

Midterm #1
Math 53
Spring 2007
Prof. V. Jones

No calculators, or books, but a one-sided "cheat-sheet" page is allowed.

20 points for each question.

1. Sketch the curve given in polar coordinates by

$$r = | \ln (\theta/2\pi) |$$

for $0 < \theta \leq 2\pi$.

2. Find the parametric equations of the line perpendicular to the plane $x + 2y + 3z = 4$ passing through the point $(5, 6, 7)$.

3. If the limit

$$\lim_{(x, y) \rightarrow (0, 0)} \frac{x^2 - 2y^2}{x^2 + y^2}$$

exists, find it. If it doesn't, say why it doesn't.

4. If x is given implicitly as a function of y and z by the equation $x = y \sin (z + x^2)$, find $\partial x / \partial z$ and $\partial x / \partial y$ in terms of x , y , and z .

5. Find the equation of the osculating plane for the curve $\langle t^2, \sin t, \cos 2t \rangle$ at $t = 0$.