$m_2 = 9$

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

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

$3y - 1 = 27x - 81$

$3y - 27x + 80 = 0$

Name: Ogirinka Ibemosi Grace
MBBS
19/MBBS/292

Math 101 Assignment

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

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

$m_1 = \frac{dy}{dx} \quad x = x_1$

$m_1 = 4(1) = 4$

a) Equation of the tangent :-

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

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

$y - 2 = 4x - 4$

$y = 4x - 4 + 2$

$y = 4x - 2, \Rightarrow y - 4x + 2 = 0$

b) Equation of the normal :-

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

$m_2 = -1/4$

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

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

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

$4y - 8 = -x + 1$

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

$4y + x - 9 = 0$

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

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

$m = 6(2) - 2$

$m = 12 - 2 = 10$

a) Equation of the tangent :-

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

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

$y - 8 = 10x - 20$

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

$y - 10x + 12 = 0$

b) Equation of the normal

$m_2 = -1/m_1$

$m_2 = -1/10$

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

$y - 8 = \frac{-x}{10} + 1/5$

$10y - 80 = -x + 2$

$10y + x - 82 = 0$

3) $y = x^3/2$ at point $(-1, -1/2)$

$y = x^3/2$

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

$m = dy/dx \; x = x_1$

$m = \frac{3(-1)^2}{2}$

$m = 3/2$

a) Equation of the tangent

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

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

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

$2y + 1 = 3x + 3$

$2y - 3x - 2 = 0$

b) Equation of the normal

$m_2 = -1/m_1$

$m_2 = -2/3$

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

$6y + 3 = -4(x + 1)$

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

$6y + 4x + 7 = 0$

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

$dy/dx = 1 - 2x$

$m = dy/dx \; x = x_1$

$m = 1 - (-2)$

$m = 1 + 2 = 3$

a) Equation of the tangent

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

$y - (-5) = 3(x + 2)$

$y + 5 = 3x + 6$

$y - 3x - 1 = 0$

b) Equation of the normal

$m_2 = -1/m_1$

$m_2 = -1/3$

$y + 5 = -1/3(x + 2)$

$3y + 15 = -1(x + 2)$

$3y + 15 = -x - 2$

$3y + x + 17 = 0$

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

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

$m = dy/dx \; x = x_1$

$m = -1/9$

a) Equation of the tangent

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

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

$9y - 3 = -x + 3$

$9y + x - 6 = 0$

b) Equation of the normal

$m_2 = -1/m_1$