

NAME: NIAMDI PRECIOUS
MATIC NO: 77139698HF
DEPARTMENT: CHEMICAL ENGINEERING

Assignment Eng. 281
 $y^2 = 5(1-x^2)$ using method Point of
 $x^2 + y^2 = 4$ (ii) intersection
(-0.5, 1.77), (0.5, 1.75)

$$y^2 = 5(1-x^2)$$

Sub for y^2 in eqn (ii)

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

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

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

$$-4x^2 = -1$$

$$x^2 = \frac{-1}{-4} = \frac{1}{4}$$

$$x = \sqrt{\frac{1}{4}} = \frac{1}{2}$$

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

Differentiating completely,

$$10x + 2y \frac{dy}{dx} = 0$$

$$2y \frac{dy}{dx} = -10x$$

$$\frac{dy}{dx} = \frac{-10x}{2y}$$

$$y^2 = 5(1-x^2)$$

$$y = \sqrt{\frac{5}{2}}$$

$$x = \frac{1}{2} \text{ and } y = \frac{\sqrt{15}}{2}$$

$$\frac{dy}{dx} = \frac{-10 \left(\frac{1}{2}\right)}{2 \left(\frac{\sqrt{15}}{2}\right)}$$

$$\frac{dy}{dx} = \frac{-5}{\sqrt{15}}$$

$$\frac{dy}{dx} = \tan \theta$$

$$\theta = \tan^{-1} \left(\frac{-5}{\sqrt{15}} \right) = -52.24^\circ$$

Substituting x in eq (ii)

$$\left(\frac{1}{2}\right)^2 + y^2 = 4$$

$$y^2 + y^2 = 4$$

$$y^2 = 4 - \frac{1}{4}$$

$$y = \sqrt{4 - \frac{1}{4}} = \sqrt{\frac{15}{2}} = 1.9365$$

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

differentiating implicitly

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

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

$$= \frac{-2 \left(\frac{1}{2}\right)}{2 \left(\frac{\sqrt{15}}{2}\right)}$$

$$\frac{dy}{dx} = \frac{-1}{\sqrt{15}}$$

$$\frac{dy}{dx} = \tan \theta$$

$$\theta_2 = \tan^{-1} \left(\frac{1}{\sqrt{2}} \right)$$

$$\theta_2 = -14.48$$

