

Name: \_\_\_\_\_ Due at Final Exam: 3:30pm, 5/26/2016  
Math 202 Quiz 4 NAC 1/203

**Directions** Answer all questions in the space provided. Show all work and box your final answers. Answers with no work shown will not receive full credit. Good luck!

1. (8 points) Consider the following parametrized curve.

$$x = 3t^2 + 1, \quad y = 2t^3 + 1$$

Find an equation for the tangent line to the curve at  $(4, 3)$ .

2. (8 points) Find the arc length of the following parametrized curve.

$$x = \cos(t) + t \sin(t), \quad y = \sin(t) - t \cos(t), \quad 0 \leq t \leq \pi$$

3. (8 points) Find the area of the region that lies inside the polar curve  $r = 2 + \sin \theta$  and outside the polar curve  $r = 3 \sin \theta$ .

4. (8 points) Find the exact length of the following polar curve.

$$r = \theta, \quad 0 \leq \theta \leq 2\pi$$

5. (8 points) Sketch the graph of  $4x^2 + 25y^2 - 10x + 100y + 100 = 0$ . Identify which sort of conic it is. On your sketch, show and label whichever of the following are present: vertices, asymptotes, foci,  $x$ -intercept(s), and  $y$ -intercepts.