(5)

19/MCS01/236

$y+5 = -1/4 (x+1)$

$y+5 = \frac{-x-2}{4}$

$4y+20 = -x-2$

$4y+20+x+2 = 0$

$4y+x+22 = 0$ → Equation of the normal

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

Sola

$x_1, y_1$

$y = 1/x \quad (3, 1/3)$

$y = x^{-1}$

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

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

$m = -1/9$

$x_1 = 3, y_1 = 1/3$

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

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

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

$9y - 9 = -3x - 3$

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

$9y + 3x - 6 = 0$

$3y + x - 2 = 0$ → equation of the tangent

Find the equation of the normal

$m_1 m_2 = -1$

$m_2 = -1/$

(6) 19/MHS01/236

$m_2 = -1 \div -1/9$

$= -1 \times 9/-1 = 9$

$m_2 = 9$

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

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

$y - 1/3 \times 3 = 9x - 27$

$y - 1 = 27x - 81$

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

$y - 27x + 80 = 0$ → equation of the normal

(4) 19/MHS 01/236

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

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

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

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

$2y + 3 + 2x + 2 = 0$

$2y + 2x + 5 = 0$ → Equation of the normal

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

Soln

$y = 1 + x - x^2 \quad (\overset{x_1}{-2}, \overset{y_1}{-5})$

$dy/dx = -2x$

$m = dy/dx \Big|_{x=-2}$

$-2(-2) = 4$

$m = 4$

$x_1 = -2, y_1 = -5$

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

$y + 5 = 4(x + 2)$

$y + 5 = 4x + 8$

$y + 5 - 4x - 8 = 0$

$y - 4x - 3 = 0$ → Equation of the tangent

To find equation of the normal

$m_1 m_2 = -1$

$m_2 = -1/m_1$

$m_2 = -1/4$

(3) 19/MH3 01/286

10 $y + 3x - 32 = 0$ → Equation of the normal

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

Sola

$y = x^3/2$ $\quad (x_1, y_1) = (-1, -1/2)$

$dy/dx = 3x^2/1 = 3x^2$

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

$m = 3$

$x_1 = -1, y_1 = -1/2$

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

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

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

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

$y + 1/2 - 3x - 3 = 0$

$y - 3x - 5/2 = 0$ → Equation of the tangent

To find the equation of the normal

$m_1 m_2 = -1$

$m_2 = -1/m_1$

$m_2 = -1/3$

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MATRICULATION NUMBER: 19/MHS01/286

COURSE TITLE: INTEGRAL MATHEMATICS III

COURSE CODE: MAT 104

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

Sol:

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

$dy/dx = 4x$

$m = dy/dx \Big| x = 1 = 4 \times 1 = 4$

$m = 4$

$x = 1, y = 2$

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

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

$y - 2 = 4x - 1$

$y = 4x - 1 + 2$ $y = 4x - 1 + 2$

$y = 4x + 1$

$y - 4x - 1 = 0 \rightarrow$ The equation of the tangent

To find the equation of the normal

$m_1 m_2 = -1$

$m_2 = -1/m_1$

$m_2 = -1/4$

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

4 $y - 8 - 14x = 0$

$4y + x - 9 = 0$ --> equation of the normal

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

Soln

$y = 3x^2 - 2x$ $(x_1, y_1)$ $(2, 8)$

$dy/dx = 6x - 2$

$m = dy/dx \Big|_{x=2}$

$6(2) - 2$

$m = 10$

$x_1 = 2, \; y_1 = 8$

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

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

$y - 8 = 10x - 20$

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

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

To find the equation of the normal

$m_1 m_2 = -1$

$m_2 = -1/m_1$

$m_2 = -1/10$

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

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

$y - 8 = -x + 2$

$\times 10$