Tangents and Normals Ex 16.3 Q3(i)

We have,

$$x^2 = 4y \qquad \text{---(i)}$$

$$4y + x^2 = 8 \qquad \text{---(ii)} \qquad P = (2,1)$$

Slope of (i)

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

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

Slope of (ii)

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

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

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

Hence the result.

Tangents and Normals Ex 16.3 Q3(ii)

We have,

$$x^2 = y \qquad \text{---(i)}$$

$$x^3 + 6y = 7 \qquad \text{---(ii)} \qquad P = (1,1)$$

Slope of (i)

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

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

Slope of (ii)

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

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

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

Tangents and Normals Ex 16.3 Q3(iii)

We have,

$$y^2 = 8x \qquad \text{---(i)}$$

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

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 **********