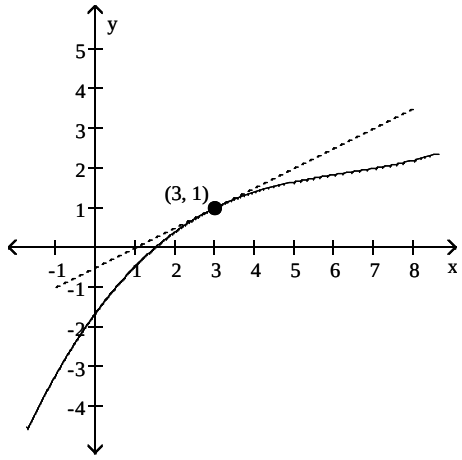
Chapter # 2 HW Section:_____, Date:_____Name_____

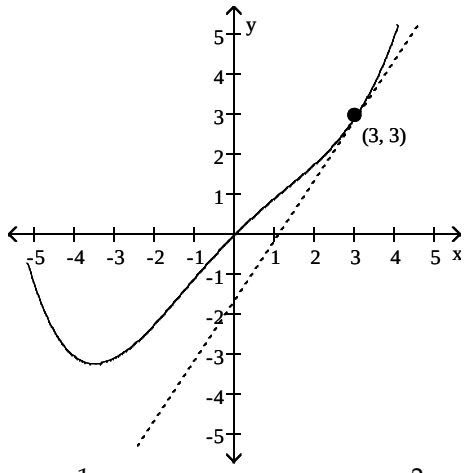
Estimate the slope of the tangent line to the curve at the given point.

1)



A) 2 B) –1 C) $\frac{1}{2}$ D) 1

2)



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

Find f'(x) at the given value of x.

3) $f(x) = -9x^2 + 6x$; Find $f'(6)$.

A) –72 B) –108 C) –87 D) –102

4) $f(x) = \frac{-11}{x}$; Find $f'(-8)$.

A) $\frac{11}{8}$ B) $\frac{8}{11}$ C) $\frac{64}{11}$ D) $\frac{11}{64}$

5) $f(x) = \sqrt{x}$; Find $f'(81)$.

A) $\frac{1}{9}$ B) $\frac{1}{18}$ C) 9 D) 81

Find the slope of the line tangent tangent to the graph a the given point.

6) $y = -2x - 2, x = -2$

A) $m = -4$ B) $m = 2$ C) $m = -2$ D) $m = 4$

7) $y = x^2 + 5x + 2, x = -1$

A) $m = -4$ B) $m = 5$ C) $m = 3$ D) $m = -2$

8) $y = x^2 + 10x, x = 8$

A) $m = 16$ B) $m = 26$ C) $m = 144$ D) $m = 18$

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

9) $y = \frac{x^3}{2}$, (2, 4)

A) $y = 2x - 8$ B) $y = 6x - 8$ C) $y = 8x + 6$ D) $y = 2x + 8$

10) $y = x^2 - 3$, (4, 13)

A) $y = 4x - 19$ B) $y = 8x - 19$ C) $y = 8x - 35$ D) $y = 8x - 38$

11) $y = x^2 + 4$, (3, 13)

A) $y = 6x - 10$ B) $y = 6x - 5$ C) $y = 3x - 5$ D) $y = 6x - 14$

Calculate the derivative of the function. Then find the value of the derivative as specified.

12) $f(x) = x^2 + 7x - 2; f'(0)$

A) $f'(x) = x + 7; f'(0) = 7$ B) $f'(x) = 2x - 2; f'(0) = -2$

C) $f'(x) = 2x; f'(0) = 0$ D) $f'(x) = 2x + 7; f'(0) = 7$

13) $g(x) = -\frac{2}{x}; g'(-2)$

A) $g'(x) = -2; g'(-2) = -2$ B) $g'(x) = \frac{2}{x^2}; g'(-2) = \frac{1}{2}$

C) $g'(x) = -2x^2; g'(-2) = -8$ D) $g'(x) = -\frac{2}{x^2}; g'(-2) = -\frac{1}{2}$

14) $\left.\frac{ds}{dt}\right|_{t=1}$ if $s = t^2 - t$

A) $\frac{ds}{dt} = 2t + 1; \left.\frac{ds}{dt}\right|_{t=1} = 3$ B) $\frac{ds}{dt} = 2 - t; \left.\frac{ds}{dt}\right|_{t=1} = 1$

C) $\frac{ds}{dt} = 2t - 1; \left.\frac{ds}{dt}\right|_{t=1} = 1$ D) $\frac{ds}{dt} = t - 1; \left.\frac{ds}{dt}\right|_{t=1} = 0$

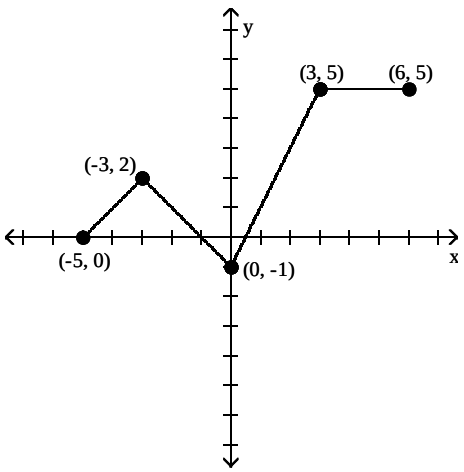
Find an equation for the tangent to the curve at the given point.

15) $f(x) = 10\sqrt{x} - x + 3$, (100, 3)

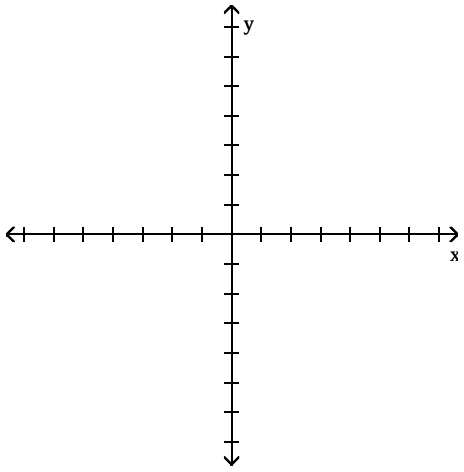
A) $y = -\frac{1}{2}x + 3$ B) $y = -\frac{1}{2}x + 53$ C) $y = \frac{1}{2}x - 53$ D) $y = 3$

Solve the problem.

16) The graph of y = f(x) in the accompanying figure is made of line segments joined end to end. Graph the derivative of f.



A)



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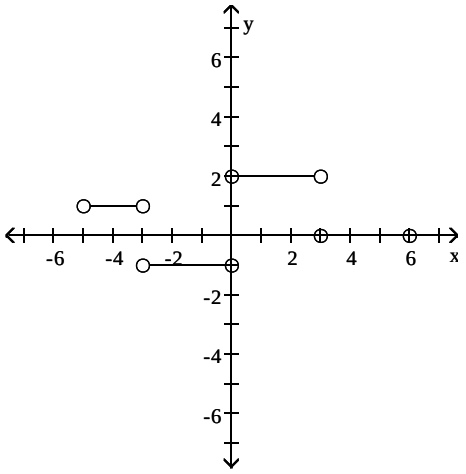

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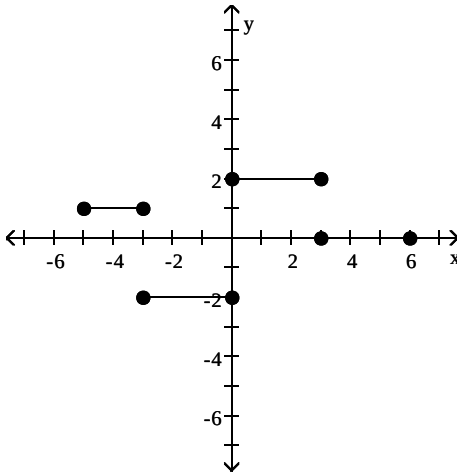
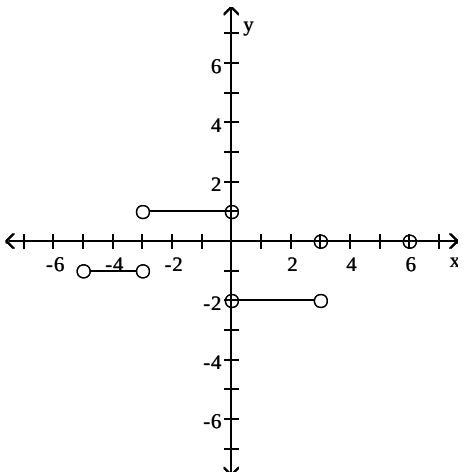
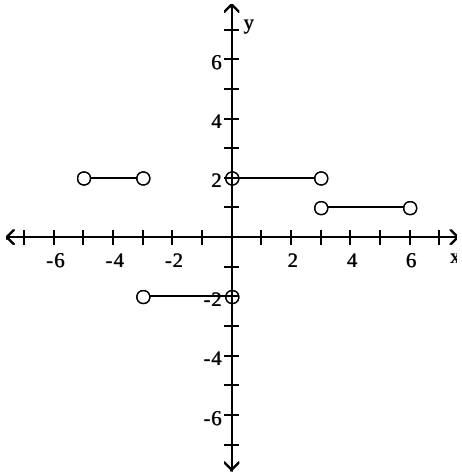


D)





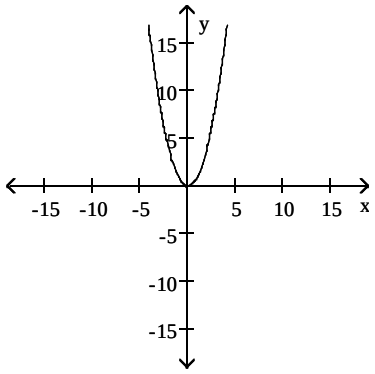
Find an equation for the tangent to the curve at the given point.

17) $y = x^2 - 2$, (3, 7)

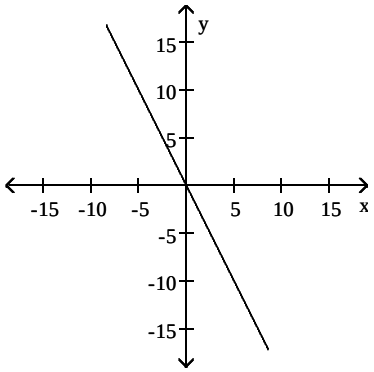
A) $y = 6x - 11$ B) $y = 6x - 20$ C) $y = 3x - 11$ D) $y = 6x - 22$

The graph of a function is given. Choose the answer that represents the graph of its derivative.

18)



A)



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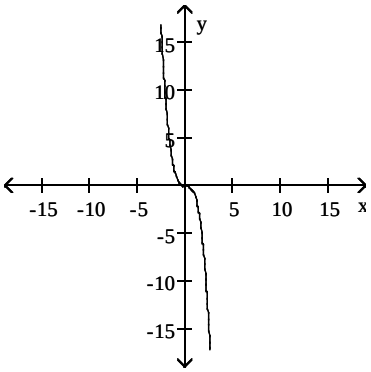
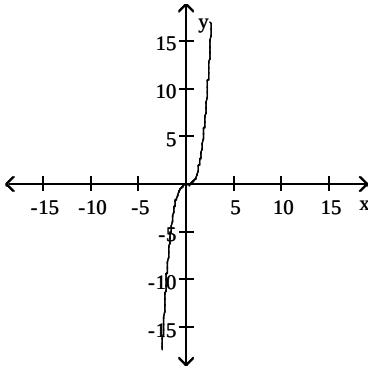
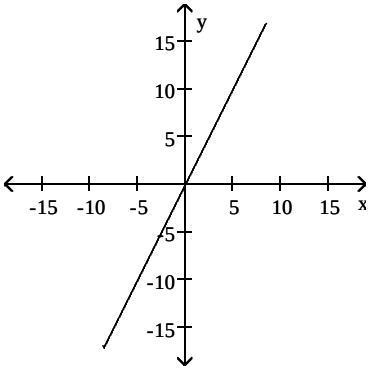


C)

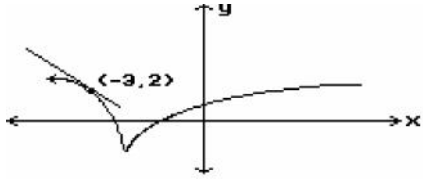


D)



Estimate the slope of the curve at the indicated point.

19)



A) Undefined B) 0 C) 1 D) –1

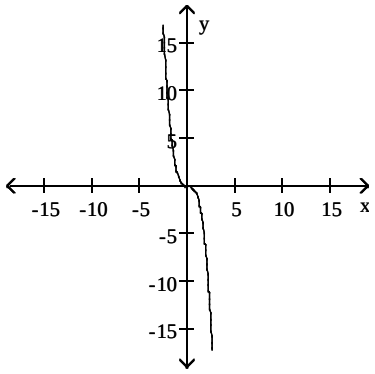
Find an equation for the tangent to the curve at the given point.

20) $y = x - x^2$, (3, –6)

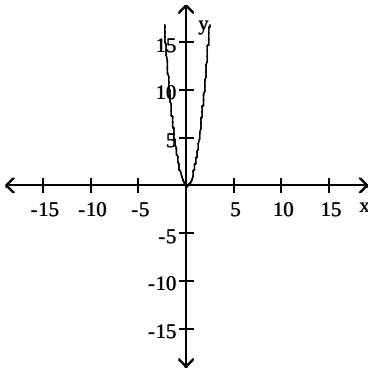
A) $y = -5x + 9$ B) $y = 5x + 9$ C) $y = 7x - 9$ D) $y = 7x + 9$

The graph of a function is given. Choose the answer that represents the graph of its derivative.

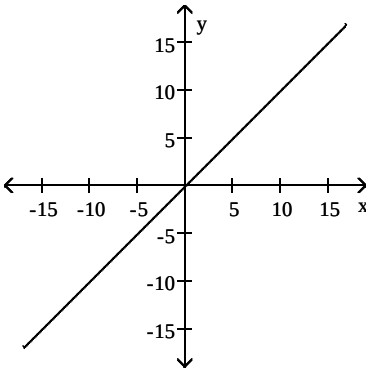
21)



A)



B)



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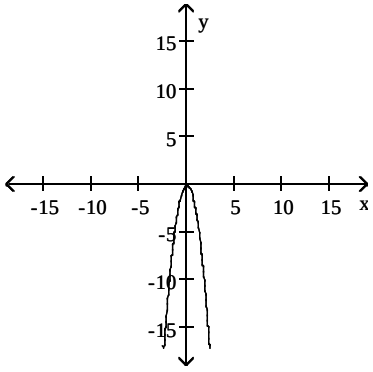
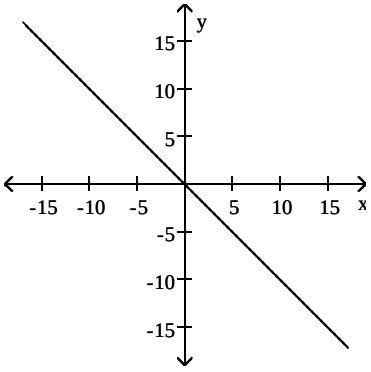
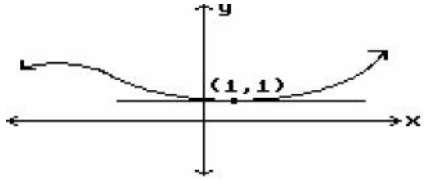


D)



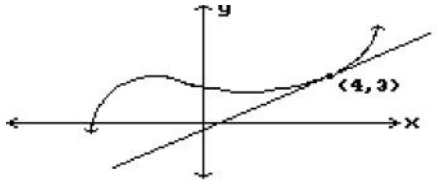
Estimate the slope of the curve at the indicated point.

22)



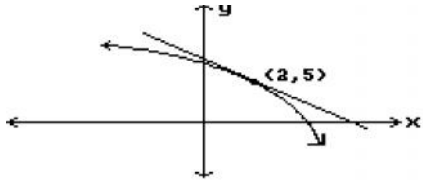
A) 0 B) Undefined C) –1 D) 1

23)



A) 1 B) 0 C) Undefined D) –1

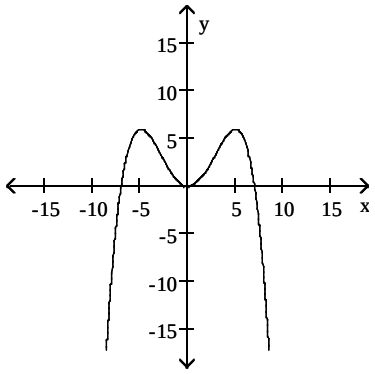
24)



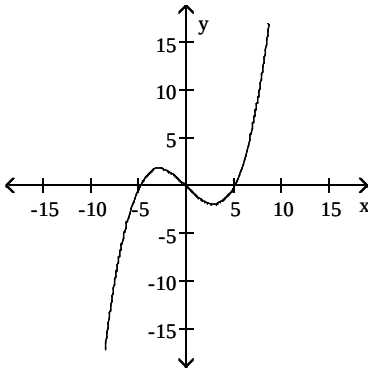
A) 0 B) –1 C) Undefined D) 1

The graph of a function is given. Choose the answer that represents the graph of its derivative.

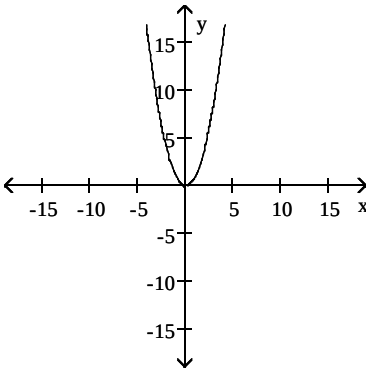
25)



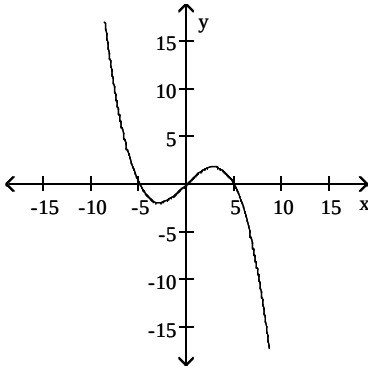
A)



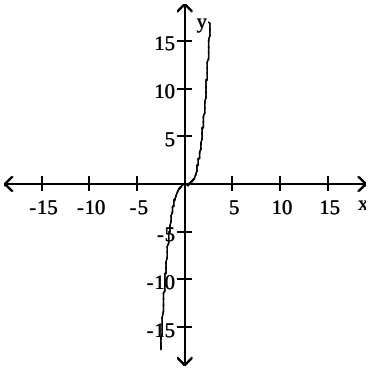
B)



C)



D)



Find the derivative.

26) $y = 15x^{-2} - 3x^3 + 14x$

A) $-30x^{-3} - 9x^2$ B) $-30x^{-1} - 9x^2$ C) $-30x^{-1} - 9x^2 + 14$ D) $-30x^{-3} - 9x^2 + 14$

Find y'.

27) $y = (5x - 2)(6x + 1)$

A) $60x - 7$ B) $60x - 3.5$ C) $60x - 17$ D) $30x - 7$

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

A) $12x^3 + 23x^2 - 69x + 3$ B) $36x^3 + 69x^2 - 23x + 3$

C) $48x^3 - 23x^2 + 69x + 3$ D) $48x^3 - 69x^2 + 10x + 3$

29) $y = (x^2 - 2x + 2)(4x^3 - x^2 + 5)$

A) $20x^4 - 36x^3 + 30x^2 + 6x - 10$ B) $4x^4 - 32x^3 + 30x^2 + 6x - 10$

C) $20x^4 - 32x^3 + 30x^2 + 6x - 10$ D) $4x^4 - 36x^3 + 30x^2 + 6x - 10$

30) $y = (4x^3 + 8)(2x^7 - 5)$

A) $16x^9 + 112x^6 - 60x$ B) $16x^9 + 112x^6 - 60x^2$

C) $80x^9 + 112x^6 - 60x$ D) $80x^9 + 112x^6 - 60x^2$

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

31) $y = x^3 - 4x - 5;\ a = 2$

A) $y = -5$ B) $y = 8x - 21$ C) $y = 3x - 21$ D) $y = 8x - 5$

Provide an appropriate response.

32) The curve $y = ax^2 + bx + c$ passes through the point (2, 8) and is tangent to the line $y = 2x$ at the origin. Find a, b, and c.

A) $a = 0, b = 1, c = 2$ B) $a = 2, b = 0, c = 1$ C) $a = 2, b = 0, c = 0$ D) $a = 1, b = 2, c = 0$

33) The curves $y = ax^2 + b$ and $y = 2x^2 + cx$ have a common tangent line at the point (–1, 0). Find a, b, and c.

A) $a - 2, b = 1, c = -1$ B) $a = 1, b = 0, c = 2$ C) $a = 1, b = -1, c = 2$ D) $a = -1, b = 1, c = -2$

34) Find all points (x, y) on the graph of $f(x) = 2x^2 - 3x$ with tangent lines parallel to the line $y = 9x + 9$.

A) (3, 18) B) (6, 9) C) (0, 0), (3, 9) D) (3, 9)

Find the second derivative.

35) $y = 7x^3 - 6x^2 + 8$

A) $28x - 12$ B) $12x - 42$ C) $42x - 12$ D) $12x - 28$

36) $s = \frac{7t^3}{3} + 7$

A) $7t$ B) $14t$ C) $14t + 7$ D) $7t^2$

Suppose u and v are differentiable functions of x. Use the given values of the functions and their derivatives to find the value of the indicated derivative.

37) $u(1) = 4, u'(1) = -7, v(1) = 6, v'(1) = -4.$

$\frac{d}{dx}(uv)$ at $x = 1$

A) 26 B) 58 C) –52 D) –58

38) $u(1) = 5, u'(1) = -6, v(1) = 7, v'(1) = -4.$

$\frac{d}{dx}\left(\frac{u}{v}\right)$ at $x = 1$

A) $-\frac{22}{7}$ B) $-\frac{11}{8}$ C) $-\frac{22}{49}$ D) $-\frac{62}{49}$

39) $u(1) = 4$, $u'(1) = -7$, $v(1) = 7$, $v'(1) = -4$.

$\frac{d}{dx}\left(\frac{v}{u}\right)$ at $x = 1$

A) $-\frac{33}{16}$ B) $\frac{33}{4}$ C) $\frac{33}{16}$ D) $-\frac{65}{16}$

Solve the problem.

40) The equation for free fall at the surface of Planet X is $s = 4.19t^2$ m with t in seconds. Assume a rock is dropped from the top of a 600m cliff. Find the speed of the rock at $t = 2$ sec.

A) 16.76 m/sec B) 17.76 m/sec C) 7.38 m/sec D) 8.38 m/sec

41) Assume that a watermelon dropped from a tall building falls $y = 16t^2$ ft in t sec. Find the watermelon's average speed during the first 4 sec of fall and the speed at the instant $t = 4$ sec.

A) 65 ft/sec; 130 ft/sec B) 32 ft/sec; 64 ft/sec C) 64 ft/sec; 128 ft/sec D) 128 ft/sec; 65 ft/sec

Find y'.

42) $y = (x^2 - 3x + 2)(5x^3 - x^2 + 4)$

A) $5x^4 - 60x^3 + 39x^2 + 4x - 12$ B) $5x^4 - 64x^3 + 39x^2 + 4x - 12$

C) $25x^4 - 64x^3 + 39x^2 + 4x - 12$ D) $25x^4 - 60x^3 + 39x^2 + 4x - 12$

43) $y = \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$

A) $2x + \frac{1}{x^2}$ B) $2x - \frac{1}{x^2}$ C) $2x + \frac{1}{x^3}$ D) $2x + \frac{2}{x^3}$

Find the derivative of the function.

44) $y = \frac{x^3}{x - 1}$

A) $y' = \frac{2x^3 - 3x^2}{(x - 1)^2}$ B) $y' = \frac{2x^3 + 3x^2}{(x - 1)^2}$ C) $y' = \frac{-2x^3 - 3x^2}{(x - 1)^2}$ D) $y' = \frac{-2x^3 + 3x^2}{(x - 1)^2}$

45) $y = \frac{x^2 + 8x + 3}{\sqrt{x}}$

A) $y' = \frac{2x + 8}{2x^{3/2}}$ B) $y' = \frac{3x^2 + 8x - 3}{2x^{3/2}}$ C) $y' = \frac{3x^2 + 8x - 3}{x}$ D) $y' = \frac{2x + 8}{x}$

46) $y = \frac{x^2 + 2x - 2}{x^2 - 2x + 2}$

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

Provide an appropriate response.

47) Find an equation for the tangent to the curve $y = \frac{10x}{x^2 + 1}$ at the point (1, 5).

A) $y = 0$ B) $y = 5$ C) $y = 5x$ D) $y = x + 5$

Find the value(s) of x for which the slope of the curve y = f(x) is 0.

48) $f(x) = \dfrac{x - x^2}{2x^2 + 6}$

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

Solve the problem.

49) The area $A = \pi r^2$ of a circular oil spill changes with the radius. At what rate does the area change with respect to the radius when r = 9 ft?

A) 18π ft^2/ft B) 18 ft^2/ft C) 81π ft^2/ft D) 9π ft^2/ft

50) The number of gallons of water in a swimming pool t minutes after the pool has started to drain is $Q(t) = 50(20 - x)^2$. How fast is the water running out at the end of 15 minutes?

A) 1250 gal/min B) 625 gal/min C) 500 gal/min D) 250 gal/min

51) The size of a population of mice after t months is $P = 100(1 + 0.2t + 0.02t^2)$. Find the growth rate at t = 14 months.

A) 152 mice/month B) 176 mice/month C) 76 mice/month D) 38 mice/month

Find the second derivative of the function.

52) $y = \dfrac{x^4 + 7}{x^2}$

A) $\dfrac{d^2y}{dx^2} = 1 + \dfrac{42}{x^4}$ B) $\dfrac{d^2y}{dx^2} = 2x - \dfrac{14}{x^3}$ C) $\dfrac{d^2y}{dx^2} = 2 - \dfrac{42}{x^4}$ D) $\dfrac{d^2y}{dx^2} = 2 + \dfrac{42}{x^4}$

Find the derivative.

53) $y = \dfrac{10}{x} + 5 \sec x$

A) $y' = -\dfrac{10}{x^2} - 5 \csc x$ B) $y' = -\dfrac{10}{x^2} + 5 \tan^2 x$

C) $y' = -\dfrac{10}{x^2} + 5 \sec x \tan x$ D) $y' = \dfrac{10}{x^2} - 5 \sec x \tan x$

54) $s = t^7 \tan t - \sqrt{t}$

A) $\dfrac{ds}{dt} = -t^7 \sec^2 t + 7t^6 \tan t + \dfrac{1}{2\sqrt{t}}$ B) $\dfrac{ds}{dt} = t^7 \sec^2 t + 7t^6 \tan t - \dfrac{1}{2\sqrt{t}}$

C) $\dfrac{ds}{dt} = t^7 \sec t \tan t + 7t^6 \tan t - \dfrac{1}{2\sqrt{t}}$ D) $\dfrac{ds}{dt} = 7t^6 \sec^2 t - \dfrac{1}{2\sqrt{t}}$

55) $y = (\csc x + \cot x)(\csc x - \cot x)$

A) $y' = -\csc x \cot x$ B) $y' = -\csc^2 x$ C) $y' = 1$ D) $y' = 0$

56) $y = \dfrac{2}{\sin x} + \dfrac{1}{\cot x}$

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

C) $y' = 2 \csc x \cot x - \csc^2 x$ D) $y' = 2 \csc x \cot x - \sec^2 x$

57) $s = t^7 \cos t - 9t \sin t - 9 \cos t$

A) $\frac{ds}{dt} = t^7 \sin t - 7t^6 \cos t + 9t \cos t$

B) $\frac{ds}{dt} = -7t^6 \sin t - 9 \cos t + 9 \sin t$

C) $\frac{ds}{dt} = -t^7 \sin t + 7t^6 \cos t - 9t \cos t$

D) $\frac{ds}{dt} = -t^7 \sin t + 7t^6 \cos t - 9t \cos t - 18 \sin t$

58) $y = \frac{\sin x}{9x} + \frac{9x}{\sin x}$

A) $\frac{dy}{dx} = \frac{\sin x - x \cos x}{81x^2} + \frac{9x \cos x - 9 \sin x}{\sin^2 x}$

B) $\frac{dy}{dx} = \frac{\cos x}{9} + \frac{9}{\cos x}$

C) $\frac{dy}{dx} = \frac{x \cos x + \sin x}{9x^2} + \frac{9 \sin x + 9x \cos x}{\sin^2 x}$

D) $\frac{dy}{dx} = \frac{x \cos x - \sin x}{9x^2} + \frac{9 \sin x - 9x \cos x}{\sin^2 x}$

59) $s = t^4 - \csc t + 5$

A) $\frac{ds}{dt} = 4t^3 + \cot^2 t$

B) $\frac{ds}{dt} = t^3 - \cot^2 t + 5$

C) $\frac{ds}{dt} = 4t^3 + \csc t \cot t$

D) $\frac{ds}{dt} = 4t^3 - \csc t \cot t$

60) $p = \frac{7 + \sec q}{7 - \sec q}$

A) $\frac{dp}{dq} = -\frac{14 \sin q}{(7 \cos q - 1)^2}$

B) $\frac{dp}{dq} = -\frac{2 \sec^2 q \tan q}{(7 - \sec q)^2}$

C) $\frac{dp}{dq} = \frac{14 \tan^2 q}{(7 - \sec q)^2}$

D) $\frac{dp}{dq} = \frac{14 \sin q}{(7 \cos q - 1)^2}$

61) $r = 5 - \theta^7 \cos \theta$

A) $\frac{dr}{d\theta} = 7\theta^6 \sin \theta - \theta^7 \cos \theta$

B) $\frac{dr}{d\theta} = 7\theta^6 \cos \theta - \theta^7 \sin \theta$

C) $\frac{dr}{d\theta} = 7\theta^6 \sin \theta$

D) $\frac{dr}{d\theta} = -7\theta^6 \cos \theta + \theta^7 \sin \theta$

Solve the problem.

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

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

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

C) $y = 2x + 1$

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

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

A) $y = x - 2$

B) $y = -x + \pi - 2$

C) $y = -x + 2$

D) $y = x - \pi + 2$

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

64) $s = 5 + 7 \cos t$

Find the body's acceleration at time $t = \pi/3$ sec.

A) $\frac{7}{2}$ m/sec^2 B) $-\frac{7}{2}$ m/sec^2 C) $-\frac{7\sqrt{3}}{2}$ m/sec^2 D) $\frac{7\sqrt{3}}{2}$ m/sec^2

65) $s = -5 + 11 \cos t$

Find the body's velocity at time $t = \pi/3$ sec.

A) $-\frac{11\sqrt{3}}{2}$ m/sec B) $-\frac{11}{2}$ m/sec C) $\frac{11\sqrt{3}}{2}$ m/sec D) $\frac{11}{2}$ m/sec

Solve the problem.

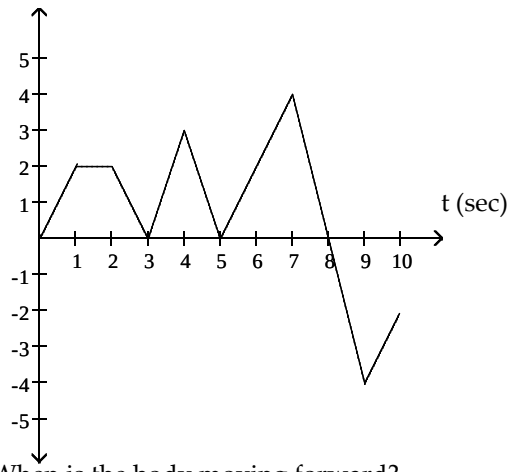
66) Does the graph of the function $y = 10x + 5 \sin x$ have any horizontal tangents in the interval $0 \le x \le 2\pi$? If so, where?

A) Yes, at $x = \frac{2\pi}{3}$ B) Yes, at $x = \frac{2\pi}{3}, x = \frac{4\pi}{3}$

C) No D) Yes, at $x = \frac{\pi}{3}, x = \frac{2\pi}{3}$

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

67) s (m)



When is the body moving forward?

A) $0 < t < 1, 3 < t < 4, 5 < t < 7, 9 < t < 10$ B) $0 < t < 8$

C) $0 < t < 1, 3 < t < 4, 5 < t < 7$ D) $0 < t < 3, 3 < t < 5, 5 < t < 8$

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

68) $s = 3t^2 + 3t + 7, 0 \le t \le 2$

Find the body's displacement and average velocity for the given time interval.

A) 32 m, 16 m/sec B) 12 m, 15 m/sec C) 18 m, 18 m/sec D) 18 m, 9 m/sec

Solve the problem.

69) The position of a body moving on a coordinate line is given by $s = t^2 - 6t + 6$, with s in meters and t in seconds. When, if ever, during the interval $0 \le t \le 6$ does the body change direction?

A) t = 12 sec B) t = 3 sec

C) no change in direction D) t = 6 sec

70) At time $t \geq 0$, the velocity of a body moving along the s–axis is $v = t^2 - 7t + 6$. When is the body's velocity increasing?

A) $t > 6$ B) $t > 3.5$ C) $t < 3.5$ D) $t < 6$

71) Suppose that the revenue from selling x radios is $r(x) = 80x - \frac{x^2}{10}$ dollars. Use the function $r'(x)$ to estimate the increase in revenue that will result from increasing production from 110 radios to 111 radios per week.

A) \$57.80 B) \$58.00 C) \$69.00 D) \$102.00

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

72) $y = (-3x + 7)^5$

A) $y = u^5; u = -3x + 7; \frac{dy}{dx} = -15(-3x + 7)^4$

B) $y = 5u + 7; u = x^5; \frac{dy}{dx} = -15x^4$

C) $y = u^5; u = -3x + 7; \frac{dy}{dx} = -3(-3x + 7)^5$

D) $y = u^5; u = -3x + 7; \frac{dy}{dx} = 5(-3x + 7)^4$

73) $y = \left(6x^2 - \frac{3}{x} - x\right)^7$

A) $y = u^7; u = 6x^2 - \frac{3}{x} - x; \frac{dy}{dx} = 7\left(6x^2 - \frac{3}{x} - x\right)^6$

B) $y = u^7; u = 6x^2 - \frac{3}{x} - x; \frac{dy}{dx} = 7\left(6x^2 - \frac{3}{x} - x\right)^6\left(12x + \frac{3}{x^2} - 1\right)$

C) $y = 6u^2 - \frac{3}{u} - u; u = x^7; \frac{dy}{dx} = 12x^{14} - \frac{3}{x^7} - x^7$

D) $y = u^7; u = 6x^2 - \frac{3}{x} - x; \frac{dy}{dx} = 7\left(12x + \frac{3}{x^2} - 1\right)^6$

74) $y = \cos^6 x$

A) $y = u^6; u = \cos x; \frac{dy}{dx} = -6\cos^5 x \sin x$

B) $y = \cos u; u = x^6; \frac{dy}{dx} = -6x^5 \sin(x^6)$

C) $y = u^6; u = \cos x; \frac{dy}{dx} = 6\cos^5 x \sin x$

D) $y = \cos u; u = x^6; \frac{dy}{dx} = -\sin(x^6)$

75) $y = \csc(\cot x)$

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

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

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

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

Given y = f(u) and u = g(x), find dy/dx = f′(g(x))g′(x).

76) y = u(u – 1), u = x^2 + x

A) $2x^2 + 4x$ B) $4x^3 + 6x^2 - 1$ C) $2x^2 + 4x + 1$ D) $4x^3 + 6x^2 - 2x$

77) y = sin u, u = 3x + 16

A) – 3 cos (3x + 16) B) – cos (3x + 16) C) 3 cos (3x + 16) D) cos (3x + 16)

78) y = tan u, u = –15x + 8

A) –15 $\sec^2(-15x + 8)$ B) –15 sec (–15x + 8) tan (–15x + 8)

C) – $\sec^2(-15x + 8)$ D) $\sec^2(-15x + 8)$

79) y = csc u, u = x^6 + 9x

A) $-(6x^5 + 9)$ csc x cot x B) $-(6x^5 + 9)\cot^2(x^6 + 9x)$

C) – csc $(x^6 + 9x)$ cot $(x^6 + 9x)$ D) $-(6x^5 + 9)$ csc $(x^6 + 9x)$ cot $(x^6 + 9x)$

80) y = sin u, u = cos x

A) – cos x sin x B) cos x sin x C) – cos(cos x) sin x D) sin(cos x) sin x

Solve the problem.

81) The position of a particle moving along a coordinate line is s = $\sqrt{6 + 10t}$, with s in meters and t in seconds. Find the particle's velocity at t = 1 sec.

A) $-\frac{1}{4}$ m/sec B) $\frac{1}{8}$ m/sec C) $\frac{5}{2}$ m/sec D) $\frac{5}{4}$ m/sec

Suppose that the functions f and g and their derivatives with respect to x have the following values at the given values of x. Find the derivative with respect to x of the given combination at the given value of x.

82)

x	f(x)	g(x)	f′(x)	g′(x)
3	1	16	8	5
4	3	3	2	–4

f(g(x)), x = 4

A) –32 B) 8 C) 24 D) –8

83)

x	f(x)	g(x)	f′(x)	g′(x)
3	1	9	8	7
4	3	3	2	–4

$1/f^2(x)$, x = 4

A) $-\frac{2}{27}$ B) $-\frac{4}{27}$ C) $\frac{4}{27}$ D) $-\frac{1}{4}$

84)

x	f(x)	g(x)	f′(x)	g′(x)
3	1	9	6	3
4	3	3	2	–6

$\sqrt{f(x) + g(x)}$, x = 3

A) $\frac{1}{2\sqrt{10}}$ B) $-\frac{1}{2\sqrt{10}}$ C) $\frac{9}{\sqrt{10}}$ D) $\frac{9}{2\sqrt{10}}$

Find the derivative of the function.

85) $q = \sqrt{20r - r^7}$

A) $\frac{1}{2\sqrt{20r - r^7}}$ B) $\frac{-7r^6}{\sqrt{20r - r^7}}$ C) $\frac{1}{2\sqrt{20 - 7r^6}}$ D) $\frac{20 - 7r^6}{2\sqrt{20r - r^7}}$

86) $r = (\sec\theta + \tan\theta)^{-3}$

A) $-3(\sec\theta + \tan\theta)^{-4}(\tan^2\theta + \sec\theta\tan\theta)$ B) $\frac{-3\sec\theta}{(\sec\theta + \tan\theta)^3}$

C) $-3(\sec\theta\tan\theta + \sec^2\theta)^{-4}$ D) $-3(\sec\theta + \tan\theta)^{-4}$

87) $h(x) = \left(\frac{\cos x}{1 + \sin x}\right)^5$

A) $-5\left(\frac{\sin x}{\cos x}\right)^4$ B) $5\left(\frac{\cos x}{1 + \sin x}\right)^4$

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

Find dy/dt.

88) $y = \cos^7(\pi t - 16)$

A) $7\cos^6(\pi t - 16)$ B) $-7\pi\cos^6(\pi t - 16)\sin(\pi t - 16)$

C) $-7\cos^6(\pi t - 16)\sin(\pi t - 16)$ D) $-7\pi\sin^6(\pi t - 16)$

89) $y = (1 + \sin 7t)^{-6}$

A) $-6(1 + \sin 7t)^{-7}$ B) $-6(1 + \sin 7t)^{-7}\cos 7t$

C) $-42(\cos 7t)^{-7}$ D) $-42(1 + \sin 7t)^{-7}\cos 7t$

90) $y = 5t(3t + 3)^4$

A) $5(3t + 3)^4(7t + 3)$ B) $5(3t + 3)^3$ C) $5(15t + 3)^3$ D) $5(3t + 3)^3(15t + 3)$

Find $\frac{d^2y}{dx^2}$ for the given function.

91) $y = \sqrt{9x + 6}$

A) $-\frac{81\sqrt{9x + 6}}{4}$ B) $\frac{9}{2\sqrt{9x + 6}}$ C) $-\frac{1}{4(9x + 6)^{3/2}}$ D) $-\frac{81}{4(9x + 6)^{3/2}}$

92) $y = \frac{1}{4}\tan(9x - 4)$

A) $\frac{1}{2}\sec^2(9x - 4)\tan(9x - 4)$ B) $\frac{1}{2}\sec(9x - 4)$

C) $\frac{81}{2}\sec^2(9x - 4)\tan(9x - 4)$ D) $\frac{9}{4}\sec^2(9x - 4)$

Solve the problem.

93) The position of a particle moving along a coordinate line is $s = \sqrt{5 + 4t}$, with s in meters and t in seconds. Find the particle's velocity at t = 1 sec.

A) $-\frac{1}{3}$ m/sec B) $\frac{4}{3}$ m/sec C) $\frac{1}{6}$ m/sec D) $\frac{2}{3}$ m/sec

Use implicit differentiation to find dy/dx.

94) $2xy - y^2 = 1$

A) $\frac{x}{x - y}$ B) $\frac{x}{y - x}$ C) $\frac{y}{x - y}$ D) $\frac{y}{y - x}$

95) $x^3 + 3x^2y + y^3 = 8$

A) $\frac{x^2 + 3xy}{x^2 + y^2}$ B) $\frac{x^2 + 2xy}{x^2 + y^2}$ C) $-\frac{x^2 + 2xy}{x^2 + y^2}$ D) $-\frac{x^2 + 3xy}{x^2 + y^2}$

96) $\frac{x + y}{x - y} = x^2 + y^2$

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

97) $y\sqrt{x + 1} = 4$

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

98) $xy + x = 2$

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

99) $xy + x + y = x^2y^2$

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

100) $x^4 = \cot y$

A) $\frac{4x^3}{\csc^2 y}$ B) $-\frac{4x^3}{\csc^2 y}$ C) $-\frac{4x^3}{\csc y \cot y}$ D) $\frac{\csc^2 y}{4x^3}$