1. Find the distance between the point $(1, -2, 2)$ and
   
   (a) the $xy$ plane;
   
   (b) the $xz$ plane;
   
   (c) the $yz$ plane;
   
   (d) the $x$ axis;
   
   (e) the $y$ axis;
   
   (f) the $z$ axis;
   
   (g) the origin;

2. Find the center and radius of the sphere $S = \{(x, y, z) : x^2 + y^2 + z^2 + 2x - 3y + 10z = 3\}$

3. Graph the set $S$ described as follows: all the points at a distance of 7 from the origin that lie in a plane perpendicular to the $y$-axis containing the point $P = (1, 2, 3)$. Does $S$ contain $P$?

4. Let $A = (3, -5, 1)$ and $B = (2, 4, -6)$ be two points.
   
   (a) Find the components of the vector $\overrightarrow{AB}$.
   
   (b) Find the coordinates of the head of the vector with tail at the origin and antiparallel to $\overrightarrow{AB}$.

5. Let $a = i + j + k$ and $b = 3j - 5k$. Find $|a|$ and $|b|$, and express the following in terms of $i,j,k$:
   
   (a) $a + b$
   
   (b) $a - b$
   
   (c) $2a - b$
   
   (d) $2b - a$

6. Express $a = i + 2j - 2k$ as the length of $a$ times a unit vector parallel to $a$. 