Name: Anuge Enoli Vanessa.
Department: MBBS.
Matric Number: 19/MHS01/096.

1 $y = 2x^2$ at the point (1, 2)

Soln

Equation Of Tangent

$y = 2x^2$

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

$\left.\frac{dy}{dx}\right|_{x=1} = 4(1) = 4$

$\therefore m = 4$

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

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

$y - 2 = 4x - 4$

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

$y - 4x + 2 = 0$

b Equation Of Normal

$m_1 m_2 = -1$

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

$y - 2 = \frac{-1}{4}(x - 1)$

$4y - 8 = -x + 1$

$4y - 8 + x - 1 = 0$

$4y + x - 9 = 0$

2 $y = 3x^2 - 2x$ at the point $(2, 8)$

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

$\frac{dy}{dx}\Big|_{x=2} = 6(2) - 2 = 10$

$\therefore m = 10$

$m_1 m_2 = -1$

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

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

$y - 8 = 10x - 20$

$y - 10x - 8 + 20 = 0 = y - 10x + 12 = 0$

$\therefore y - 10x + 12 = 0$ [Equation Of The Normal]

Equation To The Tangent

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

$y - 8 = \frac{-1}{10}(x - 2)$

$10y - 80 = -x + 2$

$10y + x - 82 = 0$

3 $y = \frac{x^3}{2}$ at the point of $(-1, -1/2)$

Equation Of The Normal

$y = 3x^2$

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

$= 3(-1)^2 = 3$

$\frac{dy}{dx}\Big|_{x=-1}$

$\therefore m = 3$

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

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

5 $y = \frac{1}{x}$ at the point $(3, 1/3)$

$$\frac{dy}{dx} = \frac{x^{-1}}{x^2}$$

$$\frac{dy}{dx}\Big|_{x=3} = \frac{-1}{3^2} = \frac{-1}{9}$$

$\therefore m = \frac{-1}{9}$

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

$y - 1/3 = -1/9(x - 3)$

$9y - 3 = -x + 3$

$9y - 3 + x - 3 = 0$

$9y + x - 6 = 0$ [Equation Of The Normal]

Equation Of The Tangent

$y - y_1 = \frac{-1}{m}(x - x_1)$ $\quad m_2 = \frac{-1}{m} = m_2 = \frac{-1}{-1/9} = 9$

$y - 1/3 = 9(x - 3)$

$y - 9x - 1/3 - 27 = 0$

$y - 9x + 80/3 = 0$

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

$3y + \frac{3}{2} = -x - 1$

$3y + x + 3/2 + 1 = 0$

$3y + x + \frac{5}{2} = 0$

4 $y = 1 + x - x^2$ at the point $(-2, -5)$

Equation At The Normal

$y = 1 + x - x^2$

$\frac{dy}{dx} = 1 - 2x$

$\left.\frac{dy}{dx}\right|_{x=-2} = 1 - 2(-2) = 1 + 4 = 5$

$\therefore m = 5$

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

$y - (-5) = 5(x - (-1))$

$y + 5 = 5(x + 2)$

$y + 5 = 5x + 10$

$y + 5 - 5x - 10 = 0$

$y - 5x - 5 = 0$

Equation At the Tangent

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

$y - (-5) = \frac{-1}{5}(x - (-2))$

$y + 5 = -1/5(x + 2)$

$5y + 25 = -x - 2$

$5y + x + 25 + 2 = 0$

$5y + x + 27 = 0$