

Use implicit differentiation to find dy/dx .

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

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

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

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

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

1) _____

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

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

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

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

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

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

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

4) _____

5) $xy + x = 2$

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

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

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

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

5) _____

6) $x = \sec(3y)$

A) $3 \sec(3y) \tan(3y)$

B) $\frac{1}{3} \sec(3y) \tan(3y)$

C) $\cos(3y) \cot(3y)$

D) $\frac{1}{3} \cos(3y) \cot(3y)$

6) _____

7) $e^{6x} = \sin(x + 5y)$

A) $\frac{dy}{dx} = \frac{-6e^x}{\sin(x + 5y)}$

B) $\frac{dy}{dx} = \frac{30e^x}{\sin(x + 5y)}$

C) $\frac{dy}{dx} = \frac{6e^x}{5\sin(x + 5y)}$

D) $\frac{dy}{dx} = -\frac{6e^x}{5\sin(x + 5y)}$

7) _____

Find $dr/d\theta$.

8) $\theta^{4/3} + r^{4/3} = 1$

A) $-\left(\frac{r}{\theta}\right)^{1/3}$

B) $\left(\frac{\theta}{r}\right)^{1/3}$

C) $\left(\frac{r}{\theta}\right)^{1/3}$

D) $-\left(\frac{\theta}{r}\right)^{1/3}$

8) _____

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

9) $xy - x + y = 2$

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

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

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) $\frac{dy}{dx} = \frac{1}{3}; \frac{d^2y}{dx^2} = \frac{2}{9}$ B) $\frac{dy}{dx} = -\frac{1}{3}; \frac{d^2y}{dx^2} = 0$

C) $\frac{dy}{dx} = 3; \frac{d^2y}{dx^2} = -24$ D) $\frac{dy}{dx} = \frac{1}{3}; \frac{d^2y}{dx^2} = -\frac{2}{9}$

12) $x^2 + y^2 = 5$, at the point $(2, 1)$ 12) _____

A) $\frac{dy}{dx} = -\frac{1}{2}; \frac{d^2y}{dx^2} = 0$ B) $\frac{dy}{dx} = 2; \frac{d^2y}{dx^2} = 5$

C) $\frac{dy}{dx} = -2; \frac{d^2y}{dx^2} = -5$ D) $\frac{dy}{dx} = -2; \frac{d^2y}{dx^2} = 1$

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

13) $y^4 + x^3 = y^2 + 11x$, slope at $(0, 1)$ 13) _____

A) $\frac{11}{6}$ B) $-\frac{7}{2}$ C) $\frac{11}{2}$ D) $\frac{11}{4}$

14) $3x^2y - \pi \cos y = 4\pi$, slope at $(1, \pi)$ 14) _____

A) -2π B) 0 C) $-\frac{\pi}{2}$ D) π

15) $y^6 + x^3 = y^2 + 12x$, tangent at $(0, 1)$ 15) _____

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

Provide an appropriate response.

16) Find the slope of the curve $xy^3 - x^5y^2 = -4$ at $(-1, 2)$. 16) _____

A) $-\frac{3}{4}$ B) $-\frac{6}{5}$ C) $-\frac{3}{2}$ D) $\frac{2}{3}$

17) Find the normal to the curve $x^2 + y^2 = 2x + 2y$ that is parallel to the line $y + x = 0$. 17) _____

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

Answer Key

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1) A

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

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

4) D

5) B

6) D

7) C

8) D

$$9) \frac{dy}{dx} = \frac{1 - y}{1 + x}, \frac{d^2y}{dx^2} = \frac{2y - 2}{(x + 1)^2}$$

10) B

11) D

12) C

13) C

14) A

15) C

16) C

17) D