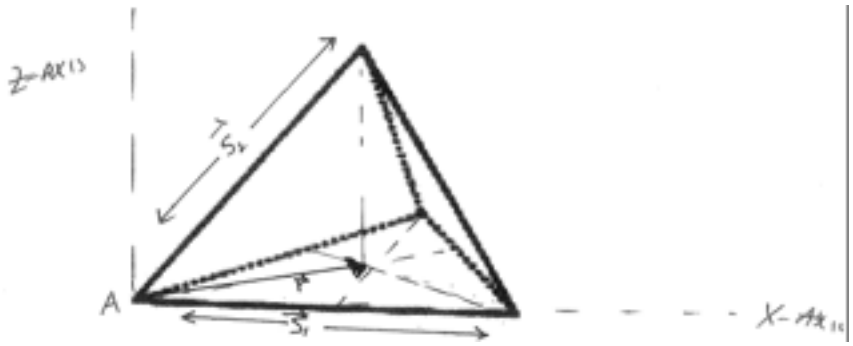
What is a Tetrahedron??

A fun review of vectors and vector relationships



A tetrahedron is 4 equilateral triangles arranged in a pyramid - Note the beautiful geometry of the tetrahedron and attempt to make a scale model on your table out of the stirrers. Also note the coordinate system defined in the drawing.

Defining the vectors

- $\vec{r}$ is defined from the *vertex A* to the intersection of the three medians of the base triangle$\vec{r}$ is also the *horizontal projection* of $\vec{S_2}$ onto the x-y plane.
- $\vec{S_1}$ is defined as: $\vec{S_1} = a\hat{i}$
- $\|\vec{S_1}\| = \|\vec{S_2}\| = a$
- Now, answer the following four questions and show all reasoning for non trivial work. All of the components magnitudes should be expressed in terms of a
  Have fun!

1. Write a vector expression for $\vec{r}$ using the$\hat{i}, \hat{j}, \hat{k}$ system:

$\vec{r}$ =_____ $\hat{i}$ +_____ $\hat{j}$ +_____ $\hat{k}$

2. Write a vector expression for $\vec{S_2}$

$\vec{S_2} =$_____ $\hat{i} +$_____ $\hat{j} +$_____ $\hat{k}$

3. Show that the angle between $\vec{S_1}$ and $\vec{S_2}$ is 60 degrees

4. Determine the angle between $\vec{r}$ and $\vec{S_2}$