

Name:

Math 116 Exam 2

November 9, 2017

Directions: WRITE YOUR NAME ON THIS TEST! Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer. Unless otherwise indicated, decimal approximations for a numerical answer accurate to 4 decimal places are acceptable.

1) a) (6 points) What are the rectangular (Cartesian) coordinates of the polar point $(4, -3\pi/2)$?

b) (10 points) Give two representations in polar coordinates for the rectangular point $(-2, -2)$.

2) a) (6 points) Find a parameterization for the Cartesian curve $x^2 + y^2 = 16$. Your parameterization should capture the whole curve, not merely a portion of it.

b) (12 points) Find a Cartesian equation (i.e. one in x and y) for the parametric curve $\langle t^2 + t, t^2 - t \rangle$. As in part a), your equation should capture the whole curve.

3) (15 points) Determine a parametric equation for the tangent line to the parametric curve given by $f(t) = \langle (\ln(t))^t, \ln(2t) - 1 \rangle$ at the point $(1, \ln(2))$.

4) Let $f(t) = \left\langle \frac{\sin^2(t)}{2}, \frac{t + \sin(t) \cos(t)}{2} \right\rangle$.

a) (13 points) Set up an equation for the arclength of the graph of f from $t = \pi/6$ to $t = \pi/4$.

b) (12 points) Find the arclength of the portion of the curve described in part a).

5) Let $f(t) = \langle \ln(t), \sqrt{t^2 - 1} - \operatorname{arcsec}(t) \rangle$.

a) (14 points) Set up an equation for the surface area obtained by revolving the graph of f from $t = e$ to $t = e^2$ about the y -axis.

b) (12 points) Find the surface area of the portion of the curve described in part a).