## Math 8

Points and Distance in 3-Space

## Practice Problems

1) Find the distance from the point $(4,-2,6)$ to each of the following:
a) The $x y$-plane
c) The $y$-axis
b) The $y z$-plane
d) The origin
2) Use the distance formula to show that the points $(0,-5,5),(1,-2,4)$ and $(3,4,2)$ lie on a straight line.
$3)$ Find the equation of sphere with radius 4 and center $(1,2,-3)$.
3) Find the equation of sphere that passes through the point $(4,3,-1)$ and has center $(3,8,-1)$.
4) Show that the equation

$$
x^{2}+y^{2}+z^{2}-2 x-4 y+8 z=0
$$

represents a sphere. Find its radius and center. (Hint: Complete the square!)
$6)$ Find an equation of a sphere if one of its diameters has endpoints $(2,-1,1)$ and $(4,5,-4)$. What is its center and radius?
7) Find the equation of the largest sphere that has center $(5,1,9)$ and is bounded by the 3 coordinate planes.
8) Describe in words the region in 3-space defined by the following equations:
a) $x^{2}+y^{2}+z^{3} \leq 4$
b) $z=\sin x$
c) $(y-1)^{2}+(z+2)^{2}=4$

## Problems to Turn In

1) Find an equation for the set of all points equidistant from the points $(-1,5,3)$ and $(6,2,-2)$. Describe this set in words.
2) Find the distance between two spheres whose formulas are given by

$$
(x+2)^{2}+(y+2)^{2}+(z+2)^{2}=9 \quad \text { and } \quad(x-1)^{2}+(y-2)^{2}+(z-2)^{2}=4
$$

