

Name _____

Use implicit differentiation to find dy/dx .

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

1) _____

A) $\frac{y}{y-x}$

B) $\frac{y}{x-y}$

C) $\frac{x}{x-y}$

D) $\frac{x}{y-x}$

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

2) _____

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

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

C) $\frac{y}{2(x+1)}$

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

3) $x^4 = \cot y$

3) _____

A) $\frac{\csc^2 y}{4x^3}$

B) $-\frac{4x^3}{\csc^2 y}$

C) $\frac{4x^3}{\csc^2 y}$

D) $-\frac{4x^3}{\csc y \cot y}$

4) $x = \sec(5y)$

4) _____

A) $5 \sec(5y) \tan(5y)$

B) $\cos(5y) \cot(5y)$

C) $\frac{1}{5} \cos(5y) \cot(5y)$

D) $\frac{1}{5} \sec(5y) \tan(5y)$

5) $e^{5x} = \sin(x + 3y)$

5) _____

A) $\frac{dy}{dx} = \frac{-5e^x}{\sin(x + 3y)}$

B) $\frac{dy}{dx} = -\frac{5e^x}{3\sin(x + 3y)}$

C) $\frac{dy}{dx} = \frac{15e^x}{\sin(x + 3y)}$

D) $\frac{dy}{dx} = \frac{5e^x}{3\sin(x + 3y)}$

At the given point, find the slope of the curve or the line that is tangent to the curve, as requested.

6) $y^6 + x^3 = y^2 + 11x$, slope at (0, 1)

6) _____

A) $-\frac{5}{2}$

B) $\frac{11}{8}$

C) $\frac{11}{6}$

D) $\frac{11}{4}$

7) $x^5y^5 = 32$, slope at (2, 1)

7) _____

A) $-\frac{1}{2}$

B) $-\frac{1}{4}$

C) 16

D) 2

8) $3x^2y - \pi \cos y = 4\pi$, slope at (1, π)

8) _____

A) 0

B) -2π

C) π

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

Use implicit differentiation to find dy/dx and d^2y/dx^2 .

9) $xy - x + y = 2$

9) _____

A) $\frac{dy}{dx} = \frac{y+1}{x+1}; \frac{d^2y}{dx^2} = \frac{2y+2}{(x+1)^2}$

B) $\frac{dy}{dx} = -\frac{1+y}{x+1}; \frac{d^2y}{dx^2} = \frac{2y-2}{(x+1)^2}$

C) $\frac{dy}{dx} = \frac{1-y}{1+x}; \frac{d^2y}{dx^2} = \frac{2y-2}{(x+1)^2}$

D) $\frac{dy}{dx} = -\frac{1+y}{x+1}; \frac{d^2y}{dx^2} = \frac{y+1}{(x+1)^2}$

10) $y^2 - x^2 = 4$

10) _____

A) $\frac{dy}{dx} = \frac{x}{y}; \frac{d^2y}{dx^2} = \frac{y^2 - x^2}{y^3}$

B) $\frac{dy}{dx} = \frac{x}{y}; \frac{d^2y}{dx^2} = \frac{y - x^2}{y^2}$

C) $\frac{dy}{dx} = \frac{x}{y}; \frac{d^2y}{dx^2} = \frac{y^2 - x^2}{y^2}$

D) $\frac{dy}{dx} = -\frac{x}{y}; \frac{d^2y}{dx^2} = \frac{y^2 - x^2}{y^3}$

11) $xy + 3 = y$, at the point (4, -1)

11) _____

A) $\frac{dy}{dx} = 3; \frac{d^2y}{dx^2} = -24$

B) $\frac{dy}{dx} = -\frac{1}{3}; \frac{d^2y}{dx^2} = 0$

C) $\frac{dy}{dx} = \frac{1}{3}; \frac{d^2y}{dx^2} = -\frac{2}{9}$

D) $\frac{dy}{dx} = \frac{1}{3}; \frac{d^2y}{dx^2} = \frac{2}{9}$

Find dy/dx by implicit differentiation.

12) $x^{4/3} + y^{4/3} = 1$

12) _____

A) $-\left(\frac{x}{y}\right)^{1/3}$

B) $\left(\frac{y}{x}\right)^{1/3}$

C) $\left(\frac{x}{y}\right)^{1/3}$

D) $-\left(\frac{y}{x}\right)^{1/3}$

Find the derivative of y with respect to x , t , or θ , as appropriate.

13) $y = \ln 7x$

13) _____

A) $-\frac{1}{7x}$

B) $\frac{1}{7x}$

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

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

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

14) _____

A) $\frac{16}{x}$

B) $\frac{1}{2x+8}$

C) $\frac{2x}{x^2+8}$

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

$$15) y = \frac{\ln x}{x^7}$$

15) _____

A) $\frac{1 - 7\ln x}{x^8}$

B) $\frac{7\ln x - 1}{x^8}$

C) $\frac{1 + 7\ln x}{x^{14}}$

D) $\frac{1 - 7\ln x}{x^{14}}$

$$16) y = x^7 \ln x - \frac{1}{3}x^3$$

16) _____

A) $8x^6 - x^2$

B) $7x^6 - x^2$

C) $x^7 \ln x - x^2 + 7x^6$

D) $x^6 - x^2 + 7x^6 \ln x$

$$17) y = \ln(\ln 2x)$$

17) _____

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

B) $\frac{1}{2x}$

C) $\frac{1}{x \ln 2x}$

D) $\frac{1}{\ln 2x}$

$$18) y = \ln(\cos(\ln \theta))$$

18) _____

A) $\frac{\tan(\ln \theta)}{\theta}$

B) $\tan(\ln \theta)$

C) $-\frac{\tan(\ln \theta)}{\theta}$

D) $-\tan(\ln \theta)$

Find the derivative of y with respect to the independent variable.

$$19) y = (\cos \theta)\sqrt{11}$$

19) _____

A) $-\sqrt{11}(\cos \theta)\sqrt{11-1} \sin \theta$

B) $\sqrt{11}(\cos \theta)\sqrt{11-1}$

C) $-(\cos \theta)\sqrt{11-1} \sin \theta$

D) $-\sqrt{11} \cos \theta \sin \theta$

20) $y = 9\cos \pi\theta$

20) _____

A) $-\pi 9\cos \pi\theta \ln 9 \sin \pi\theta$

B) $\pi 9\cos \pi\theta \ln 9$

C) $9\cos \pi\theta$

D) $-9\cos \pi\theta \ln 9 \sin \pi\theta$

21) $y = t^8 - e$

21) _____

A) $(8 - e)t^7 - e$

B) $(7 - e)t^8 - e$

C) $\frac{t^9 - e}{9 - e}$

D) $t^8 - e$

22) $y = (\ln 7\theta)^\pi$

22) _____

A) $\frac{\pi}{7\theta}(\ln 7\theta)^{\pi-1}$

B) $\frac{\pi}{\theta}(\ln 7\theta)^{\pi-1}$

C) $(7\theta)^\pi \ln \pi$

D) $\pi(\ln 7\theta)^{\pi-1}$

Find the indicated tangent line.

23) Find the tangent line to the graph of $f(x) = e^{3x}$ at the point $(0, 1)$.

23) _____

A) $y = 3x + 1$

B) $y = 3e + 1$

C) $y = x + 1$

D) $y = 3x + 3$

24) Find the tangent line to the graph of $f(x) = 5e^{4x}$ at the point $(0, 5)$.

24) _____

A) $y = 20x + 5$

B) $y = -20x + 5$

C) $y = 5x + 5$

D) $y = 4x + 5$

Find the derivative of the function.

25) $y = \log(6x)$

25) _____

A) $\frac{1}{\ln 10}$

B) $\frac{1}{x}$

C) $\frac{1}{x(\ln 10)}$

D) $\frac{1}{x(\ln 6)}$

26) $y = \log_9 \sqrt{5x+2}$

26) _____

A) $\frac{5}{\ln 9}$

B) $\frac{5}{\ln 9 (5x+2)}$

C) $\frac{5}{2(\ln 9)(5x+2)}$

D) $\frac{5 \ln 9}{5x+2}$

27) $y = 7 \ln \sin^2 9x$

27) _____

A) $18 \tan 9x$

B) $126 \cot 9x$

C) $\frac{14}{\ln \sin 9x}$

D) $\frac{126}{\sin 9x}$

Use logarithmic differentiation to find the derivative of y.

28) $y = \sqrt{x(x-4)}$

28) _____

A) $\left(\frac{\sqrt{x(x-4)}}{2}\right)\left(\frac{1}{x} + \frac{1}{x-4}\right)$

B) $\left(\frac{\ln x + \ln(x-4)}{2}\right)$

C) $\sqrt{x(x-4)}(2x-4)$

D) $\left(\frac{1}{2}\right)\left(\frac{1}{x} + \frac{1}{x-4}\right)$

29) $y = \frac{x \sin x}{\sqrt{x+4}}$

29) _____

A) $\frac{x \sin x}{\sqrt{x+4}}\left(\frac{1}{x} + \cot x - \frac{1}{2x+8}\right)$

B) $\frac{x \sin x}{\sqrt{x+4}}\left(\ln x + \ln \sin x - \frac{1}{2}\ln(x+4)\right)$

C) $\frac{1}{x} + \cot x - \frac{1}{2x+8}$

D) $\frac{1}{2}\left(\frac{1}{x} + \frac{1}{\sin x} + \frac{1}{x+4}\right)$

$$30) y = 4 \sqrt[4]{\frac{x(x+2)}{x^3+4}}$$

30) _____

$$A) \frac{1}{4} 4 \sqrt[4]{\frac{x(x+2)}{x^3+4}} \left(\frac{1}{x} + \frac{1}{x+2} - \frac{3x^2}{x^3+4} \right)$$

$$B) 4 \sqrt[4]{\frac{x(x+2)}{x^3+4}} \left(\frac{1}{x} + \frac{1}{x+2} - \frac{3x^2}{x^3+4} \right)$$

$$C) \frac{1}{4} (\ln x + \ln(x+2) - \ln(x^3+4))$$

$$D) \frac{1}{x} + \frac{1}{x+2} - \frac{3x^2}{x^3+4}$$

Use logarithmic differentiation to find the derivative of y with respect to the independent variable.

$$31) y = (x+10)^x$$

31) _____

$$A) x + (10)^{x-1}$$

$$B) \ln(x+10) + \frac{x}{x+10}$$

$$C) (x+10)^x \left(\ln(x+10) + \frac{x}{x+10} \right)$$

$$D) x \ln(x+10)$$

$$32) y = (\cos x)^x$$

32) _____

$$A) \ln \cos x - x \tan x$$

$$B) (\cos x)^x (\ln \cos x - x \tan x)$$

$$C) (\cos x)^x (\ln \cos x + x \cot x)$$

$$D) \ln x (\cos x)^{x-1}$$

$$33) y = (\sin x)^{\cos x}$$

33) _____

$$A) \cos x \cot x - \ln(\sin x)$$

$$B) \cos x \cot x - \sin x \ln(\sin x)$$

$$C) \cos x \ln(\sin x)$$

$$D) (\sin x)^{\cos x} (\cos x \cot x - \sin x \ln(\sin x))$$

Find the derivative of y with respect to x .

34) $y = \tan^{-1} \frac{8x}{3}$

34) _____

A) $\frac{-24}{64x^2 + 9}$

B) $\frac{24}{64x^2 + 9}$

C) $\frac{9}{64x^2 + 9}$

D) $\frac{8}{\sqrt{9 - 64x^2}}$

35) $y = \cos^{-1} (5x^2 - 4)$

35) _____

A) $\frac{-10x}{\sqrt{1 - (5x^2 - 4)^2}}$

B) $\frac{10x}{\sqrt{1 - (5x^2 - 4)^2}}$

C) $\frac{10x}{1 + (5x^2 - 4)^2}$

D) $\frac{5}{\sqrt{1 + (5x^2 - 4)^2}}$

36) $y = \sin^{-1} \left(\frac{10x + 13}{7} \right)$

36) _____

A) $\frac{10}{1 + (10x + 13)^2}$

B) $\frac{70}{\sqrt{1 + (10x + 13)^2}}$

C) $\frac{10}{\sqrt{49 - (10x + 13)^2}}$

D) $-\frac{10}{\sqrt{49 - (10x + 13)^2}}$

37) $y = \tan^{-1} (\ln 2x)$

37) _____

A) $\frac{1}{x(1 + (\ln 2x)^2)}$

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

C) $\frac{1}{x\sqrt{1 + (\ln 2x)^2}}$

D) $\frac{1}{1 + (\ln 2x)^2}$

Answer Key

Testname: 12FALL_CH3_DERIVATIVES_PRACTICE_PROBS

- 1) A
- 2) A
- 3) B
- 4) C
- 5) D
- 6) D
- 7) A
- 8) B
- 9) C
- 10) A
- 11) C
- 12) A
- 13) D
- 14) D
- 15) A
- 16) D
- 17) C
- 18) C
- 19) A
- 20) A
- 21) A
- 22) B
- 23) A
- 24) A
- 25) C
- 26) C
- 27) B
- 28) A
- 29) A
- 30) A
- 31) C
- 32) B
- 33) D
- 34) B
- 35) A
- 36) C
- 37) A