Name:_____ **Due: 5/22/2018**

Math 202 Quiz 4

Directions Answer all questions in the space provided and box your final answers. Good luck!

1. Consider the curve described by the following parametric equations.

$$x = t^3 - 12t$$

$$y = t^2 - 1$$

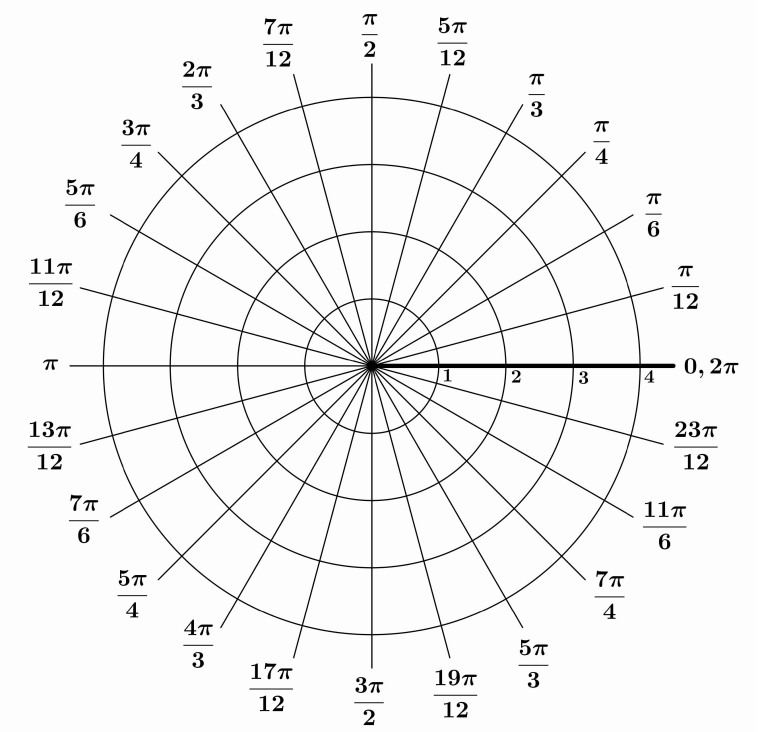
(a) (4 points) Find $\dfrac{dy}{dx}$ as a function of t.

(b) (4 points) Find all points on the curve where the tangent line is horizontal.

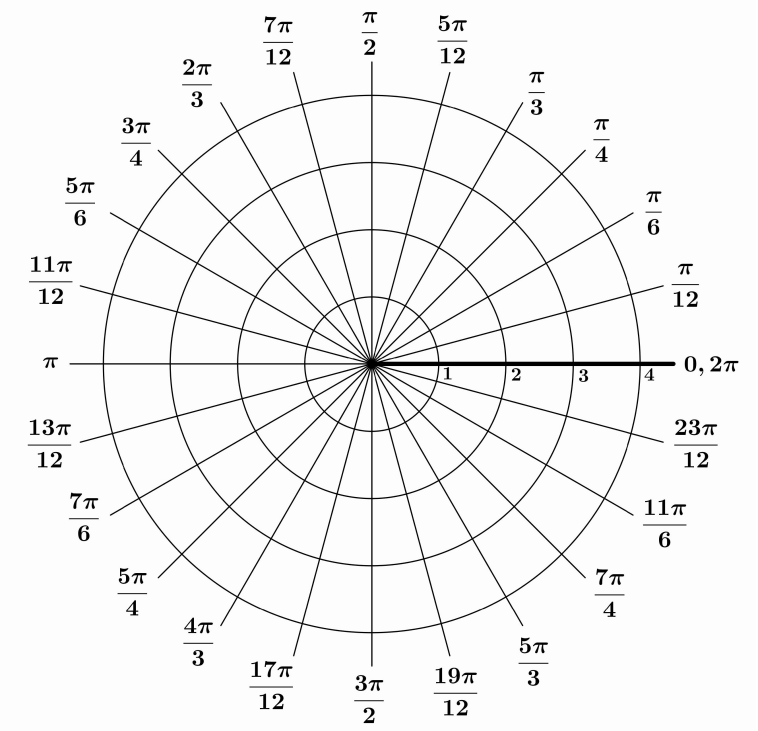
(c) (4 points) Find all points on the curve where the tangent line is vertical.

2. Sketch the following polar curves.

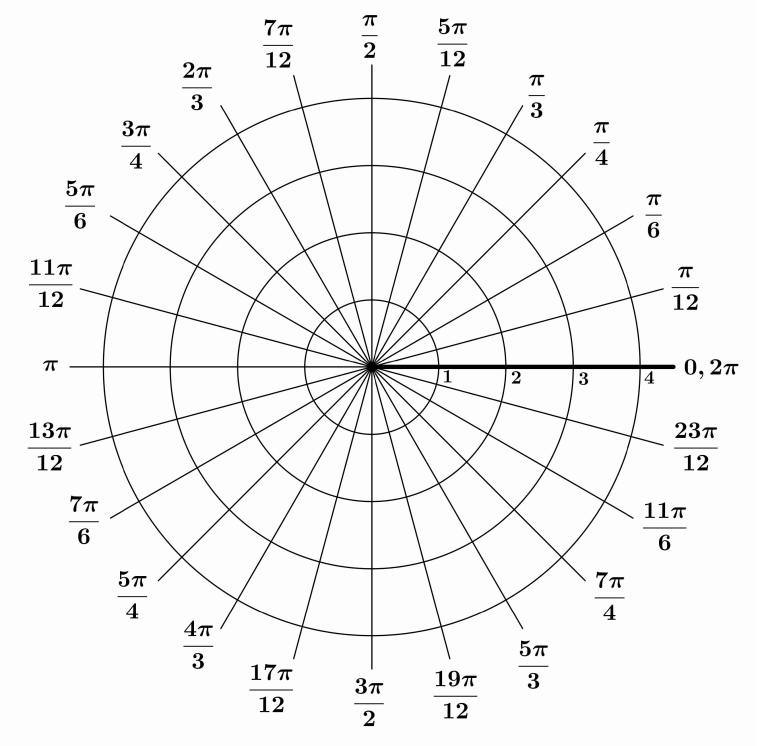
(a) (4 points) $r = 2\cos(3\theta)$



(b) (4 points) $r = 3\cos(2\theta)$



(c) (4 points) $r = 1 + 2\sin(\theta)$



3. (8 points) Find the slope of the tangent line to the polar curve $r = \dfrac{1}{\theta}$ when $\theta = \pi$.

4. (8 points) Find the area of the region inside the polar curve $r = 3\cos\theta$ and outside the polar curve $r = 1 + \cos\theta$.