

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

1) $y = x^2 - x$, (3, 6)

A) $y = 5x + 12$

B) $y = 5x - 9$

C) $y = 5x + 9$

D) $y = 5x - 12$

1) _____

2) Find an equation of the tangent to the curve $f(x) = 2x^2 - 2x + 1$ that has slope 2.

A) $y = 2x$

B) $y = 2x + 2$

C) $y = 2x - 1$

D) $y = 2x + 1$

2) _____

Find the second derivative.

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

A) $28x^2 - 10x$

B) $84x^2 - 10x$

C) $84x^2 - 10$

D) $28x^2 - 10$

3) _____

Find y' .

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

A) $40x^9 + 56x^6 - 30x^2$

B) $40x^9 + 56x^6 - 30x$

C) $8x^9 + 56x^6 - 30x$

D) $8x^9 + 56x^6 - 30x^2$

4) _____

Find the derivative of the function.

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

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

5) _____

Find the derivative.

6) $y = 7x^2e^{-x}$

A) $14xe^{-x}(1-x)$

B) $7xe^{-x}(x+2)$

C) $7xe^{-x}(2-x)$

D) $7xe^x(2-x)$

6) _____

Use the given values of the functions and their derivatives to find the value of the indicated derivative.

7) $u(1) = 4$, $u'(1) = -7$, $v(1) = 6$, $v'(1) = -3$.

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

A) -46

B) 54

C) 30

D) -54

7) _____

Find the derivative of y with respect to x :

8) $y = \ln 7x^2$

A) $\frac{2x}{x^2 + 7}$

B) $\frac{2}{x}$

C) $\frac{14}{x}$

D) $\frac{1}{2x + 7}$

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.

9) $s = 2t - t^2$, $0 \leq t \leq 2$

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

A) 8 m, 4 m/sec

B) 0 m, 0 m/sec

C) -8 m, -4 m/sec

D) 8 m, -2 m/sec

9) _____

10) $s = 7t - t^2$, $0 \leq t \leq 7$

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

A) -7 m/sec, -2 m/sec²

B) 7 m/sec, -2 m/sec²

C) 7 m/sec, -14 m/sec²

D) 21 m/sec, -14 m/sec²

10) _____

Solve the problem.

- 11) 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? 11) _____
- A) 16 sec, -512 m/sec
B) 4 sec, 128 m/sec
C) 8 sec, -64 m/sec
D) 4 sec, -128 m/sec

Find the derivative.

- 12) $s = t^2 - \cos t + 2e^t$ 12) _____
- A) $\frac{ds}{dt} = 2t + \sin t + 2e^t$
B) $\frac{ds}{dt} = 2t + \sin t - 2e^t$
C) $\frac{ds}{dt} = 2t - \sin t + 2e^t$
D) $\frac{ds}{dt} = t + \sin t + 2e^t$

- 13) $y = \cos^6(\pi t - 9)$ 13) _____
- A) $-6 \cos^5(\pi t - 9) \sin(\pi t - 9)$
B) $6 \cos^5(\pi t - 9)$
C) $-6\pi \cos^5(\pi t - 9) \sin(\pi t - 9)$
D) $-6\pi \sin^5(\pi t - 9)$

- 14) $y = t^6(t^6 + 3)^6$ 14) _____
- A) $t^6(t^6 + 3)^5(42t^5 + 18)$
B) $216t^{34}(t^6 + 3)^5$
C) $6t^5(t^6 + 3)^5(36t^6 + 3)$
D) $t^5(t^6 + 3)^5(42t^6 + 18)$

Use implicit differentiation to find dy/dx .

- 15) $xy + x + y = x^2y^2$ 15) _____
- A) $\frac{2xy^2 + y}{2x^2y - x}$
B) $\frac{2xy^2 - y - 1}{-2x^2y + x + 1}$
C) $\frac{2xy^2 - y}{2x^2y + x}$
D) $\frac{2xy^2 + y + 1}{-2x^2y - x - 1}$

- 16) $e^{5x} = \sin(x + 7y)$ 16) _____
- A) $\frac{dy}{dx} = -\frac{5e^x}{7\sin(x + 7y)}$
B) $\frac{dy}{dx} = \frac{-5e^x}{\sin(x + 7y)}$
C) $\frac{dy}{dx} = \frac{35e^x}{\sin(x + 7y)}$
D) $\frac{dy}{dx} = \frac{5e^x - \cos(x + 7y)}{7\cos(x + 7y)}$

Use logarithmic differentiation to find the derivative of y .

- 17) $y = \sqrt{x(x-2)}$ 17) _____
- A) $\sqrt{x(x-2)}(2x-2)$
B) $\left(\frac{\ln x + \ln(x-2)}{2}\right)$
C) $\left(\frac{1}{2}\right)\left(\frac{1}{x} + \frac{1}{x-2}\right)$
D) $\left(\frac{\sqrt{x(x-2)}}{2}\right)\left(\frac{1}{x} + \frac{1}{x-2}\right)$

$$18) y = \sqrt[4]{\frac{x(x-6)}{x^4+7}}$$

18) _____

A) $\frac{1}{4}(\ln x + \ln(x-6) - \ln(x^4+7))$

B) $4\sqrt[4]{\frac{x(x-6)}{x^4+7}\left(\frac{1}{x} + \frac{1}{x-6} - \frac{4x^3}{x^4+7}\right)}$

C) $\frac{1}{4}\sqrt[4]{\frac{x(x-6)}{x^4+7}\left(\frac{1}{x} + \frac{1}{x-6} - \frac{4x^3}{x^4+7}\right)}$

D) $\frac{1}{x} + \frac{1}{x-6} - \frac{4x^3}{x^4+7}$

Find the derivative of y with respect to x.

$$19) y = -\sin^{-1}(11x^2+2)$$

19) _____

A) $\frac{22x}{\sqrt{1-(11x^2+2)^2}}$

B) $\frac{11}{\sqrt{1+(11x^2+2)^2}}$

C) $\frac{22x}{1+(11x^2+2)^2}$

D) $\frac{-22x}{\sqrt{1-(11x^2+2)^2}}$

$$20) y = \tan^{-1}\sqrt{11x}$$

20) _____

A) $\frac{1}{1+11x}$

B) $\frac{11}{2(1+11x)\sqrt{11x}}$

C) $\frac{1}{\sqrt{1-11x}}$

D) $\frac{1}{22\sqrt{11x(1+11x)}}$

Provide an appropriate response.

21) If $xy^2 = 4$ and $dx/dt = -5$, then what is dy/dt when $x = 4$ and $y = 1$?

21) _____

A) $-\frac{8}{5}$

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

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

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

22) A 26-foot ladder is placed against a wall. If the top of the ladder is sliding down the wall at 2 feet per second, at what rate is the bottom of the ladder moving away from the wall when the bottom of the ladder is 10 feet away from the wall?

22) _____

A) 4.8 ft/sec

B) 9.6 ft/sec

C) 5.2 ft/sec

D) 2.4 ft/sec

Solve the problem.

23) Water is falling on a surface, wetting a circular area that is expanding at a rate of 4 mm²/s. How fast is the radius of the wetted area expanding when the radius is 168 mm? (Round your answer to four decimal places.) $A = \pi r^2$

23) _____

A) 263.8936 mm/s

B) 0.0076 mm/s

C) 0.0238 mm/s

D) 0.0038 mm/s

Find the linearization $L(x)$ of $f(x)$ at $x = a$.

$$24) f(x) = 2x^2 - 3x - 2, a = 2$$

24) _____

A) $L(x) = 5x - 10$

B) $L(x) = 11x - 10$

C) $L(x) = 11x + 6$

D) $L(x) = 5x + 6$

Solve the problem.

25) $V = \frac{4}{3}\pi r^3$, where r is the radius, in centimeters. By approximately how much does the volume of a sphere increase when the radius is increased from 3.0 cm to 3.2 cm? (Use 3.14 for π .)

25) _____

A) 22.4 cm³

B) 22.6 cm³

C) 1.5 cm³

D) 22.8 cm³

Answer Key

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- 1) B
- 2) C
- 3) C
- 4) A
- 5) C
- 6) C
- 7) D
- 8) B
- 9) B
- 10) B
- 11) D
- 12) A
- 13) C
- 14) D
- 15) B
- 16) D
- 17) D
- 18) C
- 19) D
- 20) B
- 21) D
- 22) A
- 23) D
- 24) A
- 25) B