

2013

December

Wednesday

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 Matric no: 18/ENGO4/050  
 Dept: Basic Elect/Elect

$$1. 5x^2 + y^2 = 5$$

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

Solve simultaneously

$$5x^2 + y^2 = 5 \times 1$$

$$x^2 + y^2 = 5 \times 1$$

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

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

$$4x^2 = 1$$

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

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

Sub  $x$  for  $1/2$  in eqn (1)

$$5(1/2)^2 + y^2 = 5$$

$$5/4 + y^2 = 5$$

$$y^2 = 5 - 5/4 = \frac{20-5}{4} = \frac{15}{4}$$

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

Differentiate eqn (1)

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

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

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

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

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

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

$$= -1.291$$

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

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

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

$$= -52.239^\circ$$

Differentiate 2

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

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

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

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

$$\frac{dy}{dx} = \frac{-(1/2)}{\sqrt{15/2}} = -0.258$$

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

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

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

$$\theta = -14.4775$$

$$\theta - \theta_1 = -52.239 + 14.4775$$

$$= -37.7615^\circ$$

