Name Okpe Uchenna Daniel

MatricNo: 19/MHS01/326

Dept : MBBS

1 $y - 3x - 2 = 0$ -(A)

$y = 2 + 3x$

Differentiate to find M_1

$\frac{dy}{dx} = 3$

$3y + x + 9 - 0$ ----(B)

$3y = -9 - x$

$y = \frac{-9}{3} - \frac{x}{3}$

$\frac{dy}{dx} = -\frac{1}{3}$

$M_1 = -\frac{1}{3}$

$A \times B = 3x - \frac{1}{3} = -1$

ie $y - 3x - 2 = 0$ is perpendicular $3y + x + 9 = 0$

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

$3y - 4 - 2x - 3 = 0$

$3y - 4 - 3 - 2x = 0$

$3y - 2x - 7 = 0$

$3y = 2x + 7$

$y = \frac{2x}{3} + \frac{7}{3}$

$\frac{\delta y}{\delta x} = \frac{2}{3}$

$M_1 = \frac{2}{3}$

$y - 5 = x + 6 \quad \ldots\ldots (B)$

$y - 5 - x - 6 = 0$

$y - 5 - 6 - x = 0$

$y - 11 - x = 0$

$y - x - 11 = 0$

$y = x + 11$

$\frac{\delta y}{\delta x} = 1 \quad M_1 = 1$

ie $3y - 4 = 2x + 3$ is not perpendicular to $y - 5 = x + 6$

$A \neq B$

3 $x^2 + y^2 + 3xy - 11 = 0$ at point $(1,2)$

$$2x + 2y\frac{\delta y}{\delta x} + 3\left(x \times \frac{\delta y}{\delta x} + y \times 1\right) = 0$$

$$2x + 2y\frac{\delta y}{\delta x} + 3x\frac{\delta y}{\delta x} + 3y = 0$$

$$2y\frac{\delta y}{\delta x} + 3x\frac{\delta y}{\delta x} = -2x - 3y$$

$$\frac{\delta y}{\delta x} = -\frac{2x - 2y}{2y + 3x}$$

$$M = \frac{\delta y}{\delta x} = -\frac{(2x + 3y)}{2y + 3x}$$

When $x = 1$ and $y = 2$

$$M = -\frac{[2(1) + 3(2)}{2(2) + 3(1)}$$

$$= -\frac{(2+6)}{4+3} = \frac{-8}{7}$$

$$M = \underline{-8}$$
$$7$$

Equation of the tangent to a Curve

$$y - y_1 = m(x - x_1)$$

$$y - 2 = -8/7(x - 1)$$

$$y - 2 = -\frac{8x}{7} + \frac{8}{7}$$

$7y - 14 = -8x + 8$

$8x + 7y - 14 - 8 = 0$

$8x + 7y - 22 = 0$

Equation of the normal to the curve

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - 2 = \frac{-1}{-8/7}(x - 1)$

$y - 2 = 7/8(x - 1)$

$y - 2 = 7x/8 - 7/8$

$8y - 16 = 7x - 7$

$8y = 7x - 7 + 16$

$7x - 8y + 9 = 0$ //