Tangents and Normals Ex 16.3 Q3(i)

We have,

$x^2 = 4y$ ---(i)

$4y + x^2 = 8$ ---(ii) $P = (2,1)$

Slope of (i)

$$2x = 4\frac{dy}{dx}$$

$$\therefore \quad m_1 = \left(\frac{dy}{dx}\right)_P = \left(\frac{x}{2}\right)_P = 1$$

Slope of (ii)

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

$$\therefore \quad m_2 = \left(\frac{dy}{dx}\right)_P = \left(-\frac{x}{2}\right)_P = -1$$

$$\therefore \quad m_1 \times m_2 = 1 \times -1 = -1$$

Hence the result.

Tangents and Normals Ex 16.3 Q3(ii)

We have,

$x^2 = y$ ---(i)

$x^3 + 6y = 7$ ---(ii) $P = (1,1)$

Slope of (i)

$$2x = \frac{dy}{dx}$$

$$\therefore \quad m_1 = \left(\frac{dy}{dx}\right)_P = 2$$

Slope of (ii)

$$3x^2 + 6\frac{dy}{dx} = 0$$

$$\therefore \quad m_2 = \left(\frac{dy}{dx}\right)_P = \left(-\frac{x^2}{2}\right)_P = \frac{-1}{2}$$

$$\therefore \quad m_1 \times m_2 = 2 \times \frac{-1}{2} = -1$$

Tangents and Normals Ex 16.3 Q3(iii)

We have,

$y^2 = 8x$ ---(i)

$2x^2 + y^2 = 10$ ---(ii) $P\left(1, 2\sqrt{2}\right)$

Slope of (i)

$$2y\frac{dy}{dx} = 8$$

$$\therefore \quad m_1 = \left(\frac{dy}{dx}\right)_P = \left(\frac{4}{y}\right)_P = \sqrt{2}$$

Slope of (ii)

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

$$\therefore \quad m_2 = \left(\frac{dy}{dx}\right)_P = \left(-\frac{2x}{y}\right)_P = \frac{-1}{\sqrt{2}}$$

$$\therefore \quad m_1 \times m_2 = \sqrt{2} \times \frac{-1}{\sqrt{2}} = -1$$

********** END **********