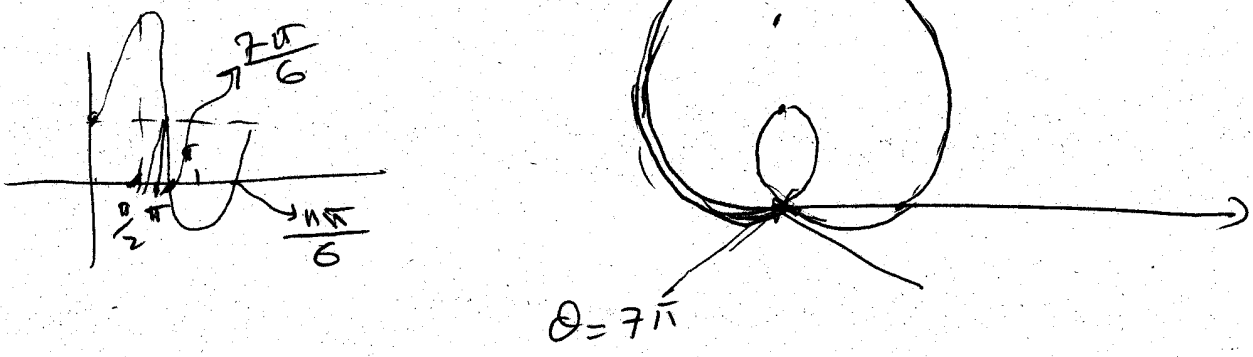
Math 201-16 Quize #1A Sem 041

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

Q1: Sketch the graph of the polar curve $r = 1 + 2\sin\theta$, show the angles where the grapg passes through the pole.

$r=0 \Rightarrow \sin\theta = -\frac{1}{2} \Rightarrow \theta = \frac{7\pi}{6}, \frac{11\pi}{6}$



Q2: Find the slope of the tangent line to the parametric curve $x = \cos t$, $y = \sin t$ at $t = \frac{\pi}{4}$

$$\frac{dy}{dx} = \frac{dy/dt}{dx/dt} = \frac{\cos t}{-\sin t}\Big|_{t=\frac{\pi}{4}} = \frac{\sqrt{2}/2}{-\sqrt{2}/2}$$

$$= -1$$

Q3: Find the angles where the graph $r = \sin\theta$, $0 \le \theta \le \pi$ has vertical tangent.

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

$y = r\sin\theta = \sin^2\theta$ | $\frac{dy}{d\theta} = 2\sin\theta\cos\theta$

$x = r\cos\theta = \sin\theta\cos\theta$ | $\frac{dx}{d\theta} = \cos^2\theta - \sin^2\theta = 1 - 2\sin^2\theta$

if $\frac{dx}{d\theta} = 0 \Rightarrow \sin^2\theta = \frac{1}{2} \Rightarrow \sin\theta = \pm\frac{1}{\sqrt{2}} \Rightarrow \theta = \frac{\pi}{4}$ & $\theta = \frac{3\pi}{4}$

$\frac{dy}{d\theta}\Big|_{\frac{\pi}{4}} \neq 0$ & $\frac{dy}{d\theta}\Big|_{\frac{3\pi}{4}} \neq 0 \Rightarrow$ The angles are $\theta = \frac{\pi}{4}$ & $\frac{3\pi}{4}$.