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 *xy*-plane c) The *y*-axis
- b) The *yz*-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).

4) Find the equation of sphere that passes through the point (4, 3, -1) and has center (3, 8, -1).

5) Show that the equation

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

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) $x^2 + y^2 + z^3 \le 4$ 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

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