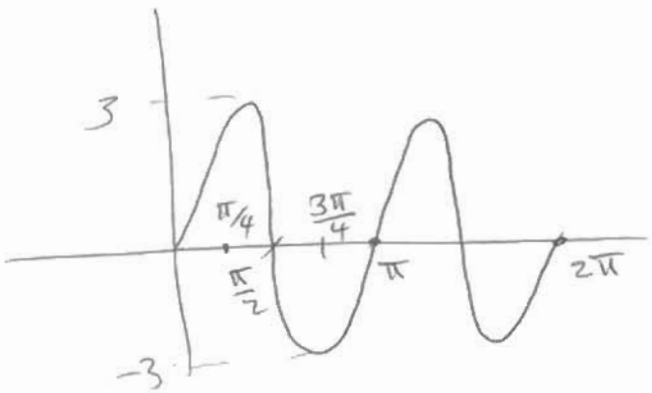
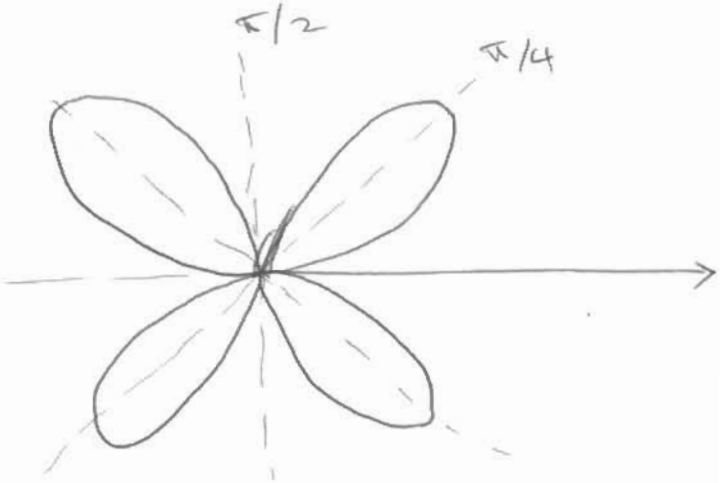
Math 201 - 4 Key Quiz # 1 Sem 053

Name:_____ I.D.#:_____ Serial #:_____

3 Q1 Sketch the graph of the polar curve $r = 3\sin 2\theta$ 4-leaves Rose

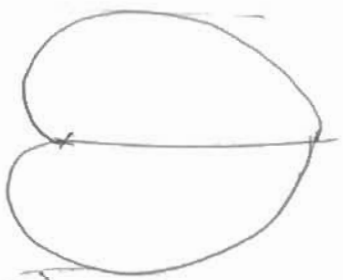




3 Q2 Find the equation of the tangent line to the curve $x = t+2$, $y = 2t^2 + 2t + 3$ at $t = 1$

$x' = 1$, $y' = 4t+2$

$$\frac{dy}{dx} = \frac{y'}{x'} = \frac{4t+2}{1}\Big|_{t=1} = \underline{6}$$



so the points are: $P_1\left(\frac{3}{2}, \frac{\pi}{3}\right)$, $P_2\left(\frac{3}{2}, \frac{5\pi}{3}\right)$

4 Q3 Find all points at which the polar curve $r = 1 + \cos\theta$ has a horizontal tangent.

horizontal tangent if $\frac{dy}{d\theta} = 0$ & $\frac{dx}{d\theta} \neq 0$.

$y = r\sin\theta = \sin\theta + \sin\theta\cos\theta$, $x = r\cos\theta = \cos\theta + \cos^2\theta$

$\frac{dy}{d\theta} = \cos\theta + \cos^2\theta - \sin^2\theta$, $\frac{dx}{d\theta} = -\sin\theta - 2\cos\theta\sin\theta$

$= -\sin\theta(1 + 2\cos\theta)$

if $\frac{dy}{d\theta} = 0 \Rightarrow \cos\theta + \cos^2\theta - 1 + \cos^2\theta = 0$

$2\cos^2\theta + \cos\theta - 1 = 0$

$(2\cos\theta - 1)(\cos\theta + 1) = 0 \rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = \frac{\pi}{3}, \frac{5\pi}{3}$

$\cos\theta = -1 \rightarrow \theta = \pi$

$\frac{dx}{d\theta}\Big|_{\pi} \neq 0$, $\frac{dx}{d\theta}\Big|_{\frac{5\pi}{3}} \neq 0$ $\frac{dx}{d\theta}\Big|_{0}$