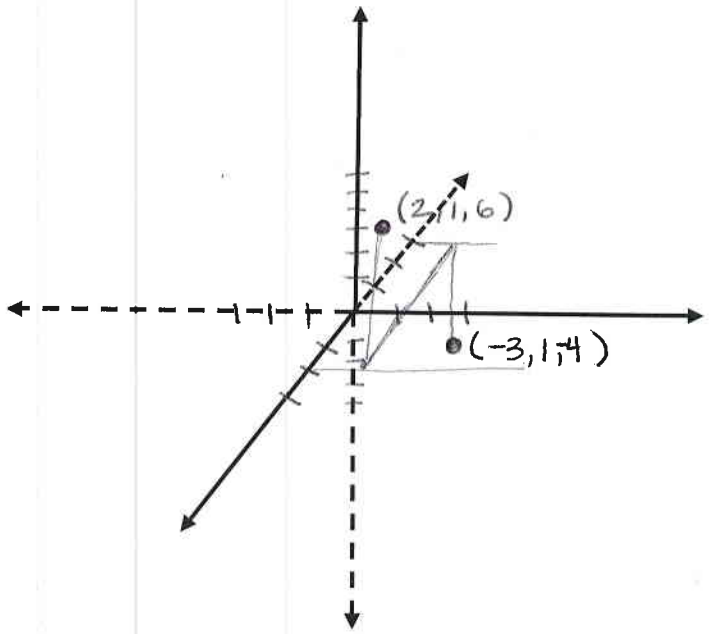
Math 2153, Quiz #1, Summer 2015 Name KEY

Instructions: Show all work. **Give exact answers** (yes, that means fractions, square roots and exponentials, and not decimals) unless specifically directed to give a decimal answer. This will require some operations to be done by hand even if not specifically directed to. Be sure to complete all parts of each question.

1. Plot the points (2,1,6) and (-3,1,-4) on the attached graph.



2. Find a unit vector orthogonal to <-8,-6,4> and <10,-12,-2>.

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -8 & -6 & 4 \\ 10 & -12 & -2 \end{vmatrix} = (12+48)\hat{i} - (16-40)\hat{j} + (96+60)\hat{k}$$

$$\vec{\omega} = \frac{60\hat{i} + 24\hat{j} + 156\hat{k}}{12}$$

$$\vec{\omega} = \Rightarrow 5\hat{i} + 2\hat{j} + 13\hat{k} \qquad \hat{\omega} = \frac{5}{\sqrt{198}}\hat{i} + \frac{2}{\sqrt{198}}\hat{j} + \frac{13}{\sqrt{198}}\hat{k}$$

$$\| \vec{u} \times \vec{v} \| = \sqrt{25 + 4 + 169} = \sqrt{198}$$

3. Use the vector you find in #2 to find an equation of the plain that is parallel to both vectors and contains the points (1,-3, 5).

Answers may vary

$$5(x-1) + 2(y+3) + 13(z-5) = 0$$

or $$60(x-1) + 24(y+3) + 156(z-5) = 0$$

or $$\frac{5}{\sqrt{198}}(x-1) + \frac{2}{\sqrt{198}}(y+3) + \frac{13}{\sqrt{198}}(z-5) = 0$$