

Section 3.7: Implicit Differentiation

Find $\frac{dy}{dx}$ if $xy = 1$

What about this curve? $x^2y + y^2 = 3x^3y^2$

Looks like we need another tool for differentiating these implicit curves!

Find $\frac{dy}{dx}$ given $y^3 + x^2 = 5$ using the two methods. Show that they are the same.

Method 1: Solve for y and then differentiate.

Method 2: Use implicit differentiation.

Find $\frac{dy}{dx}$

$$3 \sin x \cos y = 2$$

Find $\frac{dy}{dx}$

$$y = \cos(xy)$$

Find $\frac{dy}{dx}$

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

Find $\frac{dy}{dx}$ and evaluate at the given point. Then an equation for the tangent and normal lines.

$$x^2 - y^2 = 5 \quad (3, 2)$$

Find the points where the graph of the given curve has horizontal and vertical tangents.

$$25x^2 + 16y^2 + 200x - 160y + 400 = 0$$

Find $\frac{d^2 y}{dx^2}$

$$x^2 + y^3 = 9$$