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 COURSE: ENG 281.

ASSIGNMENT

With the aid of MATLAB, find the magnitude of the angles

$$5x^2 + y^2 = 5 \quad \dots (i)$$

$$x^2 + y^2 = 4 \quad \dots (ii)$$

From eqn (i)

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

Put the value of y in eqn (ii)

$$x^2 + (\sqrt{5 - 5x^2})^2 = 4 \quad \dots (iii)$$

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

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

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

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

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

From eqn (iii)

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

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

$$y = \sqrt{5 - 5(\frac{1}{2})^2}$$

$$y = \sqrt{5 - \frac{5}{4}}$$

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

$$y = 1.936$$

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

$$y = \sqrt{5 - \frac{5}{4}}$$

$$y = \sqrt{\frac{15}{4}} = 1.936$$

$$x_1 = +\frac{1}{2}, y_1 = +1.936$$

$$x_2 = -\frac{1}{2}, y_2 = +1.936$$

$$\left. \begin{aligned} 5x^2 + y^2 &= 5 \\ 10x + 2y \frac{dy}{dx} &= 0 \\ 2y \frac{dy}{dx} &= -10x \\ \frac{dy}{dx} &= \frac{-5x}{y} \\ &= \frac{-5(0.5)}{1.936} \\ &= \frac{-12.5}{1.936} \\ m_1 &= -1.27 \end{aligned} \right\}$$

$$\left. \begin{aligned} x^2 + y^2 &= 4 \\ 2x + 2y \frac{dy}{dx} &= 0 \\ \frac{dy}{dx} &= \frac{-x}{y} \\ &= \frac{-0.5}{1.936} \\ m_2 &= -0.258 \end{aligned} \right\}$$

$$\tan \theta_1 = m_1$$

$$\tan \theta_2 = m_2$$

$$\theta_1 = \tan^{-1} 1.27$$

$$= 51.2978$$

$$\theta_2 = \tan^{-1} 0.26$$

$$= 16.543$$

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

$$\theta = 16.543 - 51.2978$$

$$\theta = 34.65^\circ$$