Math 172 Quiz 11 Name: ______________

7 June 2016 Show Appropriate Work Point Values in $\boxed{\text{boxes}}$.

1. $\boxed{2}$ Find dy/dx for the the following parametric curve at the point specified.

$$x(\theta) = \sin^3\theta, y(\theta) = \cos\theta, \quad \theta = \pi/6$$

$x' = 3\sin^2\theta \cos\theta$

$y' = -\sin\theta$

$x'(\frac{\pi}{6}) = 3(\frac{1}{2})^2(\frac{\sqrt{3}}{2}) = \frac{3\sqrt{3}}{8}$

$y'(\frac{\pi}{6}) = -\frac{1}{2}$

$\frac{dy}{dx} = \frac{-1/2}{3\sqrt{3}/8} = -\frac{4}{3\sqrt{3}}$

2. Consider the parametric curve given by

$$x(t) = t^2 - 9, y(t) = t^2 - 8t.$$

(a) $\boxed{2}$ Find the points (x and y coordinates) where the tangent line to the curve has slope 2.

$x' = 2t$

$y' = 2t - 8$

$\frac{2t-8}{2t} = 2$ so $2t - 8 = 4t$

$-8 = +2t$

$t = -4$

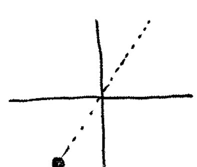
$x(-4) = 7$

$y(-4) = 48$

(b) $\boxed{1}$ Find an equation for the tanget line when $t = 0$.

~~y = 0~~ $x = -9$ $\frac{dx}{dt} = 0$, so vertical tangent line

3. $\boxed{1}$ Sketch the polar point $(-1, \pi/3)$ and then find an alternative representation for the point with a positive radial coordinate.



$(-1, \pi/3)$

$(1, \frac{4\pi}{3})$ OR $(1, -\frac{2\pi}{3})$ OR ...

4. Convert to an equation in rectangular coordinates.

(a) $\boxed{2}$ $r = 2$

$x^2 + y^2 = 4$

(b) $\boxed{2}$ $r = 2\sin\theta$

$r^2 = 2r\sin\theta$

$x^2 + y^2 = 2y$ OR $x^2 + (y-1)^2 = 1$