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 MATRIC NO: 191MHS01/295
 DEPARTMENT: MIBBS
 COURSE CODE: - MATH 102

1) $y - 3x - 2 = 0$ and $3y + x + 9 = 0$
 let $A = y - 3x - 2 = 0$

$$\frac{dy}{dx} - 3 = 0 = 0$$

$$\frac{dy}{dx} - 3 = 0$$

$$\frac{dy}{dx} = 3$$

Let $B = 3y + x + 9 = 0$

$$3 \frac{dy}{dx} + 1 + 0 = 0$$

$$3 \frac{dy}{dx} + 1 = 0$$

$$\frac{dy}{dx} = -1/3$$

A+B

i.e $y - 2x - 2 = 0$ is perpendicular to

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

2) $3y - 4 = 2x + 3$ and $y - 5 = x + 6$

let $A = 3y - 4 = 2x + 3$

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

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

$$\frac{dy}{dx} = 2/3$$

let $B = y - 5 = x + 6$
 $\frac{dy}{dx} - 0 = 1 + 0$

$$\frac{dy}{dx} = 1$$

$$\therefore A \neq B$$

1. e $3y - 4 = 2x + 3$ and

$y - 5 = x + 6$ is not perpendicular

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

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

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

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

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

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

when $x = 1$ and $y = 2$

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

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

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

Equation of the tangent to a curve

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

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

$$y - 2 = -8x/7 + 8/7$$

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

$$8x + 7y - 14 - 8 = 0$$

$$8x + 7y - 22 = 0$$

b) Equation of the normal to a curve

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

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

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

$$y - 2 = 7x/8 - 7/8$$

$$8y - 16 = 7x - 7 \quad 7x - 7$$

$$8y = 7x - 7 + 16$$

$$7x - 8y + 9 = 0 //$$