

# TYALLA MIEBAKA FAVOUR = 10

MBBS

MAT 104

19/MHSO1/212

Find the equation of tangent and of normal for each curve.

- 1  $y = 2x^2$  point (1, 2)
- 2  $y = 3x^2 - 2x$  point (2, 8)
- 3  $y = x^{3/2}$  point (1/2, -1, -1/2)
- 4  $y = 1 + x - x^2$  point (-2, -5)
- 5  $y = 1/x$  point (3, 1/3)

Solution:

a Equation of Tangent.

$$y = 2x^2, m = \frac{dy}{dx}$$

$$m = 4x$$

$$m = 4(1) = 4$$

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

$$y - 2 = 4(x - 1)$$

$$y - 2 = 4x - 4$$

$$y - 4x = 2 - 4$$

$$y - 4x = -2$$

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

$$\text{Ans} = \underline{4x - y + 2}$$

1b Equation of a Normal.

$$m_1 m_2 = -1$$

$$m_2 = -1/m_1$$

$$m_2 = -1/4$$

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

$$y - 8 = -1/4(x - 1)$$

$$4y - 8 = -x + 1$$

$$4y + x = 8 + 1$$

$$4y + x = 9$$

$$\text{Equation of normal} = \underline{4y + x - 9 = 0}$$

$$2) y = 3x^2 - 2x, m = \frac{dy}{dx} (2, 8)$$

$$\frac{dy}{dx} = 6x - 2$$

$$m = 6(2) - 2$$

$$m = 10$$

Equation of Tangent.

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

$$y - 8 = 10(x - 2)$$

$$y - 8 = 10x - 20$$

$$y - 10x = 8 - 20$$

$$y - 10x = -12$$

$$E.T = y - 10x + 12 = 0 \text{ (Equation of Tangent)}$$

$$\text{Ans} = \underline{10x - y + 12 = 0}$$

Equation of normal.

$$m_1 m_2 = -1$$

$$m_2 = -1/m_1 = -1/10$$

$$y - 8 = -1/10(x - 2)$$

$$10y - 80 = -x + 2$$

$$10y + x = 80 + 2$$

$$x + 10y = 82$$

$$\text{Equation of normal} = \underline{x + 10y - 82 = 0}$$

$$3) y = x^{3/2} \text{ point } (-1, -1/2)$$

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

$$m = 3x^{1/2}$$

$$m = 3(-1)^{1/2} = 3/2$$

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

$$y - (-1/2) = 3/2(x - (-1))$$

$$y + 1/2 = 3/2(x + 1)$$

$$2y + 1 = 3x + 3$$

$$2y - 3x = -1 + 3$$