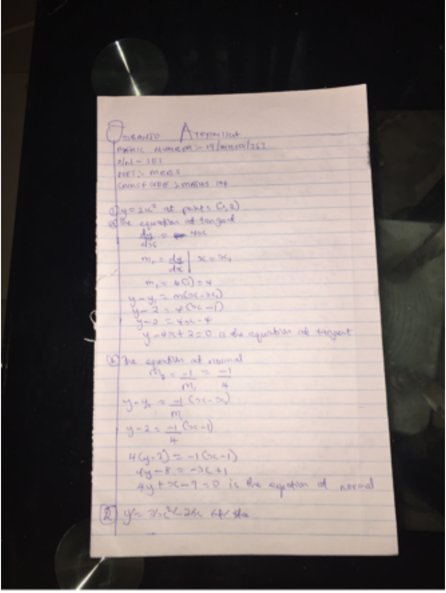

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MATRIC NUMBER :- 19/MHS01/163
S/N - 161
DEPT :- MBBS
COURSE CODE :- MATHS 198

① $y = 2x^2$ at points $(1, 2)$
ⓐ The equation at tangent

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

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

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

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

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

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

$y - 4x + 2 = 0$ is the equation at tangent

ⓑ The equation at normal

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

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

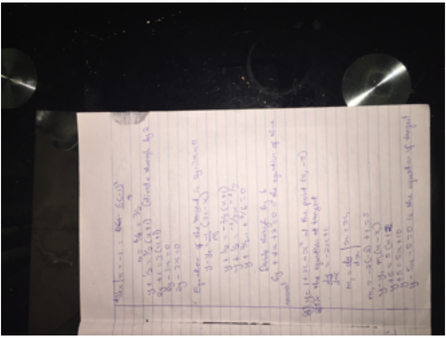
$$y - 2 = \frac{-1}{4}(x - 1)$$

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

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

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

$\boxed{2}$ $y = 3/2x^2 - 2x$ at the



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

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

$y + 1/2 = 3/2(x + 1)$ (divide through by 2

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

$$2y - 3x = 0$$

$$2y - 3x = 0$$

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

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

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

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

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

Divide through by 6
$6y + 4x + 7 = 0$ is the equation of the normal

ⓐ $y = 1 + x - x^2$ at the point $(-2, -5)$
ⓐ The equation at tangent

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

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

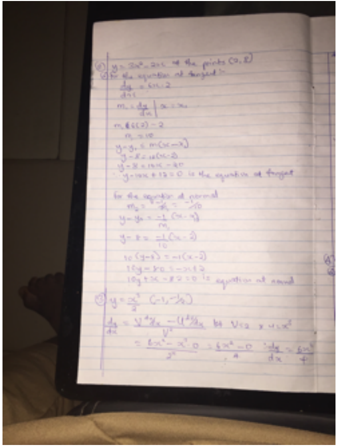
$$m_1 = -2(-2) + 1 = 5$$

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

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

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

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



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

(a) For the equation at tangent :-

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

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

$m_1 = 6(2) - 2$

$m_1 = 10$

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

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

$y - 8 = 10x - 20$

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

For the equation at normal

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

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

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

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

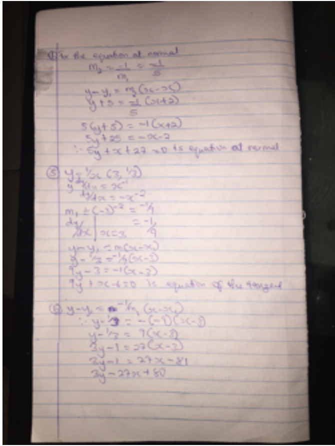
$10y - 80 = -x + 2$

$10y + x - 82 = 0$ is equation at normal

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

$\frac{dy}{dx} = \frac{V\,du/dx - U\,dv/dx}{V^2}$ let $V = 2$, $U = x^3$

$= \frac{6x^2 - x^3 \cdot 0}{2^2} = \frac{6x^2 - 0}{4}$ ∴ $\frac{dy}{dx} = \frac{6x^2}{4}$



(4) For the equation at normal

$m_2 = \frac{-1}{m_1} = \frac{-1}{5}$

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

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

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

$5y + 25 = -x - 2$

∴ $5y + x + 27 = 0$ is equation at normal

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

$y = x^{-1}$

$dy/dx = -x^{-2}$

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

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

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

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

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

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

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

∴ $y - 1/3 = -(-9)(x - 3)$

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

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

$3y - 1 = 27x - 81$

$3y - 27x + 80$