Math 2414 **Homework Set 10** **10 Points**

The 3-D Coordinate System

1. Find the distance from the point (-1, 5, 3) to

(a) the *xy*-plane (b) the *xz*-plane (c) the *x*-axis

Equations of Lines

For problems 2 & 3 give the vector and parametric form of the equation of given line.

2. The line that passes through (9, -2, -1) and (0, 2, -3).

3. The line that passes through (1, -1, 5) and is parallel to $\vec{r}(t) = \langle 1-4t, 3+7t, 9+t \rangle$.

4. Determine the angle between $x = -1+2t,\ y = 6-9t,\ z = -2t$ and $\vec{r}(t) = \langle -1, 6+2t, 10t \rangle$.

Equations of Planes

For problems 5 & 6 find the equation of the given plane.

5. The plane containing $P = (9,0,1)$, $Q = (-1,1,4)$, and $R = (7,0,4)$.

6. The plane containing (6, -9, 4) and is orthogonal to $x = 4+5t,\ y = -3-t,\ z = 8+3t$.

7. Determine if the two planes $6x - y + 4z = 90$ and $6x - y = -6$ are orthogonal, parallel or neither.

Quadric Surfaces

For problems 7 & 8 sketch the surface. I'm not after a picture perfect sketch here. Your sketch should be recognizable as the proper type of surface that has the correct orientation along the correct axis and be in the proper place on the correct axis.

8. $y = 6x^2 + 6z^2 - 2$

9. $2x^2 + 2z^2 = 4$