

OGUN MARYAM OKANILEMIEN

18/ENG04/057

Electrical Engineering

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

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

$$5x^2 + y^2 = 5 \quad \text{--- (i)}$$

$$x^2 + y^2 = 4 \quad \text{--- (ii)}$$

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

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

$$4x^2 = 1$$

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

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

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

Substitute $x = \frac{1}{2}$ in equation (ii)

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

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

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

$$y^2 = \frac{3\frac{3}{4}}{4}$$

$$y = \sqrt{\frac{3\frac{3}{4}}{4}}$$

$$= \sqrt{\frac{15}{2}}$$

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

Differentiate equ 1

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

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

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

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

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

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

$$= -1.291$$

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

$$\theta_1 = \tan^{-1} \frac{dy}{dx}$$

$$\theta_1 = \tan^{-1} (-1.291)$$

$$\theta_1 = -52.239$$

Differentiate equation 2

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

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

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

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

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

$$= -0.258$$

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

$$\theta_2 = \tan^{-1} \frac{dy}{dx}$$

$$\theta_2 = \tan^{-1} (-0.258)$$

$$\theta_2 = -14.4775$$

$$\theta_2 - \theta_1 = -52.239 - (-14.4775)$$

$$= -52.239 + 14.4775$$

$$= 37.7615$$

$$|\theta_2 - \theta_1| = 37.7615$$

$$= 37.7615$$

$$g(x) := \sqrt{4 - x^2}$$

$$f(x) := \sqrt{5 - 5x^2}$$

