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Course: Calc 1 11:30 AM / Internet
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Assignment: 3.7 Implicit Differentiation

1. Use implicit differentiation to find $\frac{dy}{dx}$.

$$7x^2y + 5xy^2 = 4$$

$$\frac{dy}{dx} = \frac{-14xy - 5y^2}{7x^2 + 10xy}$$

2. Use implicit differentiation to find $\frac{dy}{dx}$ using the following equation.

$$x^4 + y^4 = 16xy$$

Choose the correct answer below.

A. $\frac{dy}{dx} = \frac{4x - y^3}{x^3 - 4y}$

B. $\frac{dy}{dx} = \frac{y^3 - 4x}{4y + x^3}$

C. $\frac{dy}{dx} = \frac{4y - x^3}{y^3 - 4x}$

D. $\frac{dy}{dx} = \frac{x^3 - 4y}{y^3 - 4x}$

3. Use implicit differentiation to find dy/dx .

$$7xy + y^2 = 8x + y$$

$$\frac{dy}{dx} = \frac{8 - 7y}{7x + 2y - 1}$$

4. Use implicit differentiation to find $\frac{dy}{dx}$.

$$3y^2 = \frac{5x - 2}{5x + 2}$$

$$\frac{dy}{dx} = \frac{10}{3y(5x + 2)^2}$$

5. Use implicit differentiation to find $\frac{dy}{dx}$ using the following equation.

$$x^4 + \cos y = x^3 y^5$$

Choose the correct answer below.

- A. $\frac{dy}{dx} = -\frac{4x^3 - 3x^2y^5}{\sin y + 5x^3y^4}$
- B. $\frac{dy}{dx} = \frac{3x^2y^5 - 4x^4}{\cos y - 5x^3y^3}$
- C. $\frac{dy}{dx} = -\frac{3x^2y^5 - 4x^3}{\sin y + 5x^3y^4}$
- D. $\frac{dy}{dx} = \frac{4x^3 - 3x^2y^5}{\cos y - 5x^3y^4}$

6. Find the slope of the curve at the given point.

$$6y^3 + 7x^4 = 5y + 8x \text{ at } (1,1)$$

The slope of the curve $6y^3 + 7x^4 = 5y + 8x$ at $(1,1)$ is $-\frac{20}{13}$.

(Type a simplified fraction.)

7. The given point is on the curve. Find the lines that are (a) tangent and (b) normal to the curve at the given point.

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

- (a) Give the equation of the line that is tangent to the curve at the given point.

$$y = \frac{7}{4}x - \frac{1}{2}$$

- (b) Give the equation of the line that is normal to the curve at the given point.

$$y = -\frac{4}{7}x + \frac{29}{7}$$

8. The given point is on the curve. Find the lines that are (a) tangent and (b) normal to the curve at the given point.

$$8x^2 + 5xy + 3y^2 + 13y - 8 = 0, (-1,0)$$

- (a) Give the equation of the line that is tangent to the curve at the given point.

$$y = 2x + 2$$

- (b) Give the equation of the line that is normal to the curve at the given point.

$$y = -\frac{1}{2}x - \frac{1}{2}$$