

## 02 - Derivada implícita.

1. Seu  $x^2 + 4y^2 - 16 = 0$  calcule  $y''$

Derivada implícita:

$$(x^2 + 4y^2 - 16 = 0)'$$

$$2x + 8y \cdot y' = 0$$

$$y' = \frac{-2x}{8y} = -\frac{x}{4y}$$

$$y' = -\frac{x}{4y}$$

Segunda derivada implícita:

$$y' = -\frac{x}{4y}$$

$$y'' = -\frac{1}{4} \left( \frac{y - x y'}{y^2} \right)$$

$$y'' = -\frac{1}{4} \left( \frac{y - x \left( -\frac{x}{4y} \right)}{y^2} \right)$$

$$y'' = -\frac{1}{4} \left( \frac{y + \frac{x^2}{4y}}{y^2} \right)$$

$$y'' = -\frac{1}{4} \left( \frac{\frac{4y^2 + x^2}{4y}}{y^2} \right)$$

$$y'' = -\frac{1}{4} \left( \frac{4y^2 + x^2}{4y^3} \right)$$

$$y'' = -\frac{4y^2 + x^2}{16y^3}$$

$$2. \quad x^2 + y^2 = 4$$

$$x^2 + y^2 - 4 = 0$$

$$2x + 2y \cdot y' = 0$$

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

$$y' = -\frac{x}{y}$$

$$3. \quad 4xy + 3x^3 - y = 1$$

$$4xy + 3x^3 - y - 1 = 0$$

$$4(y + xy') + 6x^2 - y' = 0$$

$$4y + 4xy' + 6x^2 - y' = 0$$

$$4xy' - y' + 4y + 6x^2 = 0$$

$$y'(4x - 1) + 4y + 6x^2 = 0$$

$$y' + 4y + 6x^2 = \frac{1}{4x - 1}$$

$$y' = \frac{-4y - 6x^2}{4x - 1}$$