HWK#1

1) Find the distance from the point $(3, 7, -5)$ to the following :
   a) xy-plane　b) yz-plane　c) xz-plane　d) x-axis　e) y-axis　f) z-axis　.

2) Find the center and the radius for the sphere given by the equation
   $$3x^2 + 3y^2 + 3z^2 + 2y - 2z = 9 .$$

3) Describe the image of the following set of points , and give an equation or set of
   equations that define these points .
   The set of all points which lie on the plane which is perpendicular to the z-axis and
   contains the point $(1, 1, 3)$ and also lie on the sphere centered at the origin with
   radius 5 .

4) From the two points   A$(1, -2, 0)$, B$(2, 3, 4)$:
   a) Find the components of   the vector $\vec{AB}$.

   b) Sketch the vector which is equal to $\vec{AB}$ and starts at the   origin .

5) If $\mathbf{a} = 3\mathbf{i} - 2\mathbf{k}$ and $\mathbf{b} = \mathbf{i} - \mathbf{j} + \mathbf{k}$ then find :

   i) $|\mathbf{a}|$ ii) $\mathbf{a} + \mathbf{b}$ iii) $\mathbf{a} - \mathbf{b}$ iv) $2\mathbf{a}$ v) $3\mathbf{a} + 2\mathbf{b}$.

6) Express the vector $\mathbf{a} = 9\mathbf{i} - 2\mathbf{j} + 6\mathbf{k}$ as a product of the
   length of $\mathbf{a}$ times a vector pointing in the same direction as $\mathbf{a}$.