Problem Set #1

Due: Wednesday, January 18

1. Consider a molecule with four atoms at the points $(0,0,0)$, $(6,0,0)$, $(3,\sqrt{3},2\sqrt{6})$ and $(3,3\sqrt{3},0)$. Verify that every atom in this molecule is 6 units away from every other atom.

2. Let $P=(1,2,3)$ and $Q=(3,4,2)$.

(a) Find the distance between P and Q.

(b) Find a unit vector from the point P and toward the point Q.

(c) Find a vector of length 9 pointing in the same direction of $\overrightarrow{PQ}$.

(d) Find a point R such that $\overrightarrow{PR}$ is a vector of length 12 pointing in the opposite direction of $\overrightarrow{PQ}$.

3. Let $\vec{u}=<1,1>$ and $\vec{v}=<-2,1>$.
Describe the set of vectors $\{\vec{w}=s\vec{u}+t\vec{v}|0\leq s\leq 1, 0\leq t\leq 1\}$ geometrically.