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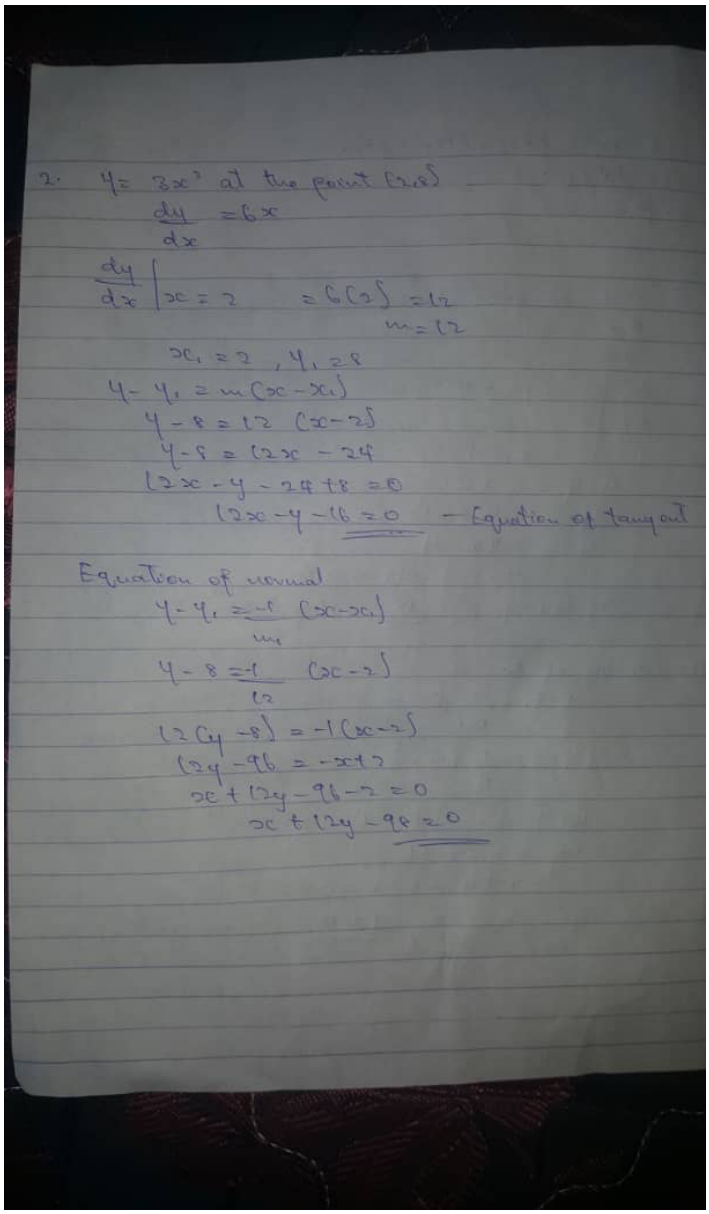
Dept: MBBS

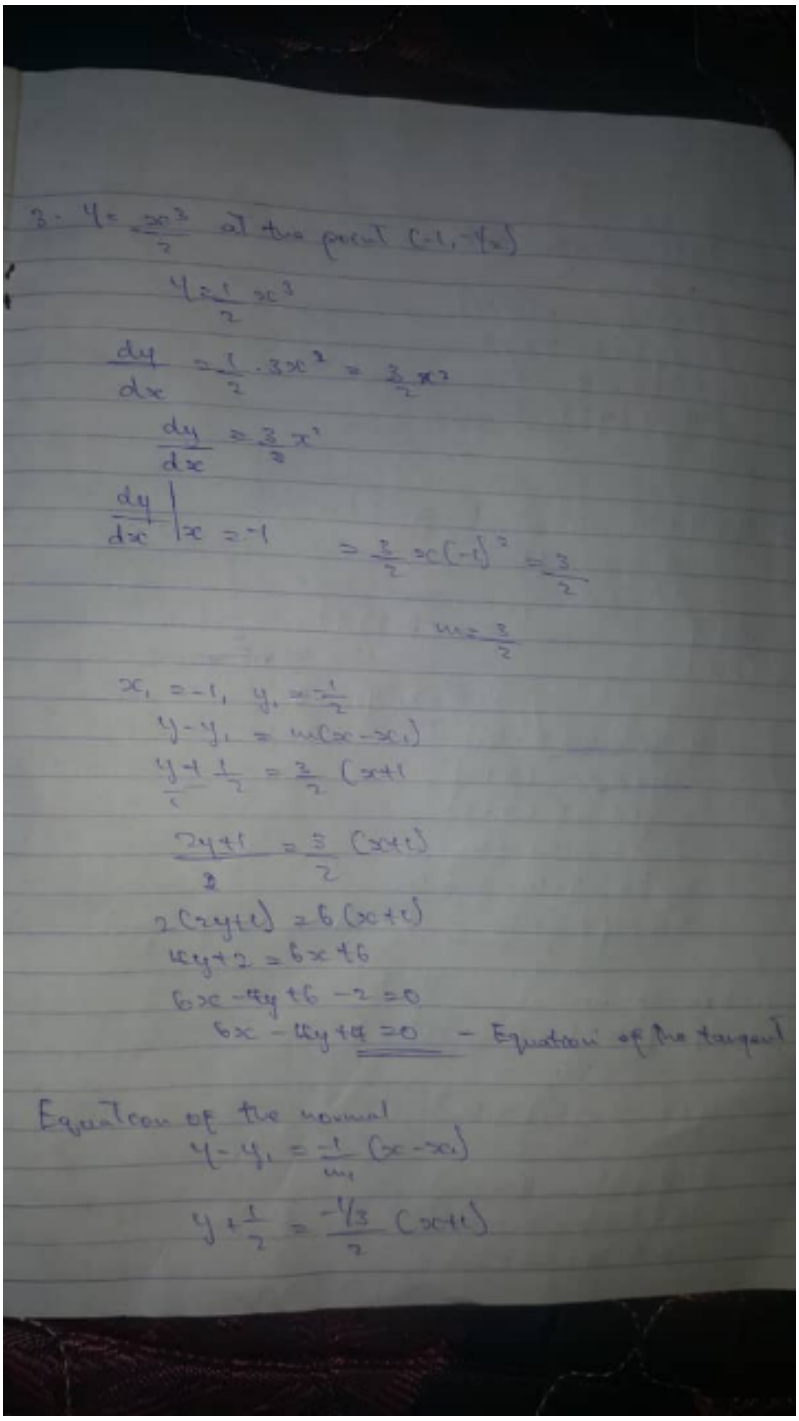
Matric no: 19/MHS01/360

Serial no:418

Course code: mat 104

Assignment 6





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

$3(2y+1) = -4(x+2)$

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

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

$4x+6y+7 = 0$

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

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

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

$m = 5$

$x_1 = -2,\ y_1 = -5$

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

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

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

$y+5 = 5x+10$

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

$5x-y+5 = 0$ — Equation of tangent

Equation of normal

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

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

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

$5y+25 = -x-2$

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

$x+5y+29 = 0$

$3y-1 = 27x-81$

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

$27x-3y-80 = 0$

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

$y = x^{-1}$

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

$\left.\frac{dy}{dx}\right|_{x=3} = \frac{-1}{9}$

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

$x_1 = 3, \; y_1 = \frac{1}{3}$

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

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

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

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

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

$3x + 27y - 18 = 0$

$x + 9y - 6 = 0$ - Equation of tangent

Equation of normal

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

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

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

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

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Answers

1.

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

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

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

$m = 4$

$x_1 = 1 \quad y_1 = 2$

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

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

$y - 2 = 4x - 4$

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

$4x - y - 2 = 0$ - Equation of tangent.

For Equation of Normal

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

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

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

$4y - 8 = -x + 1$

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

$x + 4y - 9 = 0$