

IMPLICIT DIFFERENTIATION : 3

1) Given that

$$x^4 + 3x^2y - 2y^2 = 15$$

find $\frac{dy}{dx}$ in terms of x and y .

2) Given that

$$x^3 + 2x \cos y + y^2 = 1 + \frac{\pi^2}{4}$$

find $\frac{dy}{dx}$ at the point $(1, \frac{\pi}{2})$

3) If $\frac{dy}{dx} = x^2y$

find an expression for $\frac{d^2y}{dx^2}$ in terms of x and y .

4) Given that

$$x^2y^2 + x^4 + 6 = 2y^3 + 2x$$

find $\frac{dy}{dx}$ at $(2, 3)$

5) For $x^3 + 5x^4y - 2y^3 + 7 = 0$

find $\frac{dy}{dx}$ in terms of x and y

6) Find $\frac{dy}{dx}$ in terms of x and y if

$$x^4 - 3x^2y + 2y^3 - 4x = 7$$

7) A curve C is defined by $x^3y^2 = 128$

a) find $\frac{dy}{dx}$

b) P lies on C and has coordinates (a, b)

If $\frac{dy}{dx}$ at P is 3 show $b = -2a$ and find the values of a and b .

8) A curve C is defined as $x^2 + 3xy + 2y^3 - 2x = 21$
Point P has coordinates $(-5, 2)$ and lies on C .

find $\frac{dy}{dx}$ at P .