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

$y - 5 = x + 6$

$3y - 4 = 2x + 3 \ldots eq^n 1$

Make $y$ subject formular

$3y = 2x + 3 + 4$

divide through by 3

$y = \frac{2x}{3} + \frac{4}{3}$

Recall $y = mx + c$

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

$y - 5 = x + 6$

make $y$ subject formular

$y = x + 6 + 5$

$y = x + 11$

Recall $y = mx + c$

$m = 1$

$m_1 m_2 = -1$ (for perpendicularity)

$m_1 \times m_2 = \frac{2}{3} \times 1$

$= \frac{2}{3}$

o therefore line $3y - 4 = 2x + 3$ and $y - 5 = x + 3$ are not perpendicular

3) find the equation of the tangent and normal to the curve $x$ square $+ y$ square $+ 3xy - 11 = 0$ at the point $x = 1$ $y = 2$

Solution

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

$m = \frac{dy}{dx}$

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

$\frac{dy}{dx}$

$2x + 2y\frac{dy}{dx} + 3\left(x \cdot \frac{dy}{dx} + y\right) = 0$

$2x + 2y\frac{dy}{dx} + 3\left(x \cdot \frac{dy}{dx} + y\right) = 0$

$2x + 2y\frac{dy}{dx} + 3x\frac{dy}{dx} + 3y = 0$

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

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

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

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

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

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

$7y$