Math 53 Discussion

Quiz on Monday. Topics to know:

1. Chapter 12.1: Equations in three dimensional space for a plane, cylinder, and sphere.
2. Chapter 12.2: How to add and subtract vectors, how to find a vector $\overrightarrow{AB}$ given points A and B.
3. Chapter 12.3: Dot product - how to find lengths of vectors, the dot product of vectors, and the angle between two vectors. Scalar and vector projection. When two vectors are orthogonal and parallel.
4. Good luck!

Practice Problems: Dot product, cross product

1) Find the angle between a diagonal of a cube and one of its edges. (*First draw a cube with its furthest back vertex at the origin. The sides of a cube have length one so you can figure out the coordinates of the other vertices. Then find the vector coordinates corresponding to these two vectors and take their dot product.*)

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

3) Find the scalar and vector projections of $\vec{b} = \langle 0, 1, \frac{1}{2} \rangle$ onto $\vec{a} = \langle 2, -1, 4 \rangle$.

4 – harder) Prove the addition trig formulas for $\cos(\theta_2 - \theta_1)$ and $\sin(\theta_2 - \theta_1)$ using the dot product and cross product. (Take unit vectors $\vec{u}$ and $\vec{v}$.)