

**Math 2633**  
**Summer 2004 – Practice Test**

NAME \_\_\_\_\_

1. Find an equation of the plane containing two parallel lines  $\vec{v}_1 = (-3, 0, 2) + t(-1, 1, 3)$  and  $\vec{v}_2 = (2, -2, 1) + t(3, -3, -9)$ .
2. Find all pairs of cross products among  $\vec{i}, \vec{j}, \vec{k}$ .
3. Given the vectors  $\vec{u} = 3\vec{i} - 2\vec{j} - 3\vec{k}$  and  $\vec{v} = -\vec{i} - \vec{k}$  find the following:
  - a. The angle between  $\vec{u}$  and  $\vec{v}$ .
  - b.  $\text{proj}_{\vec{v}}\vec{u}$
  - c.  $\text{comp}_{\vec{v}}\vec{u}$
4. Identify and describe the surface given by:
  - a.  $\frac{y^2}{4} + \frac{z^2}{3} - \frac{x}{5} = 0$
  - b.  $x^2 = 3 + y^2 + z^2$
5. Find an equation of a line through the point  $(3, 6, 7)$  and perpendicular to the plane  $x - y = 3$ .
6. Write the equation  $x^2 - y^2 + z = 3$  in both cylindrical and spherical coordinates.
7. Do the planes given by the equations  $x + y = z$  and  $2x - 5y - z = 1$  intersect? If so, then find the equation of the line of intersection of the planes.
8. Find the area of the triangle whose vertices are  $(2, 3, 1)$ ,  $(1, 6, -7)$  and  $(-2, -4, -5)$ .
9. A force of magnitude 12 lbs. and a second force of magnitude 15 pounds act on the same object and make an angle of  $\theta$  with each other. If the resultant force has a magnitude of 18 pounds, find  $\theta$ .