RUFUS FORTUNE CHINEMEZE
Maths
MBBS
19/MHS01/388
MAT 104

1. $y - 3x - 2 = 0$ --- (1)

$y = mx + c$

$y = 3x + 2$

$m_1 = 3$

$3y + x + 9 = 0$ ---(2)

$3y = -9 - x$

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

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

Two lines are perpendicular if the product of the gradients is -1

$m_1 \times m_2$

$3 \times \frac{-1}{3} = -1$

∴ The two lines are perpendicular to each other

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

$3y = 2x + 3 + 4$

$3y = 2x + 7$

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

$m_1 = \frac{2}{3}$

$y - 5 = x + 6$

$y = x + 6 + 5$

$y = x + 11$

$m_2 = 1$

Two lines are perpendicular if the product of their gradients is -1

$m_1 \times m_2 = -1$

$2/3 \times 1 = 2/3$

$m_1 \times m_2 \neq -1$

∴ They are not perpendicular

$x^2 + y^2 + 3xy - 11 = 0$ (at 1, 2)

$2x + 2y\, dy/dx + 3x\, dy/dx + 3y = 0$

$x^2 + y^2 + 3xy - 11 = 0$

$2x + 2y\, dy/dx + 3(x\, dy/dx + y \times 1) = 0$

$2x + 2y\, dy/dx + 3x\, dy/dx + 3y = 0$

$2y\, dy/dx + 3x\, dy/dx = -2x - 3y$

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

$m = dy/dx = -\frac{(2x + 3y)}{2y + 3x}$

$m = -\frac{(2(1) + 3(2))}{2(2) + 3(1)} = \frac{-(2+6)}{4+3}$

$m = \frac{-8}{7}$

Equation of tangent

$y - 2 = -\frac{8}{7}(x - 1)$

$y - 2 = \frac{-8x + 8}{7}$

$7y - 14 = -8x + 8$

$7y = -8x + 22$

$7y + 8x - 22 = 0$