Name: Stella Chinecherem Ezeokonkwo
Department: M.S.S.S
Matric number: 19/mhs01/164

The equation of a line is expressed $y = mx + c$, has a gradie
m. $y = m_1x + c_1$ and $y = m_2x + c_2$ are perpendicular if m_1m_2

1) $y - 3x - 2 = 0$ and $3y + x + 9 = 0$
$y = 3x + 2$ and $3y = -x - 9$
$y = 3x + 2$ $y = -x/3 - 3$
$m = 3$ $m = -1/3$
$m_1m_2 = 3 \times -1/3$
$m_1m_2 = -1$ ∴ The two lines are perpendicular

2) $3y - 4 = 2x + 3$ and $y - 5 = x + 6$
$3y = 2x + 7$ and $y = x + 11$
$y = 2/3x + 7/3$ and $y = x + 11$
$m_1 = 2/3$ and $m_2 = 1$
$m_1 \cdot m_2 = 2/3 \times 1$
$m_1 \cdot m_2 = 2/3$ ∴ The two lines are not perpendi

3) $x^2 + y^2 + 3xy - 11 = 0$ find dy/dx $(1, 2)$
$x^2 + y^2 + 3xy = 0$
$2x + 2y\, dy/dx + 3(x\, dy/dx + y) = 0$
$2x + 2y\, dy/dx + 3x\, dy/dx + 3y = 0$
$dy/dx(2y + 3x) = -3y - 2x$
$dy/dx = \frac{-3y - 2x}{2y + 3x}$

Equation of the tangent
$dy/dx = \frac{-3y - 2x}{2y + 3x}$
$m = \frac{-3y - 2x}{2y + 3x}$

$$m = \frac{-8(2) - 2(1)}{2(2) + 3(1)}$$

$$m = \frac{-6 - 2}{4 + 3} = \frac{-8}{7}$$

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

$y - 2 = -8/7(x - 1)$

$7y - 14 = -8(x - 1)$

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

$7y + 8x - 22 = 0$ (equation of tangent)

Equation of the normal

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

$y - 2 = -1 \times 7/8(x - 1)$

$y - 2 = 7/8(x - 1)$

$8y - 16 = 7(x - 1)$

$8y - 16 = 7x - 7$

$8y - 7x - 9 = 0$ (equation of the normal)