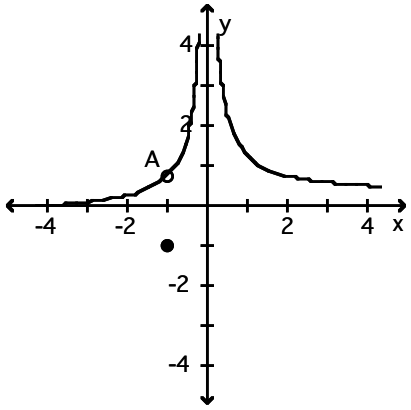
Review for Exam 1

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

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

1) Find $\lim_{x \to -1} f(x)$ and $f(-1)$. 1) _____



A is the point $\left(-1, \frac{3}{4}\right)$

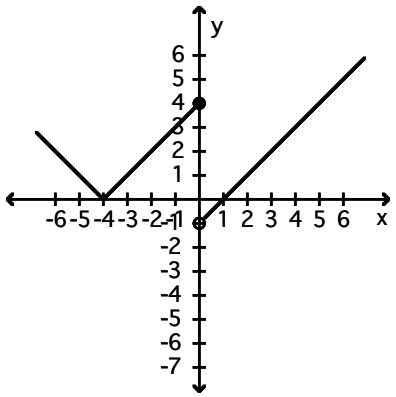
A) $\frac{3}{4}$; does not exist

B) Does not exist; -1

C) -1; $\frac{3}{4}$

D) $\frac{3}{4}$; -1

2) Find $\lim_{x \to 0^-} f(x)$ and $\lim_{x \to 0^+} f(x)$. 2) _____



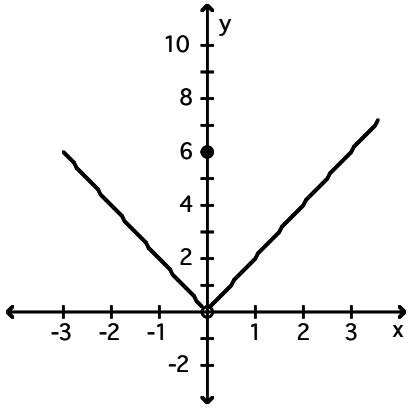
A) 4; -1

B) -1; 4

C) Does not exist; does not exist

D) 4; Does not exist

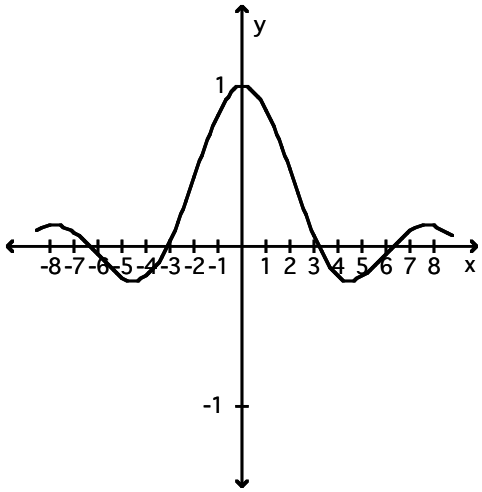
3) Find $\lim_{x \to 0}$ f(x) and f(0). 3) _____



A) 6; 0
B) 0; 6
C) 0; does not exist
D) Does not exist; 6

Use the graph to evaluate the limit.

4) $\lim_{x \to 0}$ f(x) 4) _____



A) 0
B) 1
C) does not exist
D) –1

Use the table to find the indicated limit.

5) If $f(x) = \frac{\sin(8x)}{x}$, find $\lim_{x \to 0}$ f(x). 5) _____

x	–0.1	–0.01	–0.001	0.001	0.01	0.1
f(x)		7.9914694			7.9914694	

A) limit = 0
B) limit = 7.5
C) limit = 8
D) limit does not exist

6) If $f(x) = \frac{x - 4}{\sqrt{x} - 2}$, find $\lim_{x \to 4} f(x)$. 6) _____

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)						

A)

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)	1.19245	1.19925	1.19993	1.20007	1.20075	1.20745

; limit = ∞

B)

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)	1.19245	1.19925	1.19993	1.20007	1.20075	1.20745

; limit = 1.20

C)

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)	3.97484	3.99750	3.99975	4.00025	4.00250	4.02485

; limit = 4.0

D)

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)	5.07736	5.09775	5.09978	5.10022	5.10225	5.12236

; limit = 5.10

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

7) Let $f(\theta) = \frac{\cos(7\theta)}{\theta}$, find $\lim_{\theta \to 0} f(\theta)$. 7) _____

x	−0.1	−0.01	−0.001	0.001	0.01	0.1
f(θ)	−7.6484219					7.6484219

A) limit = 7
B) limit does not exist
C) limit = 7.6484219
D) limit = 0

8) Let $f(x) = \frac{\sin(7x)}{x}$, find $\lim_{x \to 0} f(x)$. 8) _____

x	−0.1	−0.01	−0.001	0.001	0.01	0.1
f(x)		6.99428473			6.99428473	

A) limit does not exist
B) limit = 7
C) limit = 0
D) limit = 6.5

Find the indicated limit.

9) $\lim_{x \to 3} (x^2 + 3x - 1.)$ 9) _____

A) 1 B) 19 C) 17 D) Does not exist

10) $\lim_{x \to 4} \frac{x^2 - 16}{x - 4}$ 10) _____

A) 8 B) 4 C) 1 D) Does not exist

11) $\lim_{x \to -5} \frac{x^2 + 15x + 50}{x + 5}$ 11) _____

A) 5 B) 150 C) 15 D) Does not exist

12) $\lim_{x \to 1} \frac{x^2 + 7x - 8}{x^2 - 1}$ 12) _____

A) $\frac{9}{2}$ B) $-\frac{7}{2}$ C) 0 D) Does not exist

13) $\lim_{x \to 3} \frac{x^2 - 9}{x^2 - 4x + 3}$ 13) _____

A) 0 B) $\frac{3}{2}$ C) 3 D) Does not exist

Find the limit.

14) $\lim_{x \to 0} \frac{\sqrt{1 + x} - 1}{x}$ 14) _____

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

Find the limit or state that it does not exist.

15) $\lim_{x \to 0} \frac{\sqrt{x + 7} - \sqrt{7}}{x}$ 15) _____

A) $\sqrt{7}$ B) $\frac{1}{2\sqrt{7}}$ C) $\frac{\sqrt{7}}{7}$ D) Does not exist

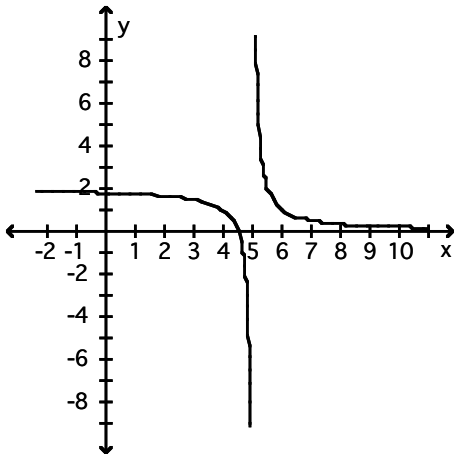
Find the indicated limit.

16) $\lim_{h \to 0} \frac{(5 + h)^2 - 25}{h}$ 16) _____

A) 25 B) 5 C) 10 D) Does not exist

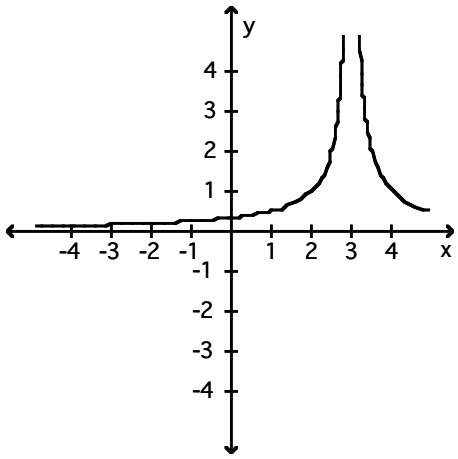
For the function f whose graph is given, determine the limit.

17) Find $\lim_{x \to 5^-} f(x)$ and $\lim_{x \to 5^+} f(x)$. 17) _____



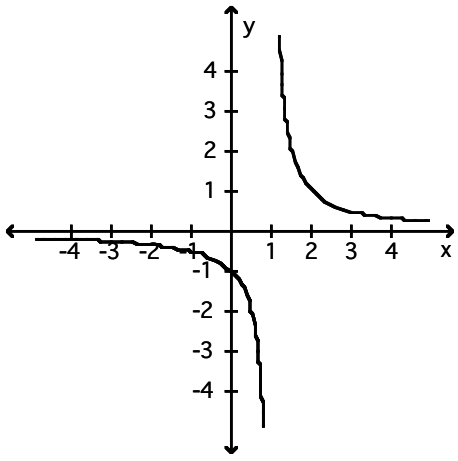
A) -5, 5 B) $-\infty, \infty$ C) $\infty, -\infty$ D) 5; 5

18) Find $\lim_{x \to 3^-} f(x)$ and $\lim_{x \to 3^+} f(x)$. 18) _____



A) 0; 1 B) 3; –3 C) $\infty; \infty$ D) $-\infty; \infty$

19) Find $\lim_{x \to 1} f(x)$. 19) _____



A) does not exist B) 1 C) $-\infty$ D) ∞

Find the limit.

20) $\lim_{x \to 4^+} \frac{1}{x-4}$ 20) _____

A) 0 B) ∞ C) -1 D) $-\infty$

21) $\lim_{x \to 10^-} \frac{1}{(x-10)^2}$ 21) _____

A) 0 B) -1 C) ∞ D) $-\infty$

22) $\lim_{x \to 7^+} \frac{1}{(x-7)^2}$ 22) _____

A) $-\infty$ B) ∞ C) -1 D) 0

23) $\lim_{x \to -2} \frac{1}{x+2}$ 23) _____

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

Find all vertical asymptotes of the given function.

24) $g(x) = \frac{4x}{x+6}$ 24) _____

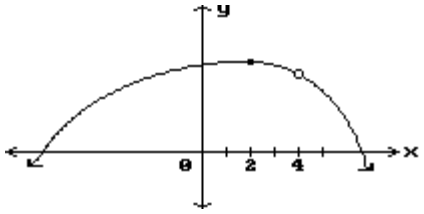
A) none B) $x = 6$ C) $x = 4$ D) $x = -6$

25) $g(x) = \frac{x+7}{x^2-1}$ 25) _____

A) $x = -1, x = 1$ B) $x = -1, x = 1, x = -7$

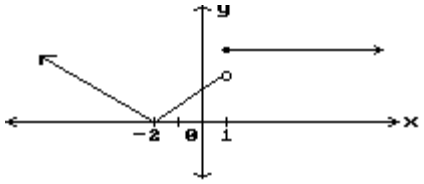
C) $x = 1, x = -7$ D) $x = 0, x = 1$

Find all points where the function is discontinuous.

26) 

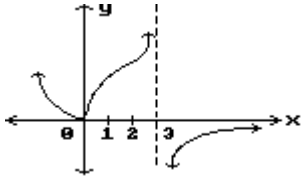
26) _____

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

27) 

27) _____

A) None B) x = −2, x = 1 C) x = 1 D) x = −2

28) 

28) _____

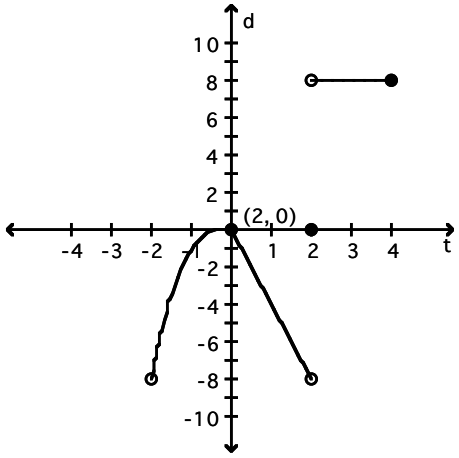
A) x = 0, x = 3 B) None C) x = 3 D) x = 0

Provide an appropriate response.

29) Is f continuous on (−2, 4]?

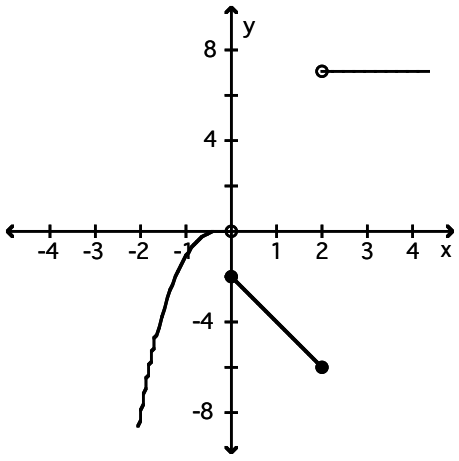
29) _____

$$f(x) = \begin{cases} x^3, & -2 < x \le 0 \\ -4x, & 0 \le x < 2 \\ 8, & 2 < x \le 4 \\ 0, & x = 2 \end{cases}$$



A) Yes B) No

From the graph of f, indicate the intervals on which f is continuous.

30) 

30) _____

A) $(-\infty, 2], (2, \infty)$
B) $(-\infty, 0), (0, 2), (2, \infty)$
C) $(-\infty, 0], [0, 2], [2, \infty)$
D) $(-\infty, 0), [0, 2], (2, \infty)$

State whether the function is continuous at the indicated point. If it is not continuous, tell why.

31) State whether f(t) is continuous at the point t = 4. 31) _____

$$f(t) = \begin{cases} 10t - 2 & \text{if } t \neq 4 \\ -5 & \text{if } t = 4 \end{cases}$$

A) Not continuous; f(4) does not exist
B) Not continuous; $\lim_{t \to 4} f(t)$ and f(4) exist but $\lim_{t \to 4} f(t) \neq f(4)$
C) Continuous
D) Not continuous; $\lim_{t \to 4} f(t)$ does not exist

Find a value for a so that the function f(x) is continuous.

32) $f(x) = \begin{cases} x^2 - 8, & x < 3 \\ 5ax, & x \geq 3 \end{cases}$ 32) _____

A) a = 11 B) $a = \frac{3}{5}$ C) $a = \frac{1}{15}$ D) a = 1

33) $f(x) = \begin{cases} x^2 + x + a, & x < 2 \\ x^3, & x \geq 2 \end{cases}$ 33) _____

A) a = 14 B) a = 8 C) a = 2 D) a = 6

Find numbers a and b, or k, so that f is continuous at every point.

34) 34) _____

$$f(x) = \begin{cases} 3x + 6, & \text{if } x < -10 \\ kx + 10, & \text{if } x \geq -10 \end{cases}$$

A) k = –1 B) k = 1 C) $k = \frac{17}{5}$ D) k = – 1

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

Provide an appropriate response.

35) Use the Intermediate Value Theorem to prove that $4x^4 + 2x^3 + 10x + 3 = 0$ has a solution between -2 and -1. 35) _____

36) Use the Intermediate Value Theorem to prove that $4x^3 - 8x^2 + 10x + 6 = 0$ has a solution between -1 and 0. 36) _____

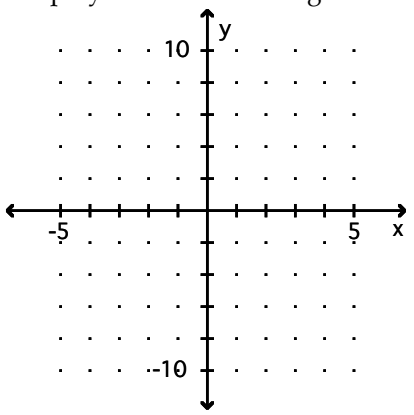
37) Use the Intermediate Value Theorem to prove that $x(x-3)^2 = 3$ has a solution between 2 and 4. 37) _____

38) Use the Intermediate Value Theorem to prove that $7 \sin x = x$ has a solution between $\frac{\pi}{2}$ and π. 38) _____

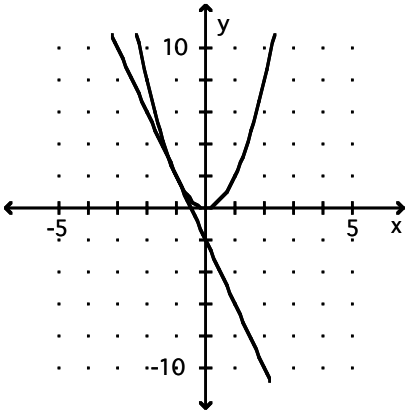
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the equation and its tangent.

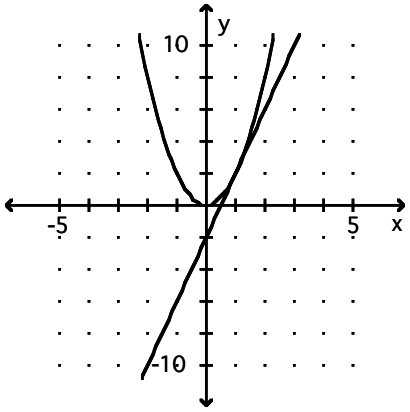
39) Graph $y = 2x^2$ and the tangent to the curve at the point whose x-coordinate is 1. 39) _____



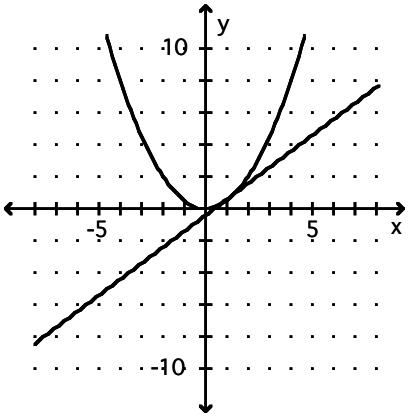
A)



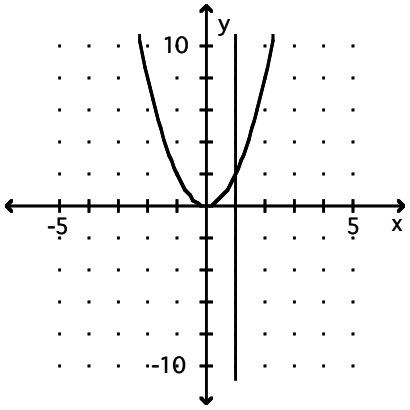
B)



C)

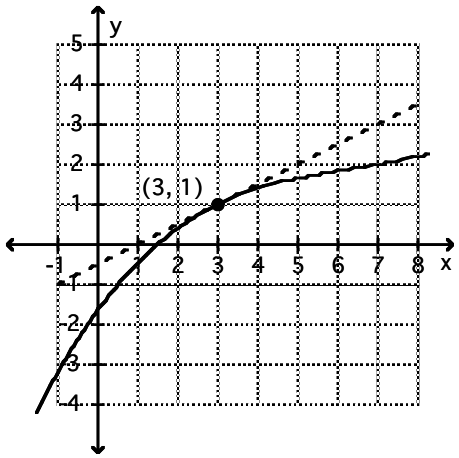


D)



Estimate the slope of the tangent line to the curve at the given point.

40) 40) _____



A) 2 B) 1/2 C) –1 D) 1

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

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

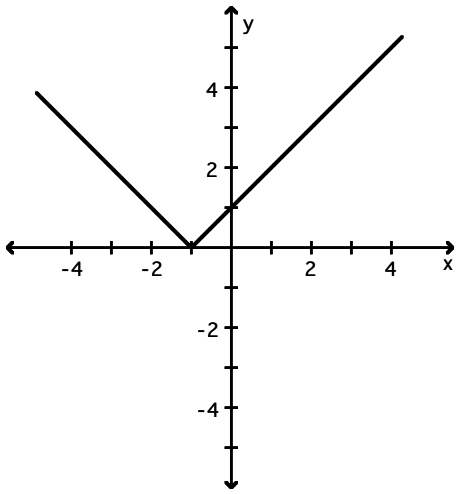
41) $f(x) = 25x - 20$ 41) _____

42) $f(x) = x^2 - 4$ 42) _____

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

The figure shows the graph of a function. At the given value of x, does the function appear to be differentiable, continuous but not differentiable, or neither continuous nor differentiable?

43) $x = -1$ 43) _____



A) Differentiable
B) Continuous but not differentiable
C) Neither continuous nor differentiable

Find $D_x y$.

44) $y = -8x^6$ 44) _____

A) $-48x^6$ B) $-8x^5$ C) $-48x^7$ D) $-48x^5$

45) $y = x^{10}$ 45) _____

A) $10x^9$ B) $10x^{10}$ C) $9x^{10}$ D) $9x^9$

46) $y = 4x^2 + 8x + 1$ 46) _____

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

47) $y = x^8 - 7x^6 - 6x^4 + x$ 47) _____

A) $x^7 - 7x^5 - 6x^3 + 1$ B) $8x^8 - 42x^6 - 24x^4 + x$
C) $8x^7 - 42x^5 - 24x^3 + 1$ D) $8x^9 - 42x^7 - 24x^5$

48) $y = \frac{1}{2}x^8 - \frac{1}{4}x^4$ 48) _____

A) $4x^8 - x^4$ B) $\frac{1}{2}x^7 - \frac{1}{4}x^3$ C) $4x^9 - x^5$ D) $4x^7 - x^3$

Find the derivative.

49) $y = 3x^4 - 7x^3 + 3$ 49) _____

A) $4x^3 + 3x^2$ B) $4x^3 + 3x^2 - 7$

C) $12x^3 - 21x^2$ D) $12x^3 - 21x^2 - 7$

50) $y = 13$ 50) _____

A) 0 B) 1 C) 12 D) 13

Find $D_x y$.

51) $y = x^8 - 8x^5 - 4x^4 + x$ 51) _____

A) $8x^9 - 40x^6 - 16x^5$ B) $8x^8 - 40x^5 - 16x^4 + x$

C) $x^7 - 8x^4 - 4x^3 + 1$ D) $8x^7 - 40x^4 - 16x^3 + 1$

Find the slope of the curve at the point indicated.

52) $y = x^2, x = 4$ 52) _____

A) −8 B) 16 C) 1 D) 8

53) $y = 7x^2 - 5x, x = 9$ 53) _____

A) 562 B) 121 C) 131 D) −131

54) $y = 8\sqrt{x}, x = 4$ 54) _____

A) − 2 B) 2 C) 1 D) 4

55) $y = 4x^5, x = -1$ 55) _____

A) 20 B) 5 C) −20 D) 4

56) $y = 4/x, x = -3$ 56) _____

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

Find an equation for the tangent to the curve at the given point.

57) $y = x^2 + 3,\ (2, 7)$ 57) _____

A) $y = 4x - 1$ B) $y = 4x - 2$ C) $y = 4x - 5$ D) $y = 2x - 1$

58) $y = x^2 - x,\ (3, 6)$ 58) _____

A) $y = 5x + 12$ B) $y = 5x - 9$ C) $y = 5x - 12$ D) $y = 5x + 9$

Find an equation of the tangent line at x = a.

59) $y = \frac{x^2}{2};\ a = -4$ 59) _____

A) $y = -4x + 8$ B) $y = -4x - 16$ C) $y = -4x - 8$ D) $y = -8x - 8$

60) $y = \frac{x^3}{2}$; $a = 3$ 60) _____

A) $y = 27x + \frac{27}{2}$ B) $y = \frac{9}{2}x + 27$ C) $y = \frac{27}{2}x - 27$ D) $y = \frac{9}{2}x - 27$

61) $y = x^2 - 2$; $a = -3$ 61) _____

A) $y = -6x - 11$ B) $y = -3x - 11$ C) $y = -6x - 20$ D) $y = -6x - 22$

62) $y = x^2 + 1$; $a = 4$ 62) _____

A) $y = 8x - 30$ B) $y = 8x - 31$ C) $y = 8x - 15$ D) $y = 4x - 15$

63) $y = x^2 - x$; $a = 3$ 63) _____

A) $y = 5x + 12$ B) $y = 5x - 12$ C) $y = 5x - 9$ D) $y = 5x + 9$

64) $y = x - x^2$; $a = 3$ 64) _____

A) $y = -5x + 9$ B) $y = 7x - 9$ C) $y = 7x + 9$ D) $y = 5x + 9$

65) $y = x^3 - 25x + 5$; $a = 5$ 65) _____

A) $y = 50x + 5$ B) $y = 55x - 245$ C) $y = 50x - 245$ D) $y = 5$

Find $D_x y$.

66) $y = (4x - 4)(6x + 1)$ 66) _____

A) $48x - 20$ B) $48x - 10$ C) $24x - 20$ D) $48x - 28$

67) $y = (7 - 3x^2)(4x^2 - 48)$ 67) _____

A) $-48x^3 + 344$ B) $-48x^4 + 344x^2$ C) $12x^3 + 172x$ D) $-48x^3 + 344x$

68) $y = (4x^3 + 3)(5x^7 - 8)$ 68) _____

A) $16x^9 + 105x^6 - 96x^2$ B) $200x^9 + 105x^6 - 96x^2$

C) $200x^9 + 105x^6 - 96x$ D) $16x^9 + 105x^6 - 96x$

69) $y = (3x - 4)(2x^3 - x^2 + 1)$ 69) _____

A) $6x^3 + 11x^2 - 33x + 3$ B) $24x^3 - 11x^2 + 33x + 3$

C) $24x^3 - 33x^2 + 8x + 3$ D) $18x^3 + 33x^2 - 11x + 3$

70) $y = (2x - 5)(4x^3 - x^2 + 1)$ 70) _____

A) $24x^3 + 66x^2 - 22x + 2$ B) $32x^3 - 22x^2 + 66x + 2$

C) $8x^3 + 22x^2 - 66x + 2$ D) $32x^3 - 66x^2 + 10x + 2$

71) $y = \frac{x}{4x - 4}$ 71) _____

A) $-\frac{4}{4x - 4}$ B) $-\frac{4}{(4x - 4)^2}$ C) $\frac{8x - 4}{(4x - 4)^2}$ D) $-\frac{4x}{(4x - 4)^2}$

72) $y = \frac{x+9}{x-9}$ 72) _____

A) $\frac{-18}{(x-9)^2}$ B) $\frac{2}{x-9}$ C) $\frac{-9}{(x-9)^2}$ D) $\frac{-18}{(x+9)^2}$

73) $y = \frac{6x-7}{x^2-4x+3}$ 73) _____

A) $\frac{6x^2+14x-10}{x^2-4x+3}$ B) $\frac{-6x^2+14x+-10}{(x^2-4x+3)^2}$

C) $\frac{18x^2-62x+46}{(x^2-4x+3)^2}$ D) $\frac{6x^3-36x^2+56x-28}{(x^2-4x+3)^2}$

Find the indicated derivative of the function.

74) $\frac{d^2y}{dx^2}$ for $y = 3x \sin x$ 74) _____

A) $-6 \cos x + 3x \sin x$ B) $6 \cos x - 3x \sin x$
C) $-3x \sin x$ D) $3 \cos x - 6x \sin x$

75) $\frac{d^2y}{dx^2}$ for $y = -2 \cos x$ 75) _____

A) $2 \sin x$ B) $-2 \cos x$ C) $-2 \sin x$ D) $2 \cos x$

76) $\frac{d^2y}{dx^2}$ for $y = 9 \sin x$ 76) _____

A) $9 \sin x$ B) $81 \sin x$ C) $-9 \sin x$ D) $9 \cos x$

77) $\frac{d^4y}{dx^4}$ for $y = -8 \cos x$ 77) _____

A) $-8 \cos x$ B) $8 \sin x$ C) $8 \cos x$ D) $-8 \sin x$

78) $\frac{d^3y}{dx^3}$ for $y = 2x^3 + 6x^2 - 6x$ 78) _____

A) 6 B) 12 C) $12x + 6$ D) $6x + 12$

79) $\frac{d^3y}{dx^3}$ for $y = 5x \sin x$ 79) _____

A) $-5x \cos x + 15 \sin x$ B) $-5x \cos x - 15 \sin x$
C) $5x \cos x + 15 \sin x$ D) $10 \cos x - 5x \sin x$

80) $\frac{d^3y}{dx^3}$ for $y = 3x^3 + 6x^2 - 2x$ 80) _____

A) $18x + 9$ B) 18 C) 9 D) $9x + 18$

81) $\frac{d^4y}{dx^4}$ for $y = 2 \sin x$ 81) _____

A) $2 \sin x$ B) $-2 \cos x$ C) $2 \cos x$ D) $-2 \sin x$

The function s = f(t) gives the position of a body moving on a coordinate line, with s in meters and t in seconds.

82) $s = 6t^2 + 3t + 2, 0 \le t \le 2$ 82) _____

Find the body's speed and acceleration at the end of the time interval.

A) 29 m/sec, 12 m/sec^2 B) 27 m/sec, 24 m/sec^2

C) 15 m/sec, 2 m/sec^2 D) 27 m/sec, 12 m/sec^2

83) $s = 4t - t^2, 0 \le t \le 4$ 83) _____

Find the body's speed and acceleration at the end of the time interval.

A) 4 m/sec, – 2 m/sec^2 B) 12 m/sec, –8 m/sec^2

C) –4 m/sec, – 2 m/sec^2 D) 4 m/sec, –8 m/sec^2

84) $s = -t^3 + 7t^2 - 7t, 0 \le t \le 7$ 84) _____

Find the body's speed and acceleration at the end of the time interval.

A) 56 m/sec, –28 m/sec^2 B) 56 m/sec, –7 m/sec^2

C) –56 m/sec, –28 m/sec^2 D) 7 m/sec, 0 m/sec^2

Solve the problem.

85) The driver of a car traveling at 60 ft/sec suddenly applies the brakes. The position of the car is $s = 60t - 3t^2$, t seconds after the driver applies the brakes. How far does the car go before coming to a stop? 85) _____

A) 300 ft B) 600 ft C) 10 ft D) 1200 ft

86) The driver of a car traveling at 36 ft/sec suddenly applies the brakes. The position of the car is $s = 36t - 3t^2$, t seconds after the driver applies the brakes. How many seconds after the driver applies the brakes does the car come to a stop? 86) _____

A) 36 sec B) 12 sec C) 18 sec D) 6 sec

87) A ball dropped from the top of a building has a height of $s = 576 - 16t^2$ meters after t seconds. How long does it take the ball to reach the ground? What is the ball's velocity at the moment of impact? 87) _____

A) 6 sec, –192 m/sec B) 12 sec, –96 m/sec

C) 36 sec, –1152 m/sec D) 6 sec, 192 m/sec

88) A ball dropped from the top of a building has a height of $s = 256 - 16t^2$ meters after t seconds. How long does it take the ball to reach the ground? What is the ball's velocity at the moment of impact? 88) _____

A) 16 sec, –512 m/sec
B) 4 sec, –128 m/sec
C) 8 sec, –64 m/sec
D) 4 sec, 128 m/sec

89) A rock is thrown vertically upward from the surface of an airless planet. It reaches a height of $s = 120t - 12t^2$ meters in t seconds. How high does the rock go? How long does it take the rock to reach its highest point? 89) _____

A) 600 m, 10 sec
B) 300 m, 5 sec
C) 1080 m, 10 sec
D) 595 m, 5 sec

Find the derivative.

90) $y = \frac{8}{x} + 9 \sec x$ 90) _____

A) $y' = -\frac{8}{x^2} + 9 \sec x \tan x$
B) $y' = \frac{8}{x^2} - 9 \sec x \tan x$
C) $y' = -\frac{8}{x^2} - 9 \csc x$
D) $y' = -\frac{8}{x^2} + 9 \tan^2 x$

91) $y = \frac{9}{\sin x} + \frac{1}{\cot x}$ 91) _____

A) $y' = 9 \csc x \cot x - \csc^2 x$
B) $y' = 9 \cos x - \csc^2 x$
C) $y' = -9 \csc x \cot x + \sec^2 x$
D) $y' = 9 \csc x \cot x - \sec^2 x$

92) $s = t^5 - \csc t + 3$ 92) _____

A) $\frac{ds}{dt} = 5t^4 - \csc t \cot t$
B) $\frac{ds}{dt} = t^4 - \cot^2 t + 3$
C) $\frac{ds}{dt} = 5t^4 + \cot^2 t$
D) $\frac{ds}{dt} = 5t^4 + \csc t \cot t$

93) $r = 12 - \theta^4 \cos \theta$ 93) _____

A) $\frac{dr}{d\theta} = -4\theta^3 \cos \theta + \theta^4 \sin \theta$
B) $\frac{dr}{d\theta} = 4\theta^3 \sin \theta$
C) $\frac{dr}{d\theta} = 4\theta^3 \cos \theta - \theta^4 \sin \theta$
D) $\frac{dr}{d\theta} = 4\theta^3 \sin \theta - \theta^4 \cos \theta$

Solve the problem.

94) Find the tangent to $y = \cos x$ at $x = \frac{\pi}{2}$. 94) _____

A) $y = 1$
B) $y = -x - \frac{\pi}{2}$
C) $y = -x + \frac{\pi}{2}$
D) $y = x + \frac{\pi}{2}$

95) Find the tangent to $y = 2 - \sin x$ at $x = \pi$. 95) _____

A) $y = x - 2$ B) $y = x - \pi + 2$ C) $y = -x + \pi - 2$ D) $y = -x + 2$

96) Find the tangent to $y = \cot x$ at $x = \frac{\pi}{4}$. 96) _____

A) $y = -2x + \frac{\pi}{2}$ B) $y = -2x + \frac{\pi}{2} + 1$

C) $y = 2x + 1$ D) $y = 2x - \frac{\pi}{2} + 1$

Write the function in the form y = f(u) and u = g(x). Then find dy/dx as a function of x.

97) $y = (-2x + 9)^4$ 97) _____

A) $y = 4u + 9;\ u = x^4;\ \frac{dy}{dx} = -8x^3$ B) $y = u^4;\ u = -2x + 9;\ \frac{dy}{dx} = -2(-2x + 9)^4$

C) $y = u^4;\ u = -2x + 9;\ \frac{dy}{dx} = -8(-2x + 9)^3$ D) $y = u^4;\ u = -2x + 9;\ \frac{dy}{dx} = 4(-2x + 9)^3$

98) $y = \cos^5 x$ 98) _____

A) $y = \cos u;\ u = x^5;\ \frac{dy}{dx} = -5x^4 \sin(x^5)$ B) $y = u^5;\ u = \cos x;\ \frac{dy}{dx} = -5\cos^4 x \sin x$

C) $y = u^5;\ u = \cos x;\ \frac{dy}{dx} = 5\cos^4 x \sin x$ D) $y = \cos u;\ u = x^5;\ \frac{dy}{dx} = -\sin(x^5)$

99) $y = \cos^4 x$ 99) _____

A) $y = u^4;\ u = \cos x;\ \frac{dy}{dx} = -4\cos^3 x \sin x$ B) $y = \cos u;\ u = x^4;\ \frac{dy}{dx} = -\sin(x^4)$

C) $y = u^4;\ u = \cos x;\ \frac{dy}{dx} = 4\cos^3 x \sin x$ D) $y = \cos u;\ u = x^4;\ \frac{dy}{dx} = -4x^3 \sin(x^4)$

100) $y = \cot(4x - 3)$ 100) _____

A) $y = \cot u;\ u = 4x - 3;\ \frac{dy}{dx} = -4\csc^2(4x - 3)$

B) $y = \cot u;\ u = 4x - 3;\ \frac{dy}{dx} = -\csc^2(4x - 3)$

C) $y = \cot u;\ u = 4x - 3;\ \frac{dy}{dx} = -4\cot(4x - 3)\csc(4x - 3)$

D) $y = 4u - 3;\ u = \cot x;\ \frac{dy}{dx} = -4\cot x \csc^2 x$

101) $y = \csc(\cot x)$ 101) _____

A) $y = \csc u;\ u = \cot x;\ \frac{dy}{dx} = -\csc(\cot x)\cot(\cot x)$

B) $y = \cot u;\ u = \csc x;\ \frac{dy}{dx} = \csc^2(\csc x)\csc x \cot x$

C) $y = \csc u;\ u = \cot x;\ \frac{dy}{dx} = \csc^3 x \cot x$

D) $y = \csc u;\ u = \cot x;\ \frac{dy}{dx} = \csc(\cot x)\cot(\cot x)\csc^2 x$

Find dy/dt.

102) $y = (1 + \sin 8t)^{-4}$ 102) _____

A) $-32(1 + \sin 8t)^{-5} \cos 8t$ B) $-4(1 + \sin 8t)^{-5} \cos 8t$

C) $-32(\cos 8t)^{-5}$ D) $-4(1 + \sin 8t)^{-5}$

Find the derivative of the function.

103) $h(x) = \left(\frac{\cos x}{1 + \sin x}\right)^6$ 103) _____

A) $6\left(\frac{\cos x}{1 + \sin x}\right)^5$ B) $-6\left(\frac{\sin x}{\cos x}\right)^5$

C) $\frac{-6\cos^5 x}{(1 + \sin x)^6}$ D) $\left(-\frac{4\sin x}{\cos x}\right)\left(\frac{\cos x}{1 + \sin x}\right)^5$

104) $q = \sqrt{12r - r^3}$ 104) _____

A) $\frac{-3r^2}{\sqrt{12r - r^3}}$ B) $\frac{1}{2\sqrt{12 - 3r^2}}$ C) $\frac{1}{2\sqrt{12r - r^3}}$ D) $\frac{12 - 3r^2}{2\sqrt{12r - r^3}}$

Find dy/dt.

105) $y = \cos^3(\pi t - 15)$ 105) _____

A) $-3\pi \cos^2(\pi t - 15)\sin(\pi t - 15)$ B) $3\cos^2(\pi t - 15)$

C) $-3\pi \sin^2(\pi t - 15)$ D) $-3\cos^2(\pi t - 15)\sin(\pi t - 15)$

Find $D_x y$.

106) $y = 4x(2x + 3)^4$ 106) _____

A) $4(10x + 3)^3$ B) $4(2x + 3)^3(10x + 3)$

C) $4(2x + 3)^4(6x + 3)$ D) $4(2x + 3)^3$

Find the derivative of the function.

107) $s = \sin\left(\frac{7\pi t}{2}\right) - \cos\left(\frac{7\pi t}{2}\right)$ 107) _____

A) $-\frac{7\pi}{2}\cos\left(\frac{7\pi t}{2}\right) - \frac{7\pi}{2}\sin\left(\frac{7\pi t}{2}\right)$

B) $\cos\left(\frac{7\pi t}{2}\right) + \sin\left(\frac{7\pi t}{2}\right)$

C) $\frac{7\pi}{2}\cos\left(\frac{7\pi t}{2}\right) - \frac{7\pi}{2}\sin\left(\frac{7\pi t}{2}\right)$

D) $\frac{7\pi}{2}\cos\left(\frac{7\pi t}{2}\right) + \frac{7\pi}{2}\sin\left(\frac{7\pi t}{2}\right)$

Find dy/dt.

108) $y = 2t(3t+3)^3$ 108) _____

A) $2(3t+3)^3(6t+3)$

B) $2(12t+3)^2$

C) $2(3t+3)^2$

D) $2(3t+3)^2(12t+3)$

1) D
2) A
3) B
4) B
5) C
6) C
7) B
8) B
9) C
10) A
11) A
12) A
13) C
14) A
15) B
16) C
17) B
18) C
19) A
20) B
21) C
22) B
23) D
24) D
25) A
26) B
27) C
28) C
29) B
30) D
31) B
32) C
33) C
34) C
35) Let $f(x) = 4x^4 + 2x^3 + 10x + 3$ and let $y_0 = 0$. $f(-2) = 31$ and $f(-1) = -5$. Since f is continuous on $[-2, -1]$ and since $y_0 = 0$ is between $f(-2)$ and $f(-1)$, by the Intermediate Value Theorem, there exists a c in the interval $(-2, -1)$ with the property that $f(c) = 0$. Such a c is a solution to the equation $4x^4 + 2x^3 + 10x + 3 = 0$.
36) Let $f(x) = 4x^3 - 8x^2 + 10x + 6$ and let $y_0 = 0$. $f(-1) = -16$ and $f(0) = 6$. Since f is continuous on $[-1, 0]$ and since $y_0 = 0$ is between $f(-1)$ and $f(0)$, by the Intermediate Value Theorem, there exists a c in the interval $(-1, 0)$ with the property that $f(c) = 0$. Such a c is a solution to the equation $4x^3 - 8x^2 + 10x + 6 = 0$.
37) Let $f(x) = x(x-3)^2$ and let $y_0 = 3$. $f(2) = 2$ and $f(4) = 4$. Since f is continuous on $[2, 4]$ and since $y_0 = 3$ is between $f(2)$ and $f(4)$, by the Intermediate Value Theorem, there exists a c in the interval $(2, 4)$ with the property that $f(c) = 3$. Such a c is a solution to the equation $x(x-3)^2 = 3$.

38) Let $f(x) = \frac{\sin x}{x}$ and let $y_0 = \frac{1}{7}$. $f\left(\frac{\pi}{2}\right) \approx 0.6366$ and $f(\pi) = 0$. Since f is continuous on $\left[\frac{\pi}{2}, \pi\right]$ and since $y_0 = \frac{1}{7}$ is between $f\left(\frac{\pi}{2}\right)$ and $f(\pi)$, by the Intermediate Value Theorem, there exists a c in the interval $\left(\frac{\pi}{2}, \pi\right)$, with the property that $f(c) = \frac{1}{7}$. Such a c is a solution to the equation $7 \sin x = x$.

39) B
40) B
41) 25
42) 2x
43) B
44) D
45) A
46) D
47) C
48) D
49) C
50) A
51) D
52) D
53) B
54) B
55) A
56) C
57) A
58) B
59) C
60) C
61) A
62) C
63) C
64) A
65) C
66) A
67) D
68) B
69) C
70) D
71) B
72) A
73) B
74) B
75) D
76) C
77) A
78) B
79) B
80) B

81) A
82) D
83) A
84) A
85) A
86) D
87) A
88) B
89) B
90) A
91) C
92) D
93) A
94) C
95) B
96) B
97) C
98) B
99) A
100) A
101) D
102) A
103) C
104) D
105) A
106) B
107) D
108) D