

**Student:** Cole Lamers**Date:** 09/11/19**Instructor:** Viktoriya Shcherban**Course:** Calc 1 11:30 AM / Internet  
(81749&81750) Shcherban**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.  $\frac{dy}{dx} = -\frac{4x^3 - 3x^2 y^5}{\sin y + 5x^3 y^4}$
- ☐ B.  $\frac{dy}{dx} = \frac{3x^2 y^5 - 4x^4}{\cos y - 5x^3 y^3}$
- ☒ C.  $\frac{dy}{dx} = -\frac{3x^2 y^5 - 4x^3}{\sin y + 5x^3 y^4}$
- ☐ D.  $\frac{dy}{dx} = \frac{4x^3 - 3x^2 y^5}{\cos y - 5x^3 y^4}$

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

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

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.

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