

MATHEMATICS 201
SUMMER SEMESTER, 2000-01
Makeup Quiz II

Time: 60 Minutes.
Date: August 17, 2001.
Instructor: Prof. A. Lyzzaik

Answer the following questions:

1. (a) Express in polar form the rectangular equation $x^3 + y^3 - 3axy = 0$. (10 points)
(b) Express in rectangular form the polar equation $r^2 \cos(2\theta) = 1$. (10 points)

2. Consider the polar equation $r^2 = 8 \cos(3\theta)$.
 - (a) Indicate the possible symmetries of the graph. (10 points)
 - (b) Sketch the graph. (10 points)
 - (c) Find the polar equation of the tangent line to the graph at the polar point whose $\theta = \pi/4$. (10 points)

3. Consider the polar equations $r = -6 \cos \theta$ and $r = 2 - 2 \cos \theta$.
 - (a) Find the points of intersection of the two graphs. (10 points)
 - (b) find the area of the region lying outside the graph of $r = -6 \cos \theta$ and inside the graph of $r = 2 - 2 \cos \theta$. (10 points)

4. Consider in rectangular form the equation $9x^2 + 4y^2 - 36z^2 = 1$.
 - (a) Write the equation in cylindrical and spherical coordinates. (10 points)
 - (b) Sketch the graph of the equation by showing its traces with the rectangular planes. (10 points)

5. Identify the surfaces given in spherical and cylindrical coordinates, respectively, by $\rho = 1 - \cos \phi$ and $r = 1 - \cos \theta$. (10 points)