

Name (Please Print) _____

Rec. Instr.

Your Signature _____ Class Time _____

ANALYTIC GEOMETRY AND CALCULUS III

Exam I

February 9, 1995

The point value of each problem is indicated in the left margin. You must show all of your work for full credit. Points will be deducted for faulty reasoning, for sloppy notation, and for failure to simplify answers, even if your answer is correct. You may use a calculator, your class notes, and any reference material. Explicitly cite, in some manner, any published formulae you use.

- (10) 1. Find a polar equation for the curve in the xy -plane whose cartesian equation is $x^2 - 2x + y^2 = 0$.

Answer _____

- (10) 2. Find the intersection points in the xy -plane of the polar curves $r = 1 - \sin \theta$ and $r = \sin \theta$.

Answer _____

(10) 3. What is the (acute) angle between vectors $\mathbf{a} = (2, -3, 1)$ and $\mathbf{b} = (5, 2, 4)$?

Answer $\theta =$ _____

(10) 4. Calculate $(-3\mathbf{i} - 2\mathbf{j} + \mathbf{k}) \times (\mathbf{i} - \mathbf{j})$.

Answer _____

- (10) 5. Find an equation for the plane containing $P_0 = (1, 1, 1)$ which is parallel to the plane

$$x - 2y + 7z - 3 = 0.$$

Answer _____

- (10) 6. Find an equation for the line that contains $P_0 = (-1, 2, 1)$ and $P_1 = (3, -2, 1)$.

Answer _____

- (10) 7. What is the distance from the point $P_1 = (1, 2, 5)$ to the plane $x + y + 2z = 4$?

Answer _____

- (10) 8. Sketch the traces (level curves) in the xy -plane of the surface $z = \sqrt{3x^2 + 3y^2}$.

(10) 9. Find a cylindrical equation for the surface

$$z = \sqrt{3x^2 + 3y^2}.$$

Answer _____

(10) 10. Find a spherical equation for the surface

$$z = \sqrt{3x^2 + 3y^2}.$$

Answer _____