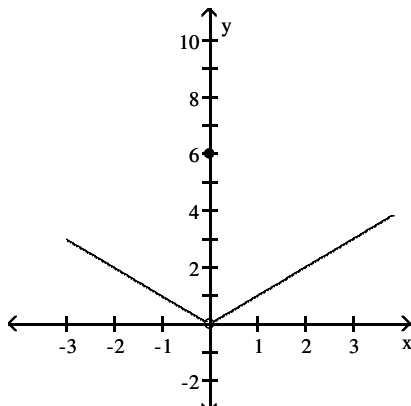
C) 0

D) 8

Use the graph to evaluate the indicated limit and function value or state that it does not exist.

3) Find $\lim_{x \rightarrow 0} f(x)$ and $f(0)$.

3) _____



A) Does not exist; 6

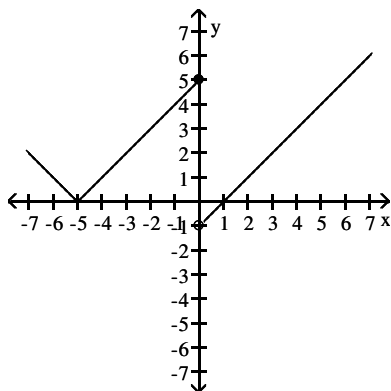
B) 6; 0

C) 0; 6

D) 0; does not exist

4) Find $\lim_{x \rightarrow 0^-} f(x)$ and $\lim_{x \rightarrow 0^+} f(x)$.

4) _____



- A) -1; 5
C) 5; -1

- B) Does not exist; does not exist
D) 5; Does not exist

Find the limit, if it exists.

5) Find: $\lim_{x \rightarrow -1} \frac{6x + 5}{5x - 6}$

5) _____

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

6) Given $\lim_{x \rightarrow 4} f(x) = -2$ and $\lim_{x \rightarrow 4} g(x) = 5$, find $\lim_{x \rightarrow 4} \frac{[g(x) - f(x)]}{-4 f(x)}$.

6) _____

- A) $-\frac{3}{8}$
B) $\frac{3}{8}$
C) $\frac{7}{8}$
D) $-\frac{7}{8}$

7) Find: $\lim_{x \rightarrow -4} \frac{x^2 - 16}{x + 4}$

7) _____

- A) 8
B) -8
C) -24
D) 16

8) Find: $\lim_{x \rightarrow 5} \frac{x - 5}{|x - 5|}$

8) _____

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

9) Find: $\lim_{x \rightarrow 3} \left(\frac{x^2 - 9}{x - 3} + \sqrt{x^2 + 7} \right)$

9) _____

- A) 2
B) 3
C) 10
D) Does not exist

10) Find: $\lim_{x \rightarrow 3} \frac{x - 3}{x^2 - 3x}$

10) _____

- A) $-\frac{1}{3}$
B) $\frac{1}{3}$
C) 0
D) Does not exist

11) Given $\lim_{x \rightarrow 5} f(x) = 4$ and $\lim_{x \rightarrow 5} g(x) = -5$, find $\lim_{x \rightarrow 5} \frac{2f(x) + 3g(x)}{3f(x)}$. 11) _____

- A) $\frac{7}{12}$ B) $-\frac{7}{15}$ C) $\frac{7}{15}$ D) $-\frac{7}{12}$

12) Evaluate the following limit 12) _____

$$\lim_{x \rightarrow 2^-} \frac{1}{x-2}$$

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

13) Let $f(x) = \frac{x^2 - 3x - 10}{x + 2}$. Find $\lim_{x \rightarrow -2} f(x)$. 13) _____

- A) 5 B) -2 C) -7 D) Does not exist

14) Let $f(x) = \begin{cases} \frac{x^2 - 16}{x + 4} & \text{if } x > 0 \\ \frac{x^2 - 16}{x - 4} & \text{if } x < 0 \end{cases}$ 14) _____

Find $\lim_{x \rightarrow 0^-} f(x)$.

- A) ∞ B) -4 C) 4 D) Does not exist

15) Let $f(x) = \begin{cases} \frac{x^2 - 16}{x + 4} & \text{if } x > 0 \\ \frac{x^2 - 16}{x - 4} & \text{if } x < 0 \end{cases}$ 15) _____

Find $\lim_{x \rightarrow 0^+} f(x)$

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

16) Let $f(x) = \begin{cases} \frac{x^2 - 16}{x + 4} & \text{if } x > 0 \\ \frac{x^2 - 16}{x - 4} & \text{if } x < 0 \end{cases}$ 16) _____

Find $\lim_{x \rightarrow 0} f(x)$.

- A) $-\infty$ B) 0 C) -4 D) Does not exist

17) Evaluate the following limit. 17) _____

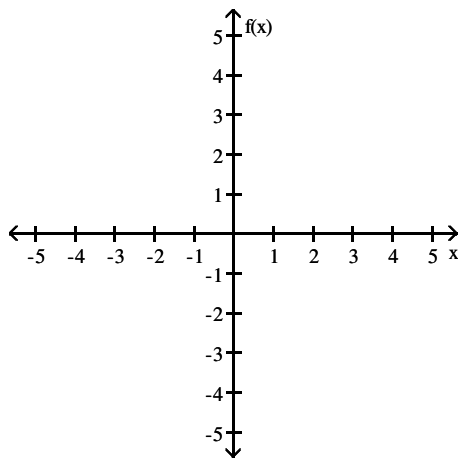
$$\lim_{x \rightarrow 2^+} \frac{1}{x-2}$$

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

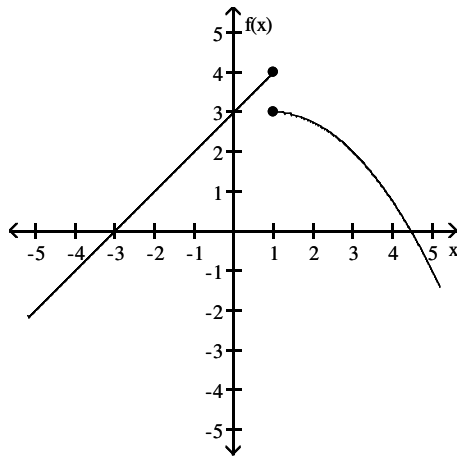
Sketch a possible graph of a function that satisfies the given conditions.

18) $f(1) = 4$; $\lim_{x \rightarrow 1^-} f(x) = 4$; $\lim_{x \rightarrow 1^+} f(x) = 3$

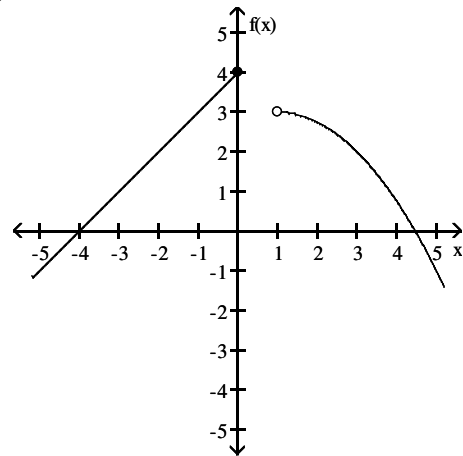
18) _____



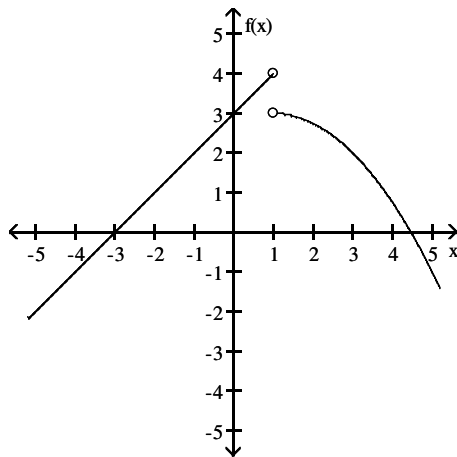
A)



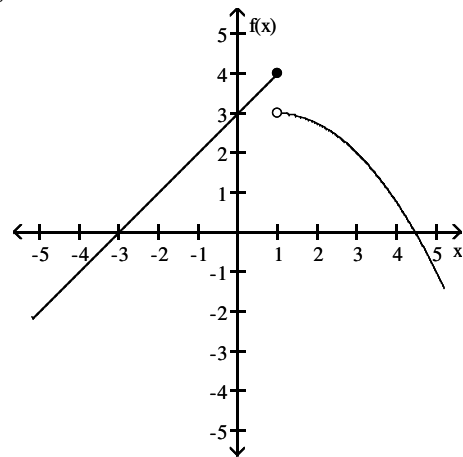
B)



C)

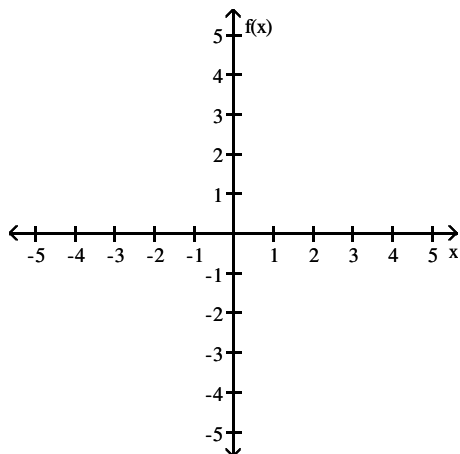


D)

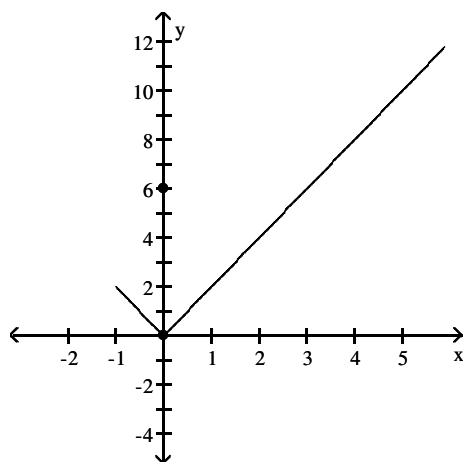


19) $f(0) = 6$; $\lim_{x \rightarrow 0^-} f(x) = 0$; $\lim_{x \rightarrow 0^+} f(x) = 0$

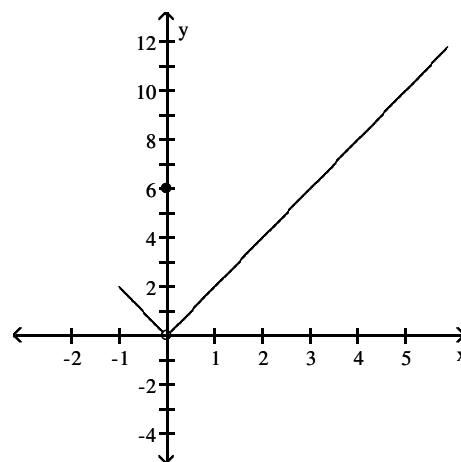
19) _____



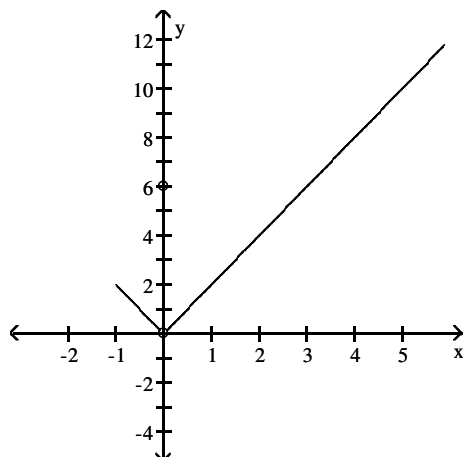
A)



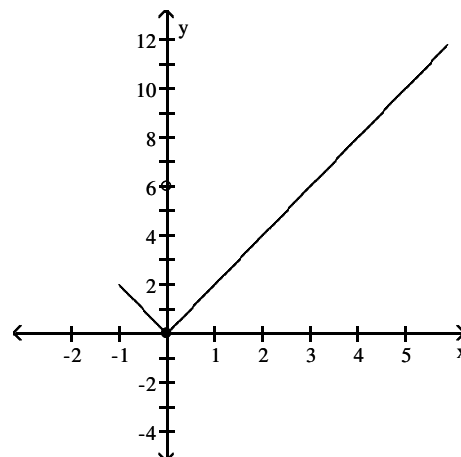
B)



C)



D)



Find the limit, if it exists.

20) Find: $\lim_{h \rightarrow 0} \frac{f(7+h) - f(7)}{h}$ for $f(x) = -x + 1$.

20) _____

A) 1

B) 0

C) -1

D) Does not exist

Solve the problem.

- 21) A company training program determines that, on average, a new employee can do $P(x)$ pieces of work per day after s days of on-the-job training, where $P(x) = \frac{90 + 60x}{x + 5}$. Find $\lim_{x \rightarrow 5} P(x)$. 21) _____

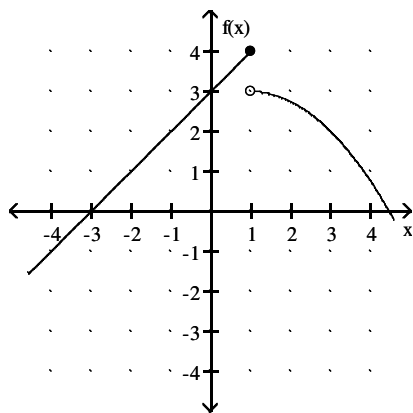
A) 42 B) 30 C) 105 D) Does not exist

- 22) The cost of manufacturing a particular videotape is $C(x) = 9000 + 9x$, where x is the number of tapes produced. The average cost per tape, denoted by $\bar{C}(x)$, is found by dividing $C(x)$ by x . Find $\lim_{x \rightarrow 9000} \bar{C}(x)$. 22) _____

A) 14 B) 6 C) 10 D) Does not exist

Use the given graph to find the indicated limit.

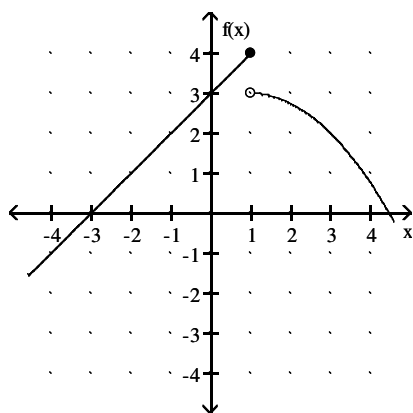
- 23) 23) _____



Find $\lim_{x \rightarrow \infty} f(x)$.

A) 3 B) $-\infty$ C) 4 D) ∞

- 24) 24) _____

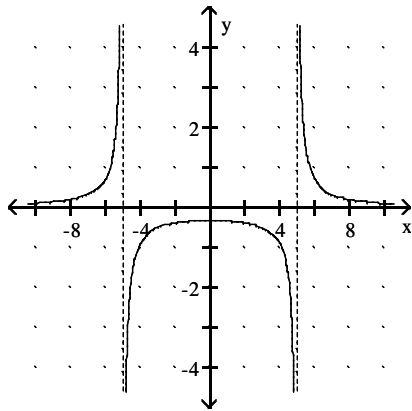


Find $\lim_{x \rightarrow -\infty} f(x)$.

A) $-\infty$ B) 4 C) ∞ D) 3

25)

25) _____



$$\lim_{x \rightarrow 5^+} f(x)$$

A) $-\infty$

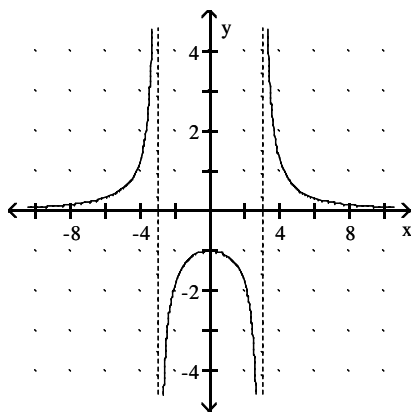
B) 5

C) 0

D) ∞

26)

26) _____



$$\lim_{x \rightarrow 3^-} f(x)$$

A) 0

B) 3

C) ∞ D) $-\infty$ **Find the limit.**

27) Determine the limit.

27) _____

$$\lim_{x \rightarrow -10^-} f(x), \text{ where } f(x) = \frac{1}{x + 10}$$

A) ∞

B) 0

C) -1

D) $-\infty$

28) Determine the limit.

28) _____

$$\lim_{x \rightarrow 5^+} f(x), \text{ where } f(x) = \frac{x^2}{(x - 5)^3}$$

A) $-\infty$

B) -2

C) ∞

D) 5

Provide an appropriate response.

29) If the limit at infinity exists, find the limit.

29) _____

$$\lim_{x \rightarrow \infty} \frac{5x^2 + 7x - 9}{-6x^2 + 2}$$

A) 0

B) ∞

C) $-\frac{5}{6}$

D) $-\frac{2}{9}$

30) If the limit at infinity exists, find the limit.

30) _____

$$\lim_{x \rightarrow \infty} \frac{3x^3 + 5x}{4x^4 + 10x^3 + 2}$$

A) $\frac{3}{4}$

B) 1

C) 0

D) ∞

Use $-\infty$ or ∞ where appropriate to describe the behavior at each zero of the denominator and identify all vertical asymptotes.

$$31) g(x) = \frac{x}{6 - x}$$

31) _____

A) $\lim_{x \rightarrow 6^-} f(x) = \infty$; $\lim_{x \rightarrow 6^+} f(x) = -\infty$; $x = 6$ is a vertical asymptote

B) $\lim_{x \rightarrow 6^-} f(x) = \infty$; $\lim_{x \rightarrow 6^+} f(x) = -\infty$; $x = 0$ is a vertical asymptote

C) $\lim_{x \rightarrow 6^-} f(x) = -\infty$; $\lim_{x \rightarrow 6^+} f(x) = \infty$; $x = 6$ is a vertical asymptote

D) $\lim_{x \rightarrow 6^-} f(x) = -\infty$; $\lim_{x \rightarrow 6^+} f(x) = -\infty$; $x = 6$ is a vertical asymptote

$$32) f(x) = \frac{x^2 - 16}{x^2 + 16}$$

32) _____

A) No zeros of denominator; no vertical asymptotes

B) $\lim_{x \rightarrow -4^-} f(x) = \infty$; $\lim_{x \rightarrow -4^+} f(x) = -\infty$; $x = -4$ is a vertical asymptote

C) $\lim_{x \rightarrow 4^-} f(x) = \infty$; $\lim_{x \rightarrow 4^+} f(x) = \infty$; $x = 0$ is a vertical asymptote

D) $\lim_{x \rightarrow 4^-} f(x) = \infty$; $\lim_{x \rightarrow 4^+} f(x) = -\infty$; $x = 4$ is a vertical asymptote

Describe the end behavior of the function.

$$33) f(x) = 5x^4 + 5x + 11$$

33) _____

A) $\lim_{x \rightarrow \infty} f(x) = -\infty$; $\lim_{x \rightarrow -\infty} f(x) = \infty$

B) $\lim_{x \rightarrow \infty} f(x) = \infty$; $\lim_{x \rightarrow -\infty} f(x) = \infty$

C) $\lim_{x \rightarrow \infty} f(x) = -\infty$; $\lim_{x \rightarrow -\infty} f(x) = -\infty$

D) $\lim_{x \rightarrow \infty} f(x) = \infty$; $\lim_{x \rightarrow -\infty} f(x) = -\infty$

Provide an appropriate response.

34) Find the vertical asymptote(s) of the graph of the given function.

34) _____

$$f(x) = \frac{3x - 9}{5x + 30}$$

A) $y = 8$

B) $y = -3$

C) $x = -8$

D) $x = -6$

35) Find the vertical asymptote(s) of the graph of the given function.

35) _____

$$f(x) = \frac{x^2 - 100}{(x - 9)(x + 3)}$$

A) $x = -9$

B) $x = 9, x = -3$

C) $x = 10, x = -10$

D) $y = 9, y = -3$

36) Find the horizontal asymptote, if any, of the given function.

36) _____

$$f(x) = \frac{(x - 3)(x + 4)}{x^2 - 4}$$

A) $x = 2, x = -2$

B) $y = 1$

C) $y = 3, y = -4$

D) None

37) Find the horizontal asymptote, if any, of the given function.

37) _____

$$f(x) = \frac{2x^3 - 3x - 9}{9x^3 - 5x + 3}$$

A) $y = 0$

B) $y = \frac{3}{5}$

C) $y = \frac{2}{9}$

D) None

Solve the problem.

38) Suppose that the value V of a certain product decreases, or depreciates, with time t , in months, where

38) _____

$$V(t) = 23 - \frac{16t^2}{(t + 2)^2}.$$

Find $\lim_{t \rightarrow \infty} V(t)$.

A) 19

B) 7

C) 23

D) 16

39) Suppose that the value V of a certain product decreases, or depreciates, with time t , in months, where

39) _____

$$V(t) = 100 - \frac{30t^2}{(t + 2)^2}.$$

Find $\lim_{t \rightarrow \infty} V(t)$.

A) 30

B) 100

C) 70

D) 85

40) Suppose that the cost C of removing $p\%$ of the pollutants from a chemical dumping site is given by

40) _____

$$C(p) = \frac{\$40,000}{100 - p}.$$

Can a company afford to remove 100% of the pollutants? Explain.

A) No, the cost of removing $p\%$ of the pollutants is \$400, which is a prohibitive amount of money.

B) Yes, the cost of removing $p\%$ of the pollutants is \$40,000, which is certainly affordable.

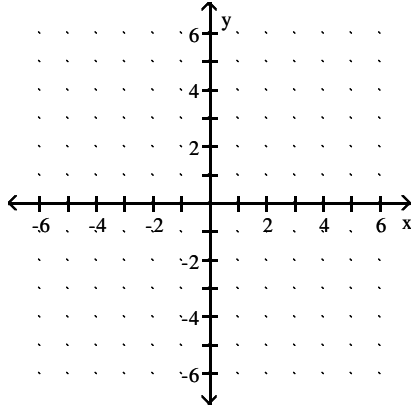
C) No, the cost of removing $p\%$ of the pollutants increases without bound as p approaches 100.

D) Yes, the cost of removing $p\%$ of the pollutants is \$400, which is certainly affordable.

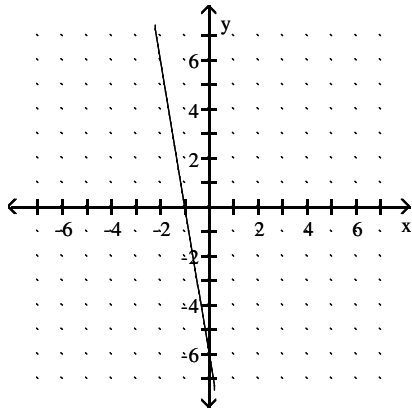
Sketch a possible graph of a function that satisfies the given conditions.

41) $f(0) = 6$ and $\lim_{x \rightarrow 0} f(x) = 6$

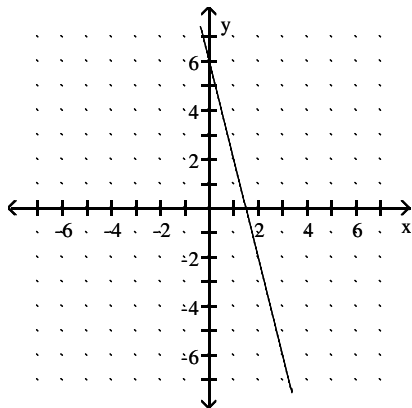
41) _____



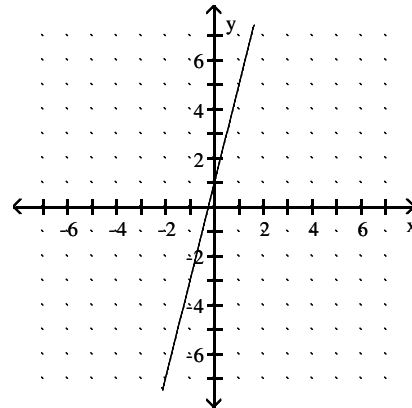
A)



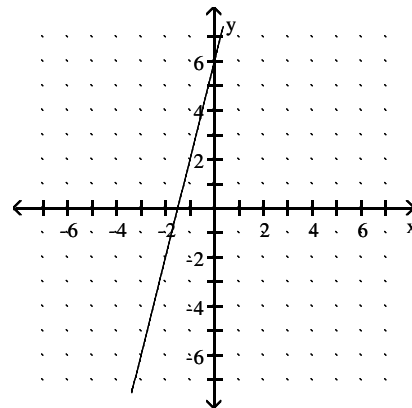
C)



B)

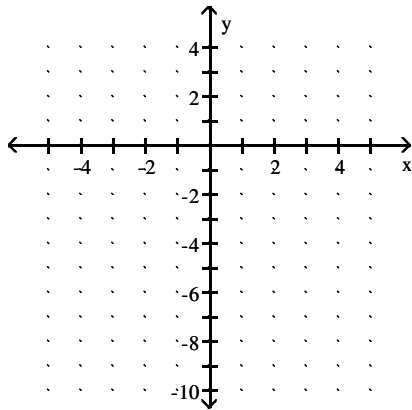


D)

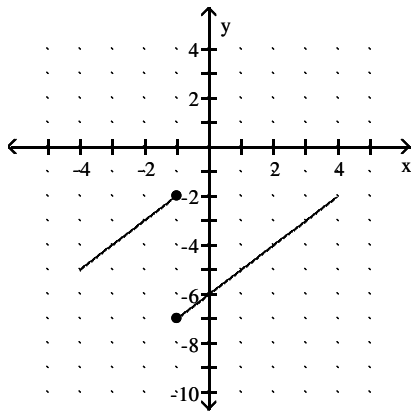


42) $f(-1) = -7$; $\lim_{x \rightarrow (-1)^-} f(x) = -2$; $\lim_{x \rightarrow (-1)^+} f(x) = -7$

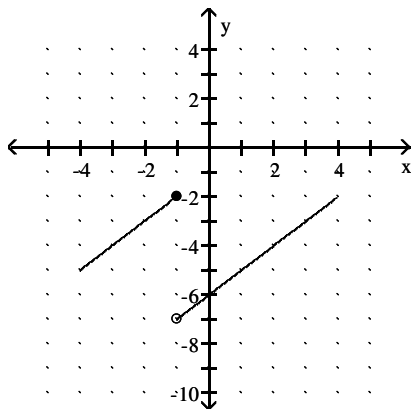
42) _____



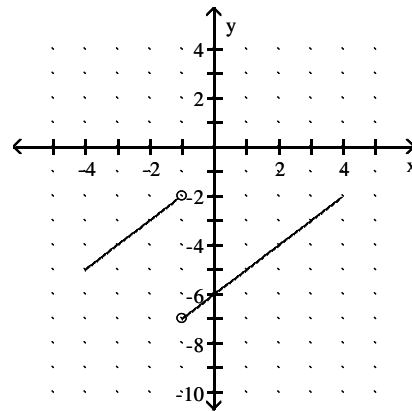
A)



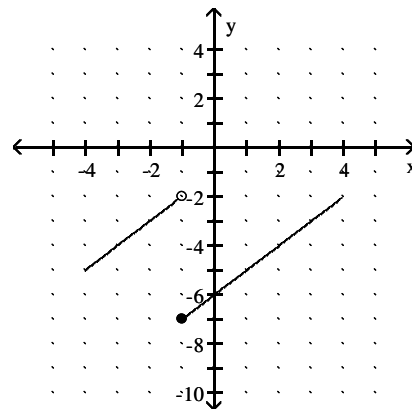
C)



B)



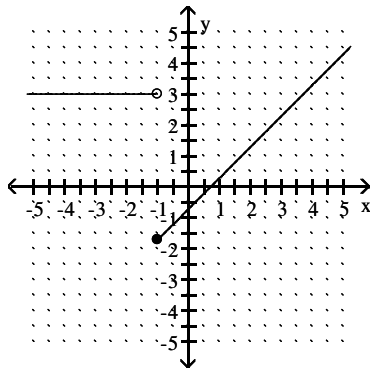
D)



The graph of $y = f(x)$ is shown. Use the graph to answer the question.

43) Is f continuous at $x = -1$?

43) _____

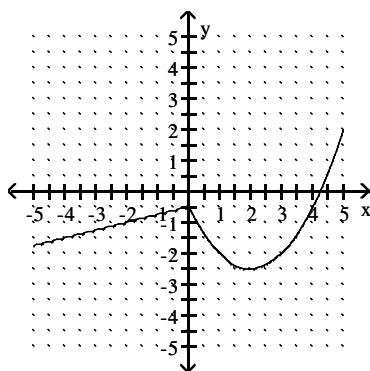


A) No

B) Yes

44) Is f continuous at $x = 2$?

44) _____

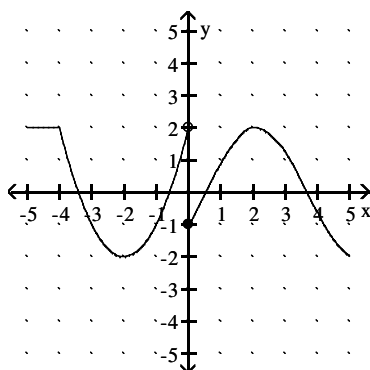


A) Yes

B) No

45) Is f continuous at $x = -1$?

45) _____



A) Yes

B) No

Provide an appropriate response.

46) Determine where the function $H(x) = \frac{x^2 + 7}{x^2 + x - 6}$ is continuous.

46) _____

A) $(-\infty, -3) \cup (-3, 2) \cup (2, \infty)$

B) $(-3, 2) \cup (2, \infty)$

C) $(-\infty, -3)$

D) $(-\infty, -3) \cup (-3, 2)$

47) Determine where the function $f(x) = \frac{5x}{2x-3}$ is continuous. 47) _____

- A) $\left(\frac{3}{2}, \infty\right)$ B) $\left(-\infty, \frac{3}{2}\right) \cup \left(\frac{3}{2}, \infty\right)$ C) $\left(-\infty, \frac{3}{2}\right)$ D) $(-\infty, \infty)$

48) Determine the x-values, if any, at which the function is discontinuous. 48) _____

$$h(x) = \begin{cases} x^2 - 9 & \text{for } x < -1 \\ 0 & \text{for } -1 \leq x \leq 1 \\ x^2 + 9 & \text{for } x > 1 \end{cases}$$

- A) -1, 1 B) 1 C) -1, 0, 1 D) None

49) Use a graphing utility to approximate the partition numbers of the function to four decimal places: 49) _____

$$f(x) = x^4 - 8x^2 - 4x + 1.$$

- A) $(-\infty, -2.4976) \cup (0.1832, 3.0347)$
 B) $(-\infty, -2.4976)$
 C) $(-\infty, -2.4976) \cup (-2.4976, -0.7203) \cup (-0.7203, 0.1832) \cup (0.1832, 3.0347)$
 D) $(-\infty, -2.4976) \cup (-2.4976, -0.7203)$

50) Use a graphing utility to find the discontinuities of the given rational function. 50) _____

$$g(x) = \frac{x+1}{x^3 + 2x^2 + 10x - 13}$$

- A) -1 B) 1
 C) 3 D) Continuous at all values of x

51) Use a graphing utility to find the discontinuities of the given rational function. 51) _____

$$g(x) = \frac{x+1}{x^3 + 2x^2 + 10x - 13}$$

- A) 3 B) -1
 C) 1 D) Continuous at all values of x

52) Use a graphing utility to find the discontinuities of the given rational function. 52) _____

$$f(x) = \frac{x^2 + 2x + 1}{x^3 + 2x^2 + 5x - 8}$$

- A) 1 B) 3
 C) -1 D) Continuous at all values of x

53) Solve the inequality and express the answer in interval notation: $\frac{x^2 - 4x}{x + 5} > 0$. 53) _____

- A) $(-5, 0)$ B) $(4, \infty)$ C) $(-5, 0) \cup (4, \infty)$ D) $(-5, \infty)$

54) Use a sign chart to solve the inequality. Express answers in interval notation. 54) _____

$$x^2 > 16$$

- A) $(4, \infty)$ B) $(-4, \infty)$ C) $(-4, 4)$ D) $(-\infty, -4) \cup (4, \infty)$

55) Use a sign chart to solve the inequality. Express answers in interval notation. 55) _____

$$x^2 + 6 < 2x$$

- A) $\emptyset$ B) $(2, \infty)$ C) $(-\infty, -2)$ D) $\{2\}$

56) Use a sign chart to solve the inequality. Express answers in interval notation.

56) _____

$$\frac{-5}{-3x-4} > 0$$

A) $(0, \infty)$

B) $\left(-\infty, -\frac{3}{4}\right)$

C) $\left(-\infty, \frac{4}{3}\right)$

D) $\left(-\frac{4}{3}, \infty\right)$

Solve the problem.

57) The cost of renting a snowblower is \$20 for the first hour (or any fraction thereof) and \$5 for each additional hour (or fraction thereof) up to a maximum rental time of 5 hours. Write a piecewise definition of the cost $C(x)$ of renting a snowblower for x hours. Is $C(x)$ continuous at $x = 2.5$?

57) _____

A) $C(x) = \begin{cases} 20 & \text{if } 0 \leq x \leq 1 \\ 25 & \text{if } 1 < x \leq 2 \\ 30 & \text{if } 2 < x \leq 3; \text{ No} \\ 35 & \text{if } 3 < x \leq 4 \\ 40 & \text{if } 4 < x \leq 5 \end{cases}$

B) $C(x) = \begin{cases} 20 & \text{if } 0 < x \leq 1 \\ 25 & \text{if } 1 < x \leq 2 \\ 30 & \text{if } 2 < x \leq 3; \text{ Yes} \\ 35 & \text{if } 3 < x \leq 4 \\ 40 & \text{if } 4 < x \leq 5 \end{cases}$

C) $C(x) = \begin{cases} 25 & \text{if } 0 < x \leq 1 \\ 30 & \text{if } 1 < x \leq 2 \\ 35 & \text{if } 2 < x \leq 3; \text{ No} \\ 40 & \text{if } 3 < x \leq 4 \\ 45 & \text{if } 4 < x \leq 5 \end{cases}$

D) $C(x) = \begin{cases} 20 & \text{if } 0 < x \leq 1 \\ 25 & \text{if } 1 < x \leq 2 \\ 30 & \text{if } 2 < x \leq 3; \text{ No} \\ 35 & \text{if } 3 < x \leq 4 \\ 40 & \text{if } 4 < x \leq 5 \end{cases}$

Find average rate of change for the function over the given interval.

58) $y = x^2 + 6x$ between $x = 4$ and $x = 8$

58) _____

A) 28

B) 14

C) 9

D) 18

59) $y = 5x^3 - 5x^2 - 7$ between $x = -9$ and $x = -4$

59) _____

A) $-\frac{407}{5}$

B) $-\frac{1825}{2}$

C) $\frac{407}{4}$

D) 730

60) Find the average rate of change for $f(x) = \sqrt{2x}$ if x changes from 2 to 8.

60) _____

A) 7

B) $-\frac{3}{10}$

C) 2

D) $\frac{1}{3}$

61) Find the average rate of change of y with respect to x if x changes from 3 to 5 in the function

61) _____

$y = x^2 + 3x.$

A) 11

B) 9

C) 4

D) 22

Find the instantaneous rate of change for the function at the value given.

62) Find the instantaneous rate of change for the function $x^2 + 7x$ at $x = 8$.

62) _____

A) 23

B) 15

C) 16

D) 120

63) Find the instantaneous rate of change for the function $f(x) = 5x^2 + x$ at $x = -4$.

63) _____

A) -14

B) -41

C) 6

D) -39

Provide an appropriate response.

- 64) Use the four step process to find $f'(x)$ for the function $f(x) = 5x^2 - 3x$. 64) _____
 A) $5h^2 - 3h$ B) $5h - 3$ C) $10x - 3$ D) $10x + 5h - 3$

- 65) Use the four step process to find $f'(x)$ for the function $f(x) = \frac{2}{x^2}$. 65) _____
 A) $-\frac{2(h+2x)}{x^2(x+h)^2}$ B) $-\frac{2(h+2x+hx)}{x^2(x+h)^2}$
 C) $\frac{(h+2x)}{x^2(x+h)^2}$ D) $\frac{2(h+x)}{x^2(x+h)^2}$

- 66) Use the four step process to find $f'(x)$ for the function $f(x) = \frac{x}{6-x}$. 66) _____
 A) $\frac{1}{(x-6)(x+h-6)}$ B) $\frac{6}{(x-6)(x+h-6)}$
 C) $-\frac{6}{h(x-6)(x+h-6)}$ D) $-\frac{x}{(x-6)(x+h-6)}$

Use the definition $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ to find the derivative at x.

- 67) $f(x) = 13x - 12$ 67) _____
 A) 13 B) -13 C) 13x D) 1
 68) $f(x) = 6 - 6x^2$ 68) _____
 A) $6 - 6x$ B) $6 - 12x$ C) $-12x^2$ D) $-12x$
 69) $f(x) = 4x - 3x^3$ 69) _____
 A) $4 - 9x^2$ B) $4 - 3x^2$ C) $4x - 9x^2$ D) $4x - 9x^3$

Provide an appropriate response.

- 70) Find the slope of the secant line joining $(2, f(2))$ and $(3, f(3))$ for $f(x) = -3x^2 - 8$. 70) _____
 A) -55 B) -15 C) 55 D) 15
 71) Find the slope of the graph $f(x) = -x^2 + 3x$ at the point $(1, 2)$. 71) _____
 A) 1 B) -1 C) 2 D) -2
 72) Find the slope of the line tangent to the graph of the function at the given value of x. 72) _____
 $y = x^4 + 2x^3 + 2x + 2$ at $x = -3$
 A) 65 B) 67 C) -50 D) -52
 73) Given $f(x+h) - f(x) = 4xh + 4h + 2h^2$, find the slope of the tangent line at $x = 4$. 73) _____
 A) 8 B) 20 C) 16 D) 22

Find the equation of the tangent line to the curve when x has the given value.

- 74) $f(x) = -3 - x^2$; $x = 7$ 74) _____
 A) $y = -2x$ B) $y = 7x + 46$ C) $y = -14x + 46$ D) $y = 14x - 46$

75) Find the equation of the tangent line to the graph of the function at the given value of x .

75) _____

$$f(x) = x^2 + 5x \text{ at } x = 4$$

A) $y = -\frac{4}{25}x + \frac{8}{5}$

B) $y = \frac{1}{20}x + \frac{1}{5}$

C) $y = 13x - 16$

D) $y = -39x - 80$

Solve the problem.

76) Suppose an object moves along the y -axis so that its location is $y = f(x) = x^2 + x$ at time x (y is in meters and x is in seconds). Find the average velocity (the average rate of change of y with respect to x) for x changing from 2 to 9 seconds.

76) _____

A) 84 m/s

B) 15 m/s

C) 12 m/s

D) 3 m/s

77) Suppose an object moves along the y -axis so that its location is $y = f(x) = x^2 + x$ at time x (y is in meters and x is in seconds). Find the average velocity for x changing from 3 to $3 + h$ seconds.

77) _____

A) $12 - h$ m/s

B) $12 + h$ m/s

C) $7 - h$ m/s

D) $7 + h$ m/s

78) Suppose an object moves along the y -axis so that its location is $y = f(x) = x^2 + x$ at time x (y is in meters and x is in seconds). Find the instantaneous velocity at $x = 4$ seconds.

78) _____

A) 9 m/s

B) 10 m/s

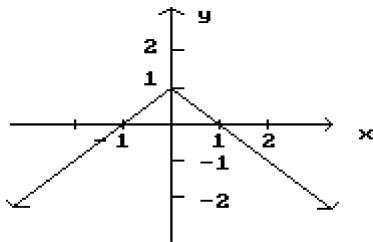
C) 8 m/s

D) 20 m/s

List the x -values in the graph at which the function is not differentiable.

79)

79) _____



A) $x = -1$

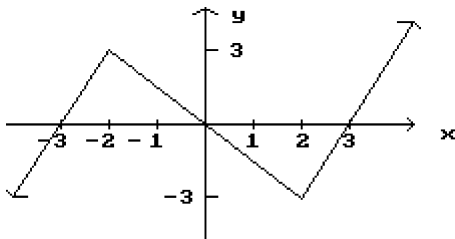
B) $x = 0$

C) $x = 1$

D) $x = 2$

80)

80) _____



A) $x = -3, x = 3$

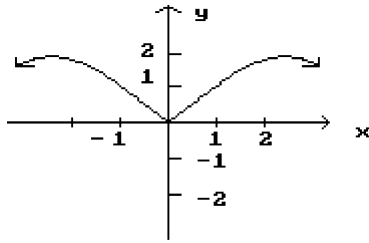
C) $x = -2, x = 2$

B) $x = -2, x = 0, x = 2$

D) $x = -3, x = 0, x = 3$

81)

81) _____



A) $x = 0$

B) $x = 2$

C) $x = -2, x = 0, x = 2$

D) $x = -2, x = 2$

Solve the problem.

82) If an object moves along a line so that it is at $y = f(x) = 3x^2 - 2x + 5$ at time x (in seconds), find the instantaneous velocity function $v = f'(x)$.

82) _____

A) $3x^2 - 2$

B) $6x^2 - 2$

C) $6x - 2$

D) $3x - 2$

83) If an object moves along a line so that it is at $y = f(x) = 8x^2$ at time x (in seconds), find the velocity at $x = 1$ (y is measured in feet).

83) _____

A) 8 ft / s

B) 16 ft / s

C) 160 ft/s

D) 6 ft/sec

84) The electric power p (in W) as a function of the current i (in A) in a certain circuit is given by $p(i) = 25i^2 + 70i$. Find the instantaneous rate of change of p with respect to i for $i = 0.7$ A.

84) _____

A) 84 W/A

B) 61.25 W/A

C) 87.5 W/A

D) 105 W/A

Provide an appropriate response.

85) Find $f'(x)$ if $f(x) = \pi$.

85) _____

A) $f'(x) = \pi^2$

B) $f'(x) = 0$

C) $f'(x) = \pi$

D) $f'(x) = 1$

86) Find y' if $y = \frac{5}{8}$.

86) _____

A) 1

B) $\frac{5}{8}x$

C) 0

D) $\frac{5}{8}$

87) Find y' if $y = 6x$.

87) _____

A) x

B) 6

C) x^2

D) 0

88) Find $f'(x)$ for $f(x) = 2x^5 + 6x^8$.

88) _____

A) $2x^4 + 6x^7$

B) $10x^4 + 48x^7$

C) $10x^3 + 48x^2$

D) $10x^6 + 48x^9$

89) Find the derivative of $y = \frac{3x^5 - 7x^2 - 4}{x^2}$.

89) _____

A) $y' = 18x^2 + 8x^{-3}$

B) $y' = 9x^2 + 8x^{-3}$

C) $y' = 9x^2 + 8x^3$

D) $y' = 9x^{-2} + 8x^{-3}$

90) Let f and g be functions that satisfy $f'(4) = 2$ and $g'(4) = -3$. Find $h'(4)$ for $h(x) = 3f(x) - g(x) + 2$.

90) _____

A) 5

B) 11

C) 2

D) 9

- 91) Find $f'(x)$ if $f(x) = 3x^4 + 6x^7$. 91) _____
 A) $4x^3 + 7x^6$ B) $7x^3 + 13x^6$ C) $3x^5 + 7x^8$ D) $12x^3 + 42x^6$
- 92) Find $f'(x)$ if $f(x) = 6x^{-2} + 8x^3 + 11x$. 92) _____
 A) $f'(x) = -12x^{-3} + 24x^2$ B) $f(x) = -12x^{-1} + 24x^2$
 C) $f'(x) = -12x^{-1} + 24x^2 + 11$ D) $f'(x) = -12x^{-3} + 24x^2 + 11$
- 93) Find $f'(x)$ if $f(x) = 9x^{7/5} - 5x^2 + 10000$. 93) _____
 A) $f'(x) = \frac{63}{5}x^{6/5} - 10x$ B) $f'(x) = \frac{63}{5}x^{6/5} - 10x + 4000$
 C) $f'(x) = \frac{63}{5}x^{2/5} - 10x + 4000$ D) $f'(x) = \frac{63}{5}x^{2/5} - 10x$
- 94) Find: $\frac{d}{dx}\left(\frac{4}{x^4} - 4\sqrt[5]{x}\right)$ 94) _____
 A) $-\frac{16}{x^5} - \frac{4}{5\sqrt[5]{x^4}}$ B) $-\frac{16}{x^3} - \frac{4}{5}\sqrt[4]{x}$ C) $\frac{1}{x^3} - \frac{4}{5}\sqrt[4]{x}$ D) $\frac{16}{x^3} - 20\sqrt[4]{x}$
- 95) Find: $\frac{dy}{dt}$ if $y = 3t^{-4} - 5t^{-1}$ 95) _____
 A) $-\frac{12}{t^5} - \frac{5}{t^2}$ B) $-12t^{-5} - 5t^{-2}$ C) $-12t^5 - 5t^2$ D) $-12t^{-5} + 5t^{-2}$
- 96) Find: $\frac{d}{dx}\left(\frac{4}{x^4} - 5\sqrt[3]{x}\right)$ 96) _____
 A) $\frac{1}{4x^3} - \frac{5}{3}x^{-2/3}$ B) $-16x^{-5} - \frac{5}{3}x^{-2/3}$
 C) $\frac{1}{x^3} + \frac{5}{3}x^{-4/3}$ D) $\frac{1}{4}x^{-5} - 15x^{2/3}$
- 97) Find $\frac{d}{dv}(6v^{0.7} - v^{5.8})$ 97) _____
 A) $4.2v^{-0.3} - 5.8v^{-4.8}$ B) $4.2v^{-0.3} - 5.8v^{-4.7}$
 C) $4.2v^{-0.3} - 5.8v^{4.8}$ D) $4.2v^{-0.3} - 5.8v^{4.7}$
- 98) Find $\frac{dy}{dx}$ for $y = \frac{1}{3x^3} + \frac{x^7}{10}$. 98) _____
 A) $-x^{-4} + \frac{7}{10}x^6$ B) $\frac{1}{9x^2} + \frac{7x^6}{10}$ C) $\frac{7x^6}{9x^2 + 10}$ D) $-x^{-2} + \frac{7}{10}x^7$
- 99) Find the equation of the tangent line at $x = 7$ for $f(x) = 6 - x^2$. Write the answer in the form $y = mx + b$. 99) _____
 A) $y = 14x - 55$ B) $y = -14x + 55$ C) $y = 7x + 55$ D) $y = -2x$

100) Find the equation of the tangent line at $x = -6$ for $f(x) = \frac{x^3}{2}$. Write the answer in the form $y = mx + b$. 100) _____

b.

A) $y = 18x + 216$

B) $y = 216x + 54$

C) $y = 216x + 18$

D) $y = 54x + 216$

101) Find the values of x where the tangent line is horizontal for $f(x) = 3x^3 - 2x^2 - 9$. 101) _____

A) $x = 0, x = -\frac{2}{3}$

B) $x = 0, x = -\frac{4}{9}$

C) $x = 0, x = \frac{4}{9}$

D) $x = 0, x = \frac{2}{3}$

102) Find the equation of the tangent line at $x = 2$ for $f(x) = 4 + x - 2x^2 - 3x^3$. Write the answer in the form $y = mx + b$. 102) _____

A) $y = -43x + 60$

B) $y = -47x + 68$

C) $y = -43x + 48$

D) $y = -39x + 52$

Solve the problem.

103) An object moves along the y -axis (marked in feet) so that its position at time t (in seconds) is given by $f(t) = 9t^3 - 9t^2 + t + 7$. Find the velocity at three seconds. 103) _____

A) 192 feet per second

B) 197 feet per second

C) 190 feet per second

D) 109 feet per second

104) A pen manufacturer determined that the total cost in dollars of producing x dozen pens in one day is given by: 104) _____

$$C(x) = 350 + 2x - 0.01x^2, \quad 0 \leq x \leq 100$$

Find the marginal cost at a production level of 70 dozen pens and interpret the result.

A) The marginal cost is \$0.62/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.62.

B) The marginal cost is \$0.60/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.60.

C) The marginal cost is \$0.58/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.58.

D) The marginal cost is \$0.59/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.59.

105) According to one theory of learning, the number of items, $w(t)$, that a person can learn after t hours of instruction is given by: 105) _____

$$w(t) = 15\sqrt[3]{t^2}, \quad 0 \leq t \leq 64$$

Find the rate of learning at the end of eight hours of instruction.

A) 20 items per hour

B) 45 items per hour

C) 5 items per hour

D) 60 items per hour

Find Δy for the given values of x_1 and x_2 .

106) $y = 2x + 3$; $x = 18$, $\Delta x = 0.5$ 106) _____

A) 0.5

B) 1

C) 0.1

D) 5

Find dy .

107) $y = 7x^2 + 3x + 3$ 107) _____

A) $14x \, dx$

B) $14x + 6 \, dx$

C) $14x + 3 \, dx$

D) $(14x + 3) \, dx$

- 108) $y = x\sqrt{5x+4}$ 108) _____
 A) $\frac{15x+8}{\sqrt{5x+4}} dx$ B) $\frac{15x-8}{2\sqrt{5x+4}} dx$ C) $\frac{15x-8}{\sqrt{5x+4}} dx$ D) $\frac{15x+8}{2\sqrt{5x+4}} dx$

Provide an appropriate response.

- 109) Evaluate dy and Δy for $y = f(x) = x^2 - 7x + 5$, $x = 7$, and $dx = \Delta x = 0.5$. 109) _____
 A) $dy = 3.5$; $\Delta y = 3.75$ B) $dy = 3.5$; $\Delta y = 3.5$
 C) $dy = 3.75$; $\Delta y = 3.75$ D) $dy = 3.75$; $\Delta y = 3.5$
- 110) Evaluate dy and Δy for $y = f(x) = 20 + 15x^2 - x^3$, $x = 2$, and $dx = \Delta x = 0.3$. 110) _____
 A) $dy = 14.4$; $\Delta y = 14.4$ B) $dy = 15.183$; $\Delta y = 15.183$
 C) $dy = 15.183$; $\Delta y = 14.4$ D) $dy = 14.4$; $\Delta y = 15.183$
- 111) A spherical balloon is being inflated. Find the approximate change in volume if the radius increases from 6.1 cm to 6.3 cm. (Recall that $V = \frac{4}{3}\pi r^3$.) 111) _____
 A) $148.84\pi \text{ cm}^3$ B) $29.768\pi \text{ cm}^3$ C) $0.976\pi \text{ cm}^3$ D) 302.64 cm^3

Solve the problem.

- 112) A cube 4 inches on an edge is given a protective coating 0.2 inches thick. About how much coating should a production manager order for 800 cubes? 112) _____
 A) About 7,680 in.² B) About 2,560 in.²
 C) About 10,240 in.³ D) About 15,360 in.³
- 113) One hour after x milligrams of a particular drug are given to a person, the change in body temperature T (in degrees Fahrenheit) is given by $T = x^2 \left(1 - \frac{x}{8}\right)$, where $0 \leq x \leq 3$. Approximate the changes in body temperature produced by changing the drug dosage from 1 to 1.8 milligrams. Round to the nearest hundredth when necessary. 113) _____
 A) 0.25°F B) 1.63°F C) 2.93°F D) 1.3°F
- 114) $V = \frac{4}{3}\pi r^3$, where r is the radius, in centimeters. By approximately how much does the volume of a sphere increase when the radius is increased from 1.0 cm to 1.1 cm? (Use 3.14 for π .) 114) _____
 A) 1.5 cm³ B) 1.1 cm³ C) 0.1 cm³ D) 1.3 cm³

Provide an appropriate response.

- 115) Suppose that the total profit in hundreds of dollars from selling x items is given by $P(x) = 4x^2 - 5x + 10$. Find the marginal profit at $x = 5$. 115) _____
 A) \$32 B) \$35 C) \$15 D) \$45
- 116) The revenue (in thousands of dollars) from producing x units of an item is modeled by $R(x) = 5x - 0.0005x^2$. Find the marginal revenue at $x = 1000$. 116) _____
 A) \$104.00 B) \$4.00 C) \$10,300.00 D) \$4.50

- 117) Let $C(x)$ be the cost function and $R(x)$ the revenue function. Compute the marginal cost, marginal revenue, and the marginal profit functions. 117) _____
- $$C(x) = 0.0005x^3 - 0.012x^2 + 100x + 30,000$$
- $$R(x) = 450x$$
- A) $C'(x) = 0.0015x^2 - 0.024x + 100$
 $R'(x) = 450$
 $P'(x) = 0.0015x^2 - 0.024x - 350$
- B) $C'(x) = 0.0015x^2 + 0.024x + 100$
 $R'(x) = 450$
 $P'(x) = 0.0015x^2 + 0.024x + 350$
- C) $C'(x) = 0.0015x^2 - 0.024x + 100$
 $R'(x) = 450$
 $P'(x) = -0.0015x^2 + 0.024x + 350$
- 118) The total cost to produce x units of paint is $C(x) = (5x + 3)(7x + 4)$. Find the marginal average cost function. 118) _____
- A) $\bar{C}'(x) = 70x + 41$ B) $\bar{C}'(x) = 35x + 41 + \frac{12}{x}$
- C) $\bar{C}'(x) = 70 - \frac{41}{x}$ D) $\bar{C}'(x) = 35 - \frac{12}{x^2}$
- 119) The total profit from selling x units of doorknobs is $P(x) = (6x - 7)(9x - 8)$. Find the marginal average profit function. 119) _____
- A) $\bar{P}'(x) = 54x - 56$ B) $\bar{P}'(x) = 54 - \frac{111}{x^2}$ C) $\bar{P}'(x) = 54 - \frac{56}{x^2}$ D) $\bar{P}'(x) = 54x - 111$
- 120) The total cost in dollars of producing x lawn mowers is given by $C(x) = 4,000 + 90x - \frac{x^2}{3}$. Find the marginal average cost at $x = 20$, $\bar{C}'(20)$ and interpret the result. 120) _____
- A) -\$13.33; a unit increase in production will decrease the average cost per unit by approximately \$13.33 at a production level of 20 units.
- B) -\$1.33; a unit increase in production will decrease the average cost per unit by approximately \$1.33 at a production level of 20 units.
- C) -\$20.33; a unit increase in production will decrease the average cost per unit by approximately \$20.33 at a production level of 20 units.
- D) -\$10.33; a unit increase in production will decrease the average cost per unit by approximately \$10.33 at a production level of 20 units.

Solve the problem.

- 121) The demand equation for a certain item is $p = 14 - \frac{x}{1,000}$ and the cost equation is $C(x) = 7,000 + 4x$. 121) _____

Find the marginal profit at a production level of 3,000 and interpret the result.

- A) \$4; at the 3,000 level of production, profit will increase by approximately \$4 for each unit increase in production.
- B) \$14; at the 3,000 level of production, profit will increase by approximately \$14 for each unit increase in production.
- C) \$7; at the 3,000 level of production, profit will increase by approximately \$7 for each unit increase in production.
- D) \$16; at the 3,000 level of production, profit will increase by approximately \$16 for each unit increase in production.

- 122) A company is planning to manufacture a new blender. After conducting extensive market surveys, the research department estimates a weekly demand of 600 blenders at a price of \$50 per blender and a weekly demand of 800 blenders at a price of \$40 per blender. Assuming the demand equation is linear, use the research department's estimates to find the revenue equation in terms of the demand x .

A) $R(x) = 80x - 20x^2$

B) $R(x) = 80x - 20$

C) $R(x) = 80x - \frac{x^2}{20}$

$$\text{D) } R(x) = 20x + \frac{x^2}{20}$$

- 123) Suppose the demand for a certain item is given by $D(p) = -3p^2 + 3p + 4$, where p represents the price of the item. Find $D'(p)$, the rate of change of demand with respect to price. 123) _____

A) $D'(p) = -3p^2 + 3$

B) $D'(p) = -6p^2 + 3$

C) $D'(p) = -6p + 3$

D) $D'(p) = -3p + 3$

Answer Key

Testname: UNTITLED40

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

Answer Key

Testname: UNTITLED40

- 51) C
- 52) A
- 53) C
- 54) D
- 55) A
- 56) D
- 57) B
- 58) D
- 59) D
- 60) D
- 61) A
- 62) A
- 63) D
- 64) D
- 65) A
- 66) B
- 67) A
- 68) D
- 69) A
- 70) B
- 71) A
- 72) D
- 73) B
- 74) C
- 75) C
- 76) C
- 77) D
- 78) A
- 79) B
- 80) C
- 81) A
- 82) C
- 83) B
- 84) D
- 85) B
- 86) C
- 87) B
- 88) B
- 89) B
- 90) D
- 91) D
- 92) D
- 93) D
- 94) A
- 95) D
- 96) B
- 97) C
- 98) A
- 99) B
- 100) D

Answer Key

Testname: UNTITLED40

- 101) C
- 102) A
- 103) C
- 104) B
- 105) C
- 106) B
- 107) D
- 108) D
- 109) A
- 110) D
- 111) B
- 112) D
- 113) D
- 114) D
- 115) B
- 116) B
- 117) C
- 118) D
- 119) C
- 120) D
- 121) A
- 122) C
- 123) C