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IMG_20191019_233639.pdf

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Computer Engineering

$$5x^2 + y^2 = 5 \quad \dots \textcircled{1}$$

$$x^2 + y^2 = 4 \quad \dots \textcircled{2}$$

⇒ Equ ① - Equ ②

$$4x^2 = 1$$

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

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

Sub x in Equ ②

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

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

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

$$y = \sqrt{\frac{15}{4}}$$

$$y = 1.9365$$

Co-ordinates of point of intersection

$$(x, y) = \left(\frac{1}{2}, \sqrt{\frac{15}{4}}\right) = (0.5, 1.9365)$$

To Plot the graph, we make y the subject of formula for both Equ.

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

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

$$y = \sqrt{5 - 5x^2}$$

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

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

$$y = \sqrt{4 - x^2}$$

Angle of intersection

Angle 1 (θ_1)

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

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

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

$$\frac{dy}{dx} = -\frac{5x}{y}$$

Sub x and y

$$\frac{dy}{dx} = \frac{-5\left(\frac{1}{2}\right)}{\left(\sqrt{\frac{15}{4}}\right)} = -1.2910$$

$$\frac{dy}{dx} = \tan \theta_2$$

$$\tan \theta_2 = -1.2910$$

$$\theta_2 = \tan^{-1} -1.2910 = -52.24^\circ$$

Angle 2 (θ_2)

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

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

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

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

Sub x and y

$$\frac{dy}{dx} = \frac{-\frac{1}{2}}{\frac{\sqrt{15}}{2}}$$

$$= -\frac{1}{2} \times \frac{2}{\sqrt{15}} = -\frac{1}{\sqrt{15}} \times \frac{\sqrt{15}}{\sqrt{15}}$$

$$= -\frac{\sqrt{15}}{15} = -0.2582$$

$$\frac{dy}{dx} = \tan \theta_2$$

$$\tan \theta_2 = -0.2582$$

$$\theta_2 = \tan^{-1} -0.2582$$

$$= -14.48^\circ$$

$$\therefore \theta = \theta_2 - \theta_1$$

$$= -14.48^\circ - (-52.24^\circ)$$

$$= 37.76^\circ$$

