NAME: OKWUOKWU BRYAN COURSE: MAT 102

MATRIC No: 19/ENG05/049 DEPARTMENT: Mechatronics

① $x^2 + y^2 - 5x - y + 4 = 0$

$x^2 - 5x + y^2 - y = -4$

$(x - 5/2)^2 + (y - 1/2)^2 = -4 + \frac{25}{4} + \frac{1}{4} = \frac{10}{4}$

$(x - 5/2)^2 + (y - 1/2)^2 = 10/4$

∴ Centre of circle = $5/2, 1/2$

gradient of radius = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{1/2 - 0}{5/2 - 1} = \frac{1}{2} \times \frac{2}{3} = \frac{1}{3}$

Gradient of tangent = $\frac{-1}{1/3} = -3$

∴ Equation of tangent = $(y - 0) = -3(x - 1)$

∴ Equation of tangent ⇒ $y = -3x + 3$

② $x^2 - 12x + y^2 - 12y = -47$

$(x - 6)^2 + (y - 6)^2 = -47 + 36 + 36 = 25$

∴ Centre of circle = $(6, 6)$

Gradient of radius = $\frac{6 - 0}{6 - 1} = \frac{6}{5}$

Gradient of tangent = $-5/6$

∴ Equation of tangent $\Rightarrow (y-0) = -\frac{5}{6}(x-1)$

∴ Equation of tangent $\Rightarrow$ $6y = -5x + 5$

(3) $x^2 - 8x + y^2 + 14y = -40$

$(x-4)^2 + (y+7)^2 = -40 + 16 + 49 = 25$

∴ Centre of circle $= (4, -7)$

∴ gradient of radius $= \frac{-7-0}{4-1} = \frac{-7}{3}$

∴ gradient of tangent $= \frac{3}{7}$

Equation of tangent $\Rightarrow (y-0) = \frac{3}{7}(x-1)$

∴ Equation of tangent $\Rightarrow$ $7y = 3x - 3$