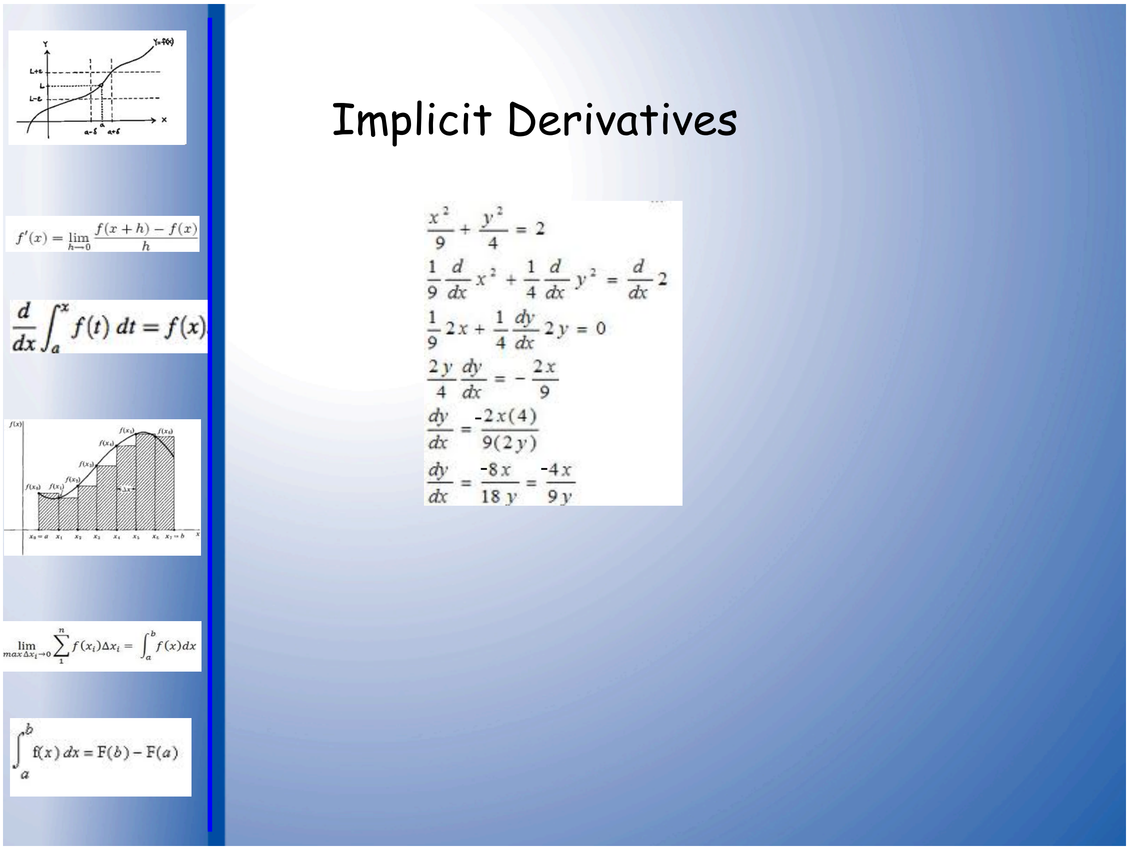


Given the equation $2y^3 - y^2 = x^2 + 5$

How do we find $\frac{dy}{dx}$?

Let's check to see if implicit differentiation is reasonable.

Differentiate $x^2 + 2x^2 y + 3xy = 0$ in two ways.

Implicit

Explicit

EX 1 Find $\frac{dy}{dx}$ for the following equations.

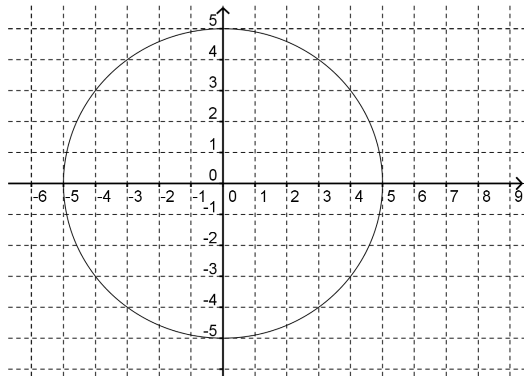
a) $x\sqrt{y+1} = xy + 1$

b) $9x^2+4y^2 = 36$

To convince ourselves that is works, let's look at a familiar equation.

Find the equation of the tangent line at the point (-4,3) on this circle.

$$x^2 + y^2 = 25$$



$$x^2 + y^2 = 25$$

EX 2 Find the equation of the tangent line at the indicated point.

$y + \cos\left(xy^2\right) + 3x^2 = 4$ at (1,0)

Power Rule (revisited): Basically the power rule can now be used with rational exponents.

EX 3 Find *y′* if $y = \sqrt[3]{x} - 2x^{\frac{7}{2}}$

$$\frac{x^2}{9} + \frac{y^2}{4} = 2$$

$$\frac{1}{9}\frac{d}{dx}x^2 + \frac{1}{4}\frac{d}{dx}y^2 = \frac{d}{dx}2$$

$$\frac{1}{9}2x + \frac{1}{4}\frac{dy}{dx}2y = 0$$

$$\frac{2y}{4}\frac{dy}{dx} = -\frac{2x}{9}$$

$$\frac{dy}{dx} = \frac{-2x(4)}{9(2y)}$$

$$\frac{dy}{dx} = \frac{-8x}{18y} = \frac{-4x}{9y}$$