Quiz #01 – MATH 2421

Summer 2006

Kawai Name : _____

Directions: No calculators, books, or notes. Show algebra. Be sure to highlight your final answer!

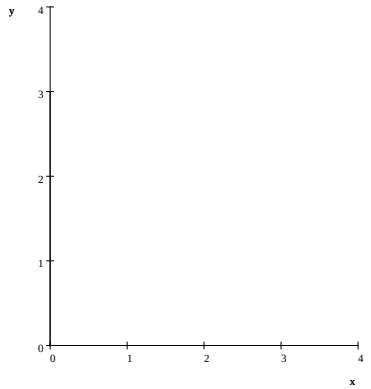
1. Let $\mathbf{v} = \langle 2,\ -3,\ 6 \rangle$.

   (a) [10 *pts*.] Find the associated unit vector (same direction).

   (b) [10 *pts*.] Now resize the answer to part (a) so that the new vector has magnitude 13.

2. Sketchapalooza

   (a) [5 *pts*.] On the set of axes below, sketch in points P, Q, and R such that they form an EQUILATERAL triangle.
   Place P at the origin and then you decide where to put Q and R. (It doesn't need to be perfect, but it should be reasonably convincing.)



   (b) [5 *pts*.] Now place arrowheads at the appropriate places and form the vectors $\overrightarrow{PQ}$, $\overrightarrow{QR}$, and $\overrightarrow{RP}$.

   (c) [10 *pts*.] Find the sum (explain!):

$$\overrightarrow{PQ} + \overrightarrow{QR} + \overrightarrow{RP} = ???$$

3. Miscellaneous.

(a) [6 *pts.*] With what angle θ $(0 \leq \theta < 2\pi)$ do we associate the unit direction vector

$$\left\langle \frac{1}{2},\ -\frac{\sqrt{3}}{2} \right\rangle = \langle \cos(\theta),\ \sin(\theta) \rangle$$

$\theta =$

(b) [6 *pts.*] What is the Cartesian equation of the plane which is parallel to the xy-plane, but is located 5 units below the xy-plane?

(c) [8 *pts.*] Find the center and radius of this sphere.

$$x^2 + y^2 - 6y + z^2 + 12z = -29$$