LEBILE CELINE MOTUNROLA
19/MHS01/235
MBBS

Examine whether or not these pair of lines are pendicular (3)

① $y-3x-2=0$ & $3y+x+9=0$

If is perpendicular when $M_1 M_2 = -1$

$y-3x-2=0$

$y=3x+2$, comparing to $y=mx+c$

$m_1=3$

$3y+x+9=0$

$y=\frac{-x}{3}-\frac{9}{3}$

$y=-\frac{1}{3}x-3$, comparing to $y=mx+c$

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

Therefore $m_1 \times m_2$ is $3 \times -\frac{1}{3}$

$=-1$

The lines $y-3x-2=0$ and $3y+x+9=0$ ARE PERPENDICULAR

2) $3y-4=2x+3$ ... ① and $y-5=x+6$ -- ②

$3y-4=2x+3$ -- ①

$3y=2x+7$

$y=\frac{2x}{3}+\frac{7}{3}$, comparing to $y=mx+c$

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

$y-5=x+6$ -- ②

$y=x+11$, comparing to $y=mx+c$

$m_2=1$

for the lines to be perpendicular $m_1 m_2 = -1$

$\therefore M_1 M_2 = \frac{2}{3} \times 1 = \frac{2}{3}$

Hence the lines $3y-4 = 2x+3$ & $y-5 = x+6$ ARE NOT PERPENDICULAR

(3) find the equation of normal & tangent to ~~$x^2+y^2+3xy-11=0$~~ $(1,2)$

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

$m = \frac{dy}{dx} = 2x + 2y\frac{dy}{dx} + 3\left[x \cdot \frac{dy}{dx} + y \cdot 1\right] = 0$

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

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

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

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

$m = \frac{dy}{dx}\Big|_{x=1,y=2} \quad \frac{-2(1)-3(2)}{2(2)+3(1)} = \frac{-2-6}{4+3} = -\frac{8}{7}$

$m = -8/7$

① Tangent $y-y_1 = m(x-x_1)$

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

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

$7y+8x-22=0 \quad \therefore$ equation of Tangent

② Normal $y-y_1 = -1/m(x-x_1)$

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

$8y-16 = 7x-7$

$8y-7x-9=0 \quad \therefore$ equation of Normal