

Implicit Differentiation HW 2

For each problem, use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y .

1) $-5y^2 + 4 = 2x$

2) $3 = x^2 + y^2 + 4y$

3) $5x^2 + 2y = -4y^3 + 4$

4) $5x^2 + 5x^3y + 4x^3y^3 = 2$

5) $-3x^2y^2 + 4 = x + 4y^3$

6) $(3y^2 + 2)^2 = 2x^2$

$$7) \ 3x + 4 = \sin y^2$$

$$8) \ 3x + 2 = \tan y^3$$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ in terms of x and y .

$$9) \ 2 = 5x - 5y^2$$

$$10) \ 4y^2 + 1 = 2x^2$$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ at the given point.

$$11) \ 5 = 4x^2 + y^2 \text{ at } (1, 1)$$

$$12) \ 1 = 5x^2 - 4y^2 \text{ at } (1, 1)$$

Implicit Differentiation HW 2

For each problem, use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y .

1) $-5y^2 + 4 = 2x$

$$\frac{dy}{dx} = -\frac{1}{5y}$$

2) $3 = x^2 + y^2 + 4y$

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

3) $5x^2 + 2y = -4y^3 + 4$

$$\frac{dy}{dx} = -\frac{5x}{1+6y^2}$$

4) $5x^2 + 5x^3y + 4x^3y^3 = 2$

$$\frac{dy}{dx} = \frac{-10 - 15xy - 12xy^3}{5x^2 + 12x^2y^2}$$

5) $-3x^2y^2 + 4 = x + 4y^3$

$$\frac{dy}{dx} = \frac{1 + 6xy^2}{-6yx^2 - 12y^2}$$

6) $(3y^2 + 2)^2 = 2x^2$

$$\frac{dy}{dx} = \frac{x}{9y^3 + 6y}$$

$$7) \ 3x + 4 = \sin y^2$$

$$\frac{dy}{dx} = \frac{3}{2y \cos y^2}$$

$$8) \ 3x + 2 = \tan y^3$$

$$\frac{dy}{dx} = \frac{1}{y^2 \sec y^3 \sec y^3}$$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ in terms of x and y .

$$9) \ 2 = 5x - 5y^2$$

$$\frac{d^2y}{dx^2} = -\frac{1}{4y^3}$$

$$10) \ 4y^2 + 1 = 2x^2$$

$$\frac{d^2y}{dx^2} = \frac{2y^2 - x^2}{4y^3}$$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ at the given point.

$$11) \ 5 = 4x^2 + y^2 \text{ at } (1, 1)$$

$$\left. \frac{d^2y}{dx^2} \right|_{\begin{array}{l} x=1 \\ y=1 \end{array}} = -20$$

$$12) \ 1 = 5x^2 - 4y^2 \text{ at } (1, 1)$$

$$\left. \frac{d^2y}{dx^2} \right|_{\begin{array}{l} x=1 \\ y=1 \end{array}} = -\frac{5}{16}$$