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MATRIC NO: 19/MHS01/010
DEPT: MBBS

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

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

$\frac{dy}{dx}|_{x \to 1} = 4$

$m = 4$

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

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

$y - 2 = 4x - 4$

$y - 4x - 2 = 0$

∴ equation of tangent $= y - 4x + 2$

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

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

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

$4y - 8 = -x + 1$

$4y + x - 9 = 0$

∴ equation of the normal $=$

$4y + x - 9$

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

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

$\frac{dy}{dx}|_{x \to 2} = 6 \cdot 2 - 1$

$= 10$

$m = 10$

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

$y - 8 = 10x - 20$

$y - 10x + 12 = 0$

∴ the equation of tangent

$= y - 10x + 12$

$m_2 = \frac{-1}{m_1} = \frac{-1}{10}$

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

$10y - 80 = -x + 2$

$10y + x - 82 = 0$

∴ the equation of the normal $=$

$10y + x - 82$

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

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

$\frac{dy}{dx}|_{x \to -1} = \frac{3}{2}$

$m = \frac{3}{2}$

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

$2y + 1 = 3x + 3$

$2y - 3x - 2 = 0$

∴ equation of tangent $=$

~~$2y - 3x - 2$~~ $2y - 3x - 2$

$m_2 = \frac{-1}{\frac{3}{2}} = \frac{-2}{3}$

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

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

$3y + 2x + \frac{7}{2} = 0$

∴ equation of norm

4. $y = 1 + x -$

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

$\frac{dy}{dx}|_{x \to 2} =$

$m = 5$

$y + 5 = 5(x$

$y + 5 = 5$

$y - 5x$

∴ equation of

$y - 5$

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

$= -\frac{1}{5}$

$y + 5 = \frac{-1}{5}$

$5y + 25$

$5y + x$

equation

5

5. $y =$

$\frac{dy}{dx} = 1$

$m = 1$

$(y - \frac{1}{3})$

$y -$

$y -$

∴ equation of normal = $3y + 2x + \frac{7}{2}$

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

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

$\left.\frac{dy}{dx}\right|_{x \to 2} = 5$

$m = 5$

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

$y + 5 = 5x + 10$

$y - 5x - 5 = 0$

∴ equation of tangent =

$y - 5x - 5$

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

$= -\frac{1}{5}$

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

$5y + 25 = -x - 2$

$5y + x + 27 = 0$

equation of normal =

$5y + x + 27$

∴ equation of tangent =

$y - x - \frac{10}{3}$

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

$m_2 = -1$

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

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

$y + x - \frac{10}{3} = 0$

∴ equation of normal =

$y + x - \frac{10}{3}$

5. $y = \frac{1}{x}$ $(3, \frac{1}{3})$

$\frac{dy}{dx} = 1$

$m = 1$

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

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

$y - x - \frac{10}{3} = 0$