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 Dpt: Biochemical Engineering
 Course: ENG 251 ENGINEERING MATHEMATICS
ASSIGNMENT #1

By plotting the curves given in equations (1) and (2) show the angles between them at their points of intersection with the aid of MathCAD find the magnitude of the angle for

ANSWER: which x and y are positive.
 $5x^2 + y^2 = 5$ and $x^2 + y^2 = 4$

$$5x^2 + y^2 = 5 \quad \text{--- (1)}$$

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

$$y^2 = \frac{15}{4} = \sqrt{\frac{15}{4}}$$

By Substitution:

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

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

$$4x^2 = 1$$

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

$$\therefore x = +\frac{1}{2}, y = 1.936$$

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

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

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

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

Differentiating,
 $5x^2 + y^2 = 5$
 it becomes;

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

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

divide both sides by 2y

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

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

$$\therefore \frac{dy}{dx} = \frac{-5(1/2)}{(1.936)} = -1.2953$$

Substituting x into eq. (1)

$$5\left(\frac{1}{2}\right)^2 + y^2 = 5$$

$$5\left(\frac{1}{4}\right) + y^2 = 5$$

$$y^2 = 5 - \frac{5}{4}$$

$$y^2 = \frac{20 - 5}{4}$$

Differentiating

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

this becomes,

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

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

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

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

$$\therefore \frac{dy}{dx} = \frac{-(1/2)}{1.93}$$

$$\frac{dy}{dx} = -0.2590$$

for Math Cao

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

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

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

therefore; $f(x) = y$

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

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

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

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

therefore; $f(x)$

Mathcad Professional - [Untitled1]

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$f(x) = \sqrt{5-x^2}$ $g(x) = \sqrt{4-x^2}$

Graph

Calculator

Math

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