

**AP Calculus AB**  
**Group Assignment**  
**2.9 - Implicit Differentiation**

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Name: \_\_\_\_\_

**\*\*Show all steps clearly & logically!\*\***

1. Consider the curve given by:  $xy^2 - x^3y = 6$ .

a. Show that  $\frac{dy}{dx} = \frac{3x^2y - y^2}{2xy - x^3}$ . [2]

b. Find all points on the curve whose  $x$ -coordinate is 1. [2]

c. Write an equation for the tangent line at each of the points found in part (b). [2]

d. Find the  $x$ -coordinate of each point on the curve where the tangent line is vertical. [3]

2. Consider the curve defined by  $2y^3 + 6x^2y - 12x^2 + 6y = 1$ .

a. Show that  $\frac{dy}{dx} = \frac{4x - 2xy}{x^2 + y^2 + 1}$ .

[2]

b. Find the equation of all horizontal tangent lines to the curve. (*Think: What is the equation of a horizontal line?*) [4]

c. The line through the origin with slope -1 is tangent to the curve at point  $P$ . Find the coordinates of point  $P$ . [3]  
(*Hint: Find the equation of the line first*)