

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

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

$4y + x - 9 = 0$ is the equation of normal

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

For the equation of tangent:

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

$$m_1 = \frac{dy}{dx} \Big|_{x=x_1}$$

$$m_1 = 6(2) - 2$$

$$m = 10$$

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

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

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

$y - 10x + 12 = 0$ is the equation of tangent

For the equation of normal

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

$$y - y_1 = -1/m_1 (x - x_1)$$

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

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

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

$$10y + x - 82 = 0 \quad \text{is the equation to normal}$$

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

$$\frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$= \frac{2 \times 3x^2 - x^3 \cdot 0}{2^2}$$

$$= \frac{6x^2 - 0}{4}$$

$$\left. \frac{dy}{dx} \right|_{x=-1} = \frac{6(-1)^2}{4}$$

$$m = 6/4 = 3/2$$

$$y + 1/2 = 3/2(x+1) \quad (\text{Divide through by 2})$$

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

$$2y - 3x = 0$$

$$2y - 3x = 0$$

∴ Equation of the tangents is $2y - 3x = 0$

$$y - y_1 = -1/m(x - x_1)$$

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

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

$$y + 2/3x + 7/6 = 0$$

Divide through by 6

$by + 4x + 7 = 0$ is the equation of the normal.

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

Ⓐ For the equation of tangent

$$dy/dx = -2x + 1$$

$$m_1 = \frac{dy}{dx} \Big|_{x=x_1}$$

$$m_1 = -2(-2) + 1 = 5$$

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

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

$$y + 5 = 5x + 10$$

$y - 5x - 5 = 0$ is the equation of tangent

Ⓑ For the equation of normal

$$m_2 = -1/m_1 = -1/5$$

$$y - y_1 = m_2(x - x_1)$$

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

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

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

$\therefore 5y + x + 27 = 0$ is the equation of normal.

5. $y = 1/x$ (3, 1/3)

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

$$m_1 = (-3)^{-2} = -1/9$$

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

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

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

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

$9y + x - 6 = 0$ is the equation of the tangent

$$y - y_1 = -1/m(x - y_1)$$

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

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

$$3y - 1 = 27(x - 3)$$

$$3y - 1 = 27x - 81$$

$$3y = 27x + 8$$

MBAH PRECIOUS OBIANUJU

119/mhsol1243, MBBS

Mat 104 Assignment

1. $y = 2x^2$ at two points (1, 2)

(a) For equation at tangents:

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

$$m_1 = \frac{dy}{dx} \Big|_{x=x_1}$$

$$m_1 = 4(1) = 4$$

$$y - y_1 = m_1(x - x_1)$$

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

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

$\therefore y - 4x + 2 = 0$ is the equation at tangents.

(b) For the equation at normal

$$m_2 = \frac{-1}{m_1} = \frac{-1}{4}$$

$$y - y_1 = \frac{-1}{m_1} (x - x_1)$$

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