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)