

Quiz 3, Math 53
July 8, 2008

Solutions of all problems must be accompanied by relevant explanations. Show your work, but not to others.

Problem 1. Find all angles in a triangle ABC if the coordinates of the vertices are $A(0, 0, 1)$, $B(1, 1, 0)$, $C(-\frac{\sqrt{2}}{2} - 1, \frac{\sqrt{2}}{2} - 1, 1)$.

Problem 2. Find symmetric equations of the line that passes through the intersection of the lines

$$x = t, y = 2t, z = 3t, \text{ and } x = 4t, y = 5t, z = 6t$$

and is perpendicular to both of these lines.

Problem 3. Do there exist vectors \mathbf{a} and \mathbf{b} in the three dimensional space so that $\mathbf{a} \neq \mathbf{0}$, $\mathbf{b} \neq \mathbf{0}$ and $\mathbf{a} \cdot \mathbf{b} = -\mathbf{b} \cdot \mathbf{a}$. If your answer is yes give an example, if your answer is no prove your statement.