FERPA WAIVER: WRITTEN HOMEWORK

By my signature I relinquish my FERPA rights in the following context: My written homework sets for Math 11, Fall 2014, may be returned en masse with others in the class via the homework boxes in the hallway. In addition, examinations may be returned to me in class. I acknowledge that I understand my score may be visible to others.

If I choose not to relinquish my FERPA rights, I understand that I will have to present my student ID at my instructor's office to retrieve my homework sets.

Name (PRINT): ____

Signature: ____

Math 11. Multivariable Calculus.
Written Homework 1.
Due on Wednesday, 9/24/14.

You can turn in this homework by leaving it in the boxes labeled Math 11 in the hallway in the basement of Kemeny anytime before 3:00 pm on Wednesday.

1. (a) Consider the set of points P such that the distance from P to $A(-1,5,3)$ is twice the distance from P to $B(6,2,-2)$. Show that this set is a sphere, and find the center and radius of this sphere.

   (b) Now consider the set of points P such that the distance from P to $A(-1,5,3)$ is equal to the distance from P to $B(6,2,-2)$. Find an equation whose solution equals this set. What geometric shape is this set?

2. (a) Find the equation for a sphere with center $(4,-2,1)$ which also passes through the point $(8,1,1)$.

   (b) Find the radius and center of the circle given by the intersection of this sphere with the yz coordinate plane.

   (c) The vector equation $(\mathbf{r}-\mathbf{a})\cdot(\mathbf{r}-\mathbf{b})=0$ describes a sphere. If $\mathbf{a}=\langle 2,0,5\rangle$ and $\mathbf{b}=\langle 6,4,3\rangle$, find the center and radius of the sphere. [Hint: you may want to use Cartesian coordinates $\mathbf{r}=\langle x,y,z\rangle$]

3. Find the angle between the diagonal of a cube and a diagonal of one of its faces.

4. Suppose that $\mathbf{a}\neq\mathbf{0}$.

   (a) If $\mathbf{a}\cdot\mathbf{b}=\mathbf{a}\cdot\mathbf{c}$, does it follow that $\mathbf{b}=\mathbf{c}$?

   (b) If $\mathbf{a}\times\mathbf{b}=\mathbf{a}\times\mathbf{c}$, does it follow that $\mathbf{b}=\mathbf{c}$?

   (c) If $\mathbf{a}\cdot\mathbf{b}=\mathbf{a}\cdot\mathbf{c}$ and $\mathbf{a}\times\mathbf{b}=\mathbf{a}\times\mathbf{c}$, does it follow that $\mathbf{b}=\mathbf{c}$?