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

$5y + x + 27 = 0$ (Equation of the normal)

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

$y = 1/x$

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

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

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

$y - 1/3 = -\frac{1}{9}(x - 3)$

$\frac{3y-1}{3} = \frac{-x+3}{9}$

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

$27y - 9 = -3x + 9$

$27y + 3x - 9 - 9 = 0$

$27y + 3x - 18 = 0$ (Equation of the tangent)

$y - \frac{1}{3} = 9(x - 3)$

$\frac{3y-1}{3} = 9x - 27$

$3y - 1 = 27x - 81$

$3y - 1 - 27x + 81 = 0$

$3y - 27x + 81 - 1 = 0$

$3y - 27x + 80 = 0$ (Equation of the normal)

$4y - 6x + 2 - 6 = 0$

$4y - 6x - 4 = 0$ (Equation of the tangent)

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

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

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

$6y + 3 = -4x - 4$

$6y + 4x + 3 + 4 = 0$

$6y + 4x + 7 = 0$ (Equation of the normal)

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

Solution

$y = 1 + x - x^2$

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

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

$\frac{dy}{dx}\Big|_{x=-2} = 1 - 2(-2)$

$= 1 + 4$

$= 5$

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

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

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

$y + 5 = 5x + 10$

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

$y - 5x - 5 = 0$ (Equation of the tangent)

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

$y + 5 = -\frac{x-2}{5}$

$5y + 25 = -x - 2$

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

$= 12 - 2$

$= 10$

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

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

$y - 8 = 10x - 20$

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

$y - 10x + 12 = 0$ (Equation of the tangent)

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

$10y - 80 = -x + 2$

$10y + x - 80 - 2 = 0$

$10y + x - 82 = 0$ (Equation of the normal)

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

$y = \frac{x^3}{2}$

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

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

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

$= \frac{3}{2}$

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

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

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

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

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

$4y + 2 = 6x + 6$

NAME: UDOMBEH, NDIANABASI BONIFACE
MATRIC NO: 19/MHS01/411
DEPARTMENT: MBBS

MAT 104
ASSIGNMENT

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

Solution

$y = 2x^2$

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

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

$\frac{dy}{dx}\Big|_{x=1} = 4(1)$

$= 4$

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

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

$y - 2 = 4x - 4$

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

$y - 4x + 2 = 0$ (Equation of the tangent)

$m_1 m_2 = -1$

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

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

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

$4y - 8 = -x + 1$

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

$4y + x - 9 = 0$ (Equation of the normal)

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

$y = 3x^2 - 2x$

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

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

d $y-y_0 = m(x-x_0)$

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

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

$y+5 = 5x+10$

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

$y-5x-5=0$ (Equation of the tangent)

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

$y+5 = \frac{-x-2}{5}$

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

$5y+25 = -x-2$

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

$5y+x+27=0$ (Equation of the normal)

$y = 1/x$ at the point $(3, 1/3)$

Solution

$y = 1/x$

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

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

$y-y_0 = m(x-x_0)$

$y-\frac{1}{3} = \frac{-1}{9}(x-3)$

$\frac{3y-1}{3} = \frac{-x+3}{9}$

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

$27y-9 = -3x+9$

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

$27y-3x-18=0$ (Equation tangent)

$y-\frac{1}{3} = +9(x-3)$

$\frac{3y-1}{3} = 9x-27$

$3y-1 = 3(9x-27)$

$3y-1 = 27x-81$

$3y-27x+81-1=0$

$3y-27x+80=0$ (Equa the normal).