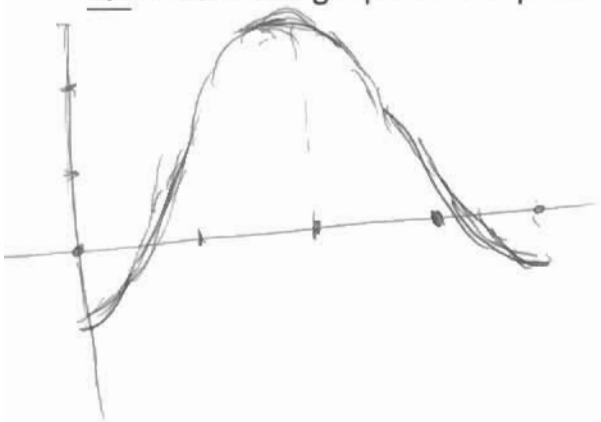
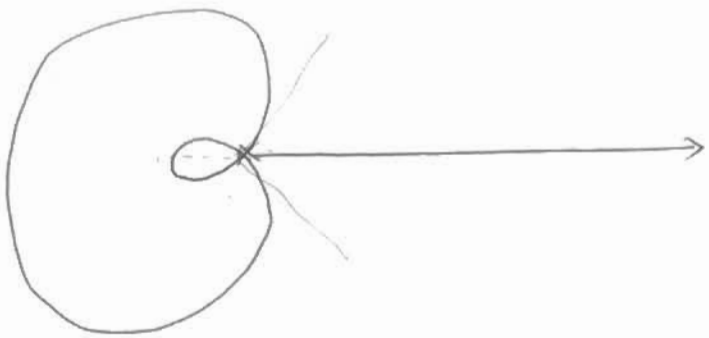
Math 201 - 1 Key Quiz # 1 A Sem 053

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

Q1 Sketch the graph of the polar curve $r = 1 - 2\cos\theta$





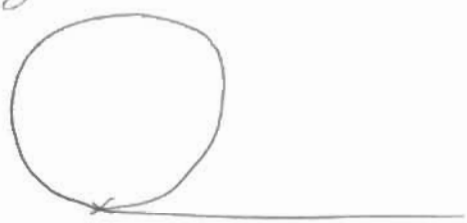
Q2 Find the equation of the tangent line to the curve $x = t+2$, $y = t^2 + t + 1$ at $t = 1$

$x' = 1$, $y' = 2t+1$, $x = 3$, $y = 3$

$$\frac{dy}{dx} = \frac{2t+1}{1}\Big|_{t=1} = 3$$

equation of the tangent is

$y - 3 = 3(x-3)$



Q3 Find all points at which the polar curve $r = 2\sin\theta$ has a horizontal tangent.

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

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

$\frac{dy}{d\theta} = 4\sin\theta\cos\theta$, $\frac{dx}{d\theta} = 2\cos^2\theta - 2\sin^2\theta$

$4\sin\theta\cos\theta = 0 \rightarrow \sin\theta = 0 \Rightarrow \theta = 0, \pi,$

$\cos\theta = 0 \Rightarrow \theta = \frac{\pi}{2}, \frac{3\pi}{2},$

$\frac{dx}{d\theta}\Big|_{\theta=0} \neq 0$, $\frac{dx}{d\theta}\Big|_{\theta=\pi} \neq 0$, $\frac{dx}{d\theta}\Big|_{\theta=\frac{\pi}{2}} \neq 0$, $\frac{dx}{d\theta}\Big|_{\theta=\frac{3\pi}{2}} \neq 0$

so the points are $(2, \frac{\pi}{2})$.