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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

Exam

Name_____

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

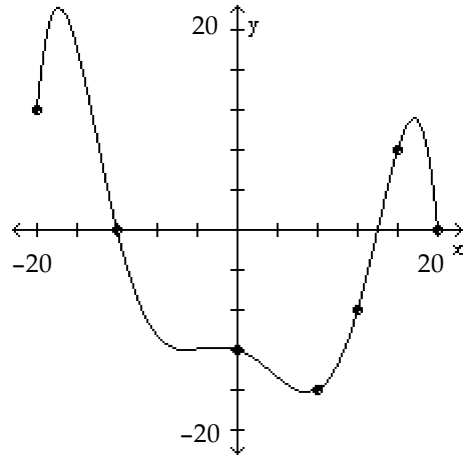
Provide an appropriate response.

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.

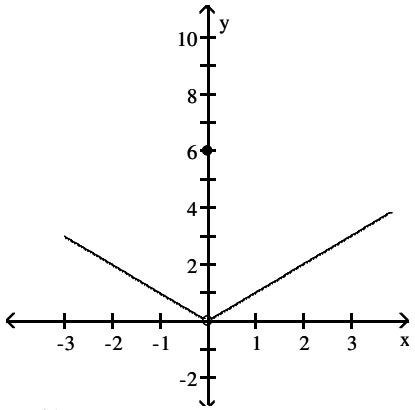
2) Use the graph of f given below to find f(8). 2) _____



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 $\lim_{x \to 0} f(x)$ and f(0). 3) _____

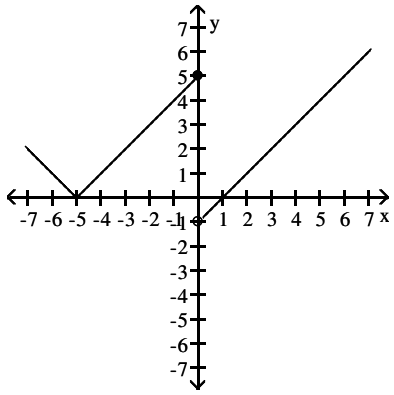


A) Does not exist; 6 B) 6; 0

C) 0; 6 D) 0; does not exist

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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



A) –1; 5
B) Does not exist; does not exist
C) 5; –1
D) 5; Does not exist

Find the limit, if it exists.

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

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

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

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

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

A) 8
B) –8
C) – 24
D) 16

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

A) –1
B) 1
C) 0
D) Does not exist

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

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

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

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

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

12) Evaluate the following limit 12) _____

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

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

13) Let $f(x) = \frac{x^2 - 3x - 10}{x + 2}$. Find $\lim_{x \to -2} f(x)$. 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 $\lim_{x \to 0^-} f(x)$.

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

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

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

17) Evaluate the following limit. 17) _____

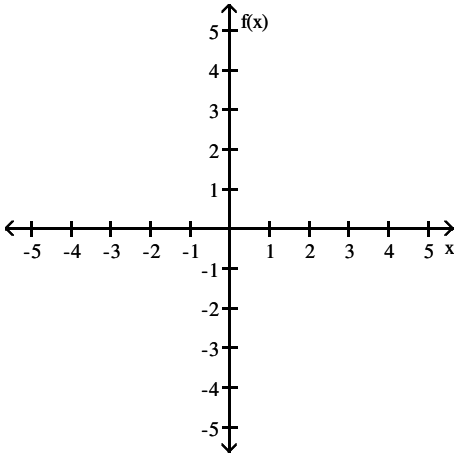
$\lim_{x \to 2^+} \frac{1}{x - 2}$

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

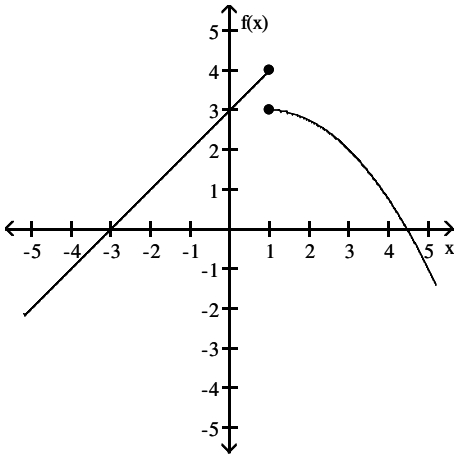
Sketch a possible graph of a function that satisfies the given conditions.

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

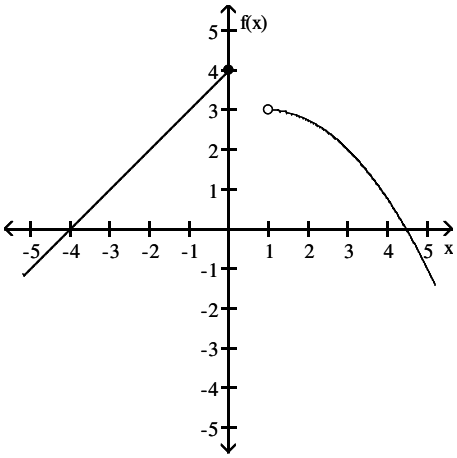
18) $f(1) = 4$; $\lim_{x \to 1^-} f(x) = 4$; $\lim_{x \to 1^+} f(x) = 3$ 18) _____



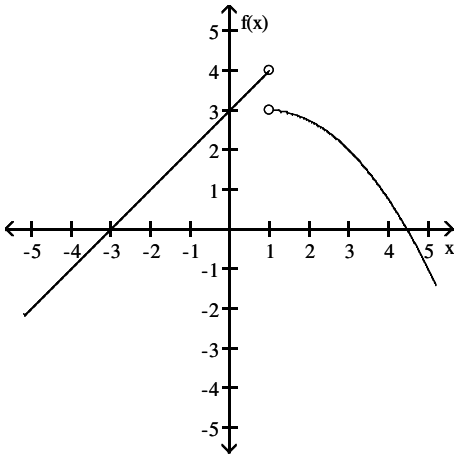
A)



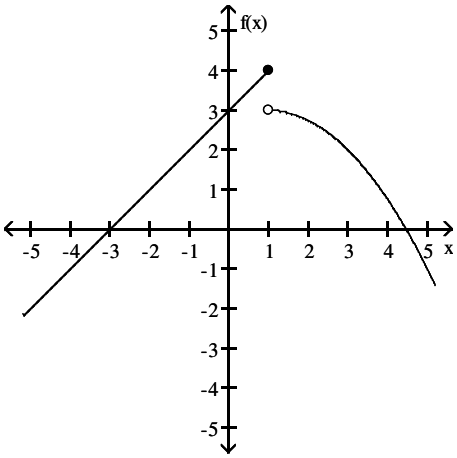
B)



C)

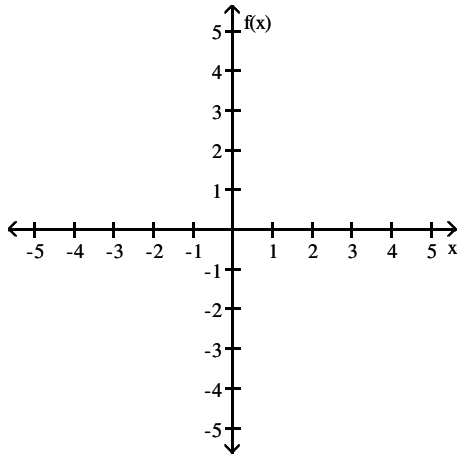


D)

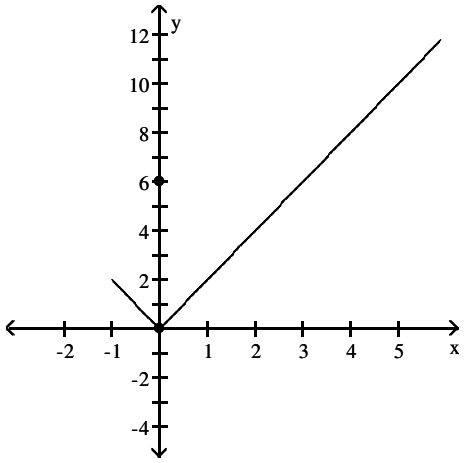


Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

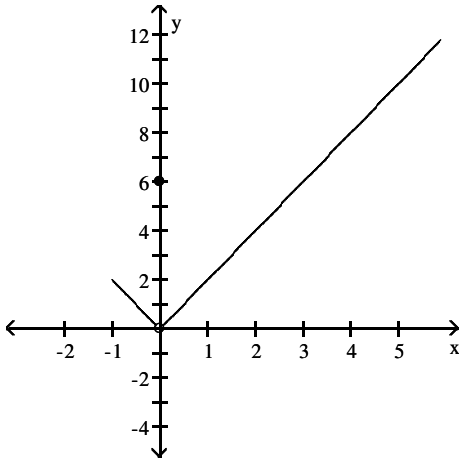
19) $f(0) = 6$; $\lim_{x \to 0^-} f(x) = 0$; $\lim_{x \to 0^+} f(x) = 0$ 19) _____



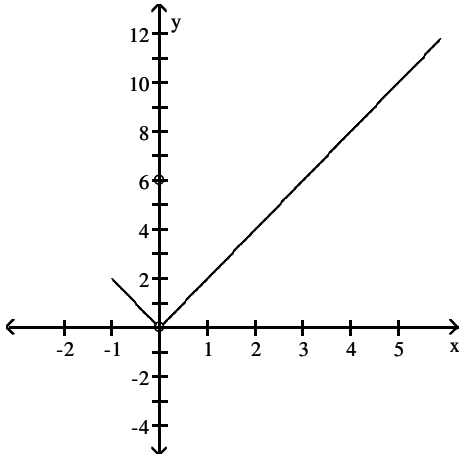
A)



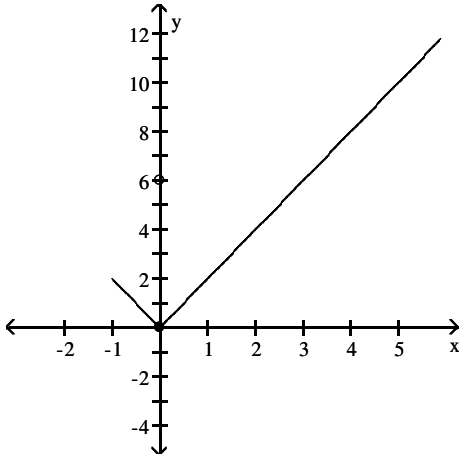
B)



C)



D)



Find the limit, if it exists.

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

A) 1 B) 0 C) –1 D) Does not exist

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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 $\lim_{x \to -5} P(x)$. 21) _____

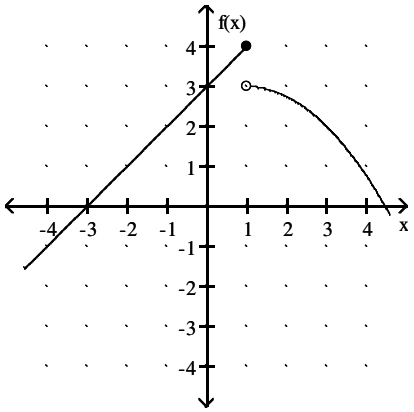
A) 42 B) 30 C) 105 D) Does not exist

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 $\overline{C}(x)$, is found by dividing C(x) by x. Find $\lim_{x \to 9000} \overline{C}(x)$. 22) _____

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

Use the given graph to find the indicated limit.

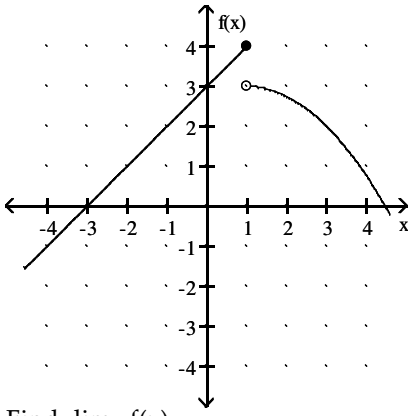
23) 23) _____



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

A) 3 B) -∞ C) 4 D) ∞

24) 24) _____

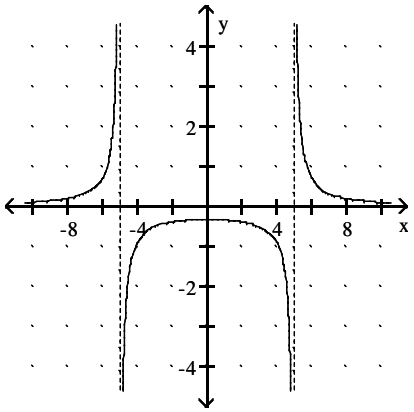


Find $\lim_{x \to -\infty} f(x)$.

A) -∞ B) 4 C) ∞ D) 3

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

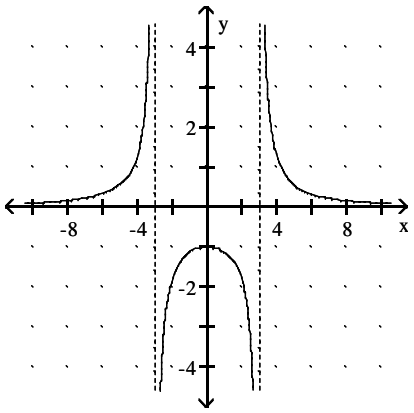
25) 25) _____



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

A) $-\infty$ B) 5 C) 0 D) ∞

26) 26) _____



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

A) 0 B) 3 C) ∞ D) $-\infty$

Find the limit.

27) Determine the limit. 27) _____

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

A) ∞ B) 0 C) -1 D) $-\infty$

28) Determine the limit. 28) _____

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

A) $-\infty$ B) -2 C) ∞ D) 5

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

Provide an appropriate response.

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

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

A) 0 B) ∞ C) $-\frac{5}{6}$ D) $-\frac{2}{9}$

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

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

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

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

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

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

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

A) No zeros of denominator; no vertical asymptotes

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

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

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

Describe the end behavior of the function.

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

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

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

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

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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, wher 38) _____

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

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

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, wher 39) _____

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

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

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.

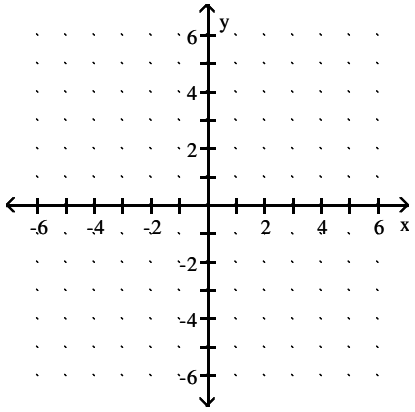
D) Yes, the cost of removing p% of the pollutants is $400, which is certainly affordable.

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

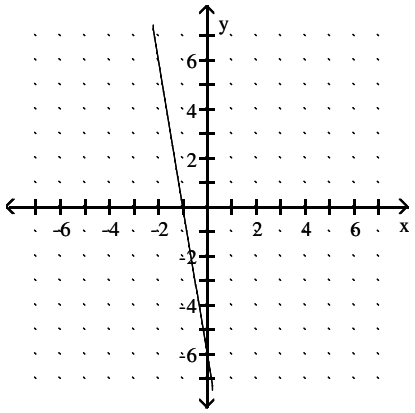
Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

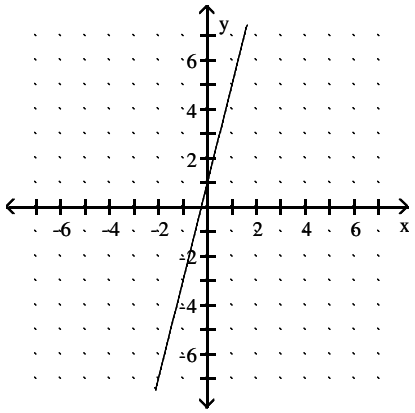
41) _____



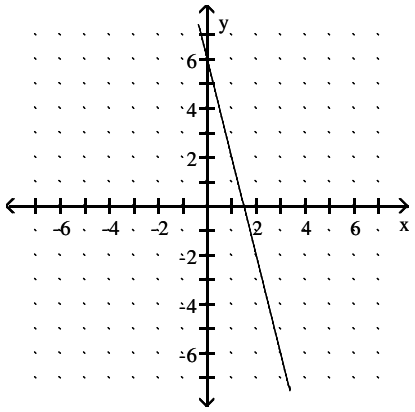
A)



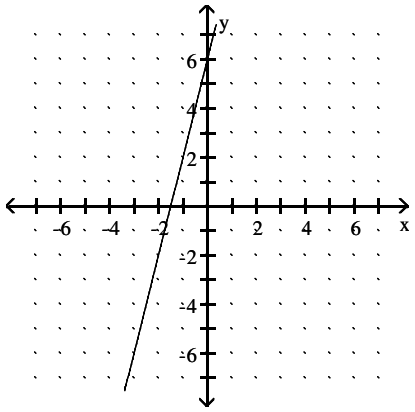
B)



C)

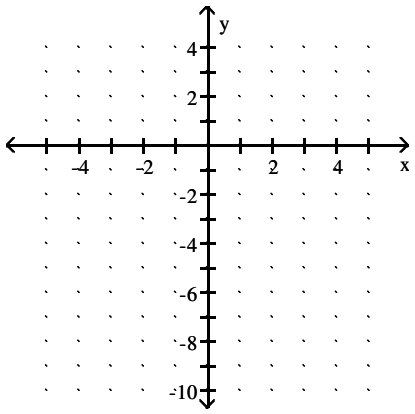


D)

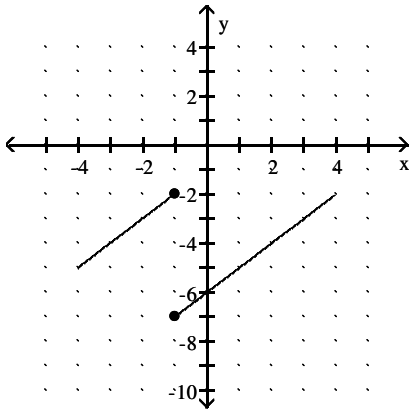


Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

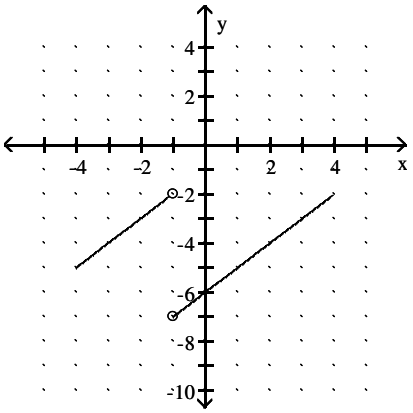
42) $f(-1) = -7$; $\lim_{x \to (-1)^-} f(x) = -2$; $\lim_{x \to (-1)^+} f(x) = -7$ 42) _____



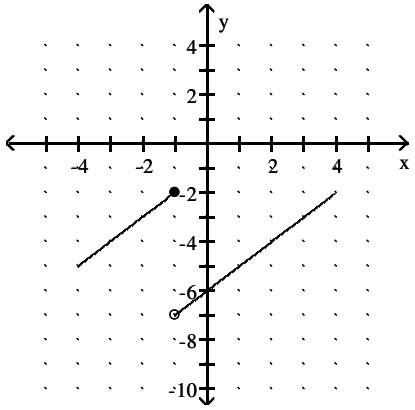
A)



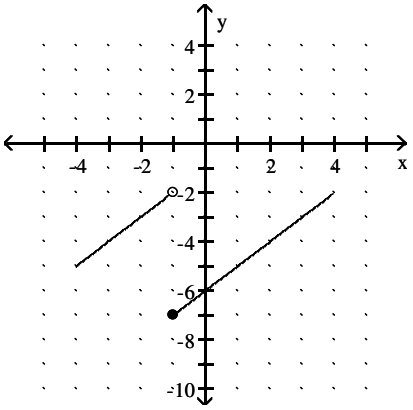
B)



C)



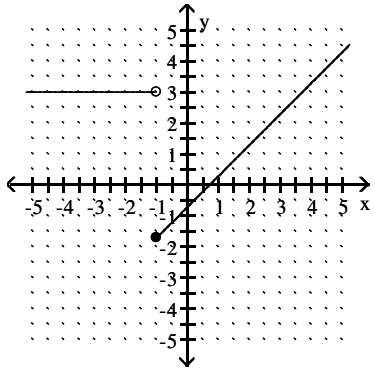
D)



Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

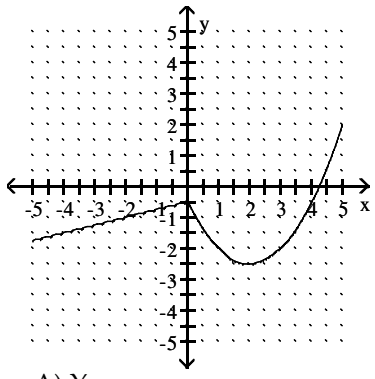
The graph of y = f(x) is shown. Use the graph to answer the question.

43) Is f continuous at x = –1? 43) _____



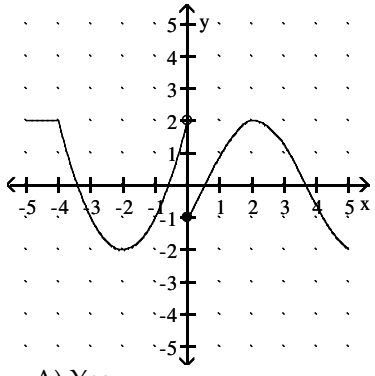
A) No B) Yes

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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) _____

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

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

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

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

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

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 $y = x^2 + 3x$. 61) _____

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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) $-\frac{2(h + 2x + xh)}{x^2(x + h)^2}$

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 $f'(x) = \lim_{h \to 0} \frac{f(x + h) - f(x)}{h}$ 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) $y = 14x - 46$

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

$f(x) = x^2 + 5x$ 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) _____

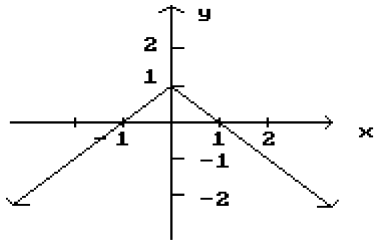
A) 12 – h m/s B) 12 + h m/s C) 7 – h m/s D) 7 + h m/s

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

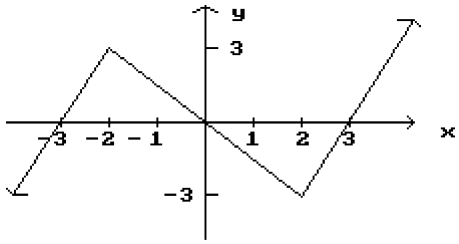
List the x–values in the graph at which the function is not differentiable.

79) 79) _____



A) x = –1 B) x = 0 C) x = 1 D) x = 2

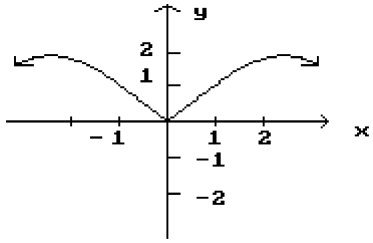
80) 80) _____



A) x = –3, x = 3 B) x = –2, x = 0, x = 2

C) x = –2, x = 2 D) x = –3, x = 0, x = 3

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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) $y = -2x$

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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) _____

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 i by: 104) _____

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

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 o instruction is given by: 105) _____

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

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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 $\triangle y$ for $y = f(x) = x^2 - 7x + 5$, $x = 7$, and $dx = \triangle x = 0.5$. 109) _____

A) $dy = 3.5$; $\triangle y = 3.75$ B) $dy = 3.5$; $\triangle y = 3.5$

C) $dy = 3.75$; $\triangle y = 3.75$ D) $dy = 3.75$; $\triangle y = 3.5$

110) Evaluate dy and $\triangle y$ for $y = f(x) = 20 + 15x^2 - x^3$, $x = 2$, and $dx = \triangle x = 0.3$. 110) _____

A) $dy = 14.4$; $\triangle y = 14.4$ B) $dy = 15.183$; $\triangle y = 15.183$

C) $dy = 15.183$; $\triangle y = 14.4$ D) $dy = 14.4$; $\triangle y = 15.183$

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) 148.84π cm^3 B) 29.768π cm^3 C) 0.976π 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 $0 \le x \le 3$. 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 cm^3 B) 1.1 cm^3 C) 0.1 cm^3 D) 1.3 cm^3

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

117) Let C(x) be the cost function and R(x) the revenue function. Compute the marginal cost, marginal re 117) _____
and the marginal profit functions.

$C(x) = 0.0005x^3 - 0.012x^2 + 100x + 30{,}000$

$R(x) = 450x$

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 118) _____
function.

A) $\overline{C}'(x) = 70x + 41$

B) $\overline{C}'(x) = 35x + 41 + \frac{12}{x}$

C) $\overline{C}'(x) = 70 - \frac{41}{x}$

D) $\overline{C}'(x) = 35 - \frac{12}{x^2}$

119) The total profit from selling x units of doorknobs is $P(x) = (6x - 7)(9x - 8)$. Find the marginal average 119) _____
profit function.

A) $\overline{P}'(x) = 54x - 56$ B) $\overline{P}'(x) = 54 - \frac{111}{x^2}$ C) $\overline{P}'(x) = 54 - \frac{56}{x^2}$ D) $\overline{P}'(x) = 54x - 111$

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 120) _____
marginal average cost at $x = 20$, $\overline{C}'(20)$ and interpret the result.

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.

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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. 122) _____

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

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

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

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett

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

Access Complete Test Bank for Calculus for Business Economics Life Sciences and Social Sciences 14th Barnett