Math 53: Quiz #2

February 8

GSI: M. Lindsey

20 points, 20 minutes

Name: _____

Please give neat and organized answers. Whenever applicable (especially for computational questions), make it clear what strategy you are using. Points may be deducted for poor exposition.

Problem 1

(10 points.) Suppose that $\vec{a}$ and $\vec{b}$ are orthogonal (perpendicular) vectors in 3-dimensional space. Then show that $\|\vec{a} + \vec{b}\|^2 = \|\vec{a}\|^2 + \|\vec{b}\|^2$. (Hint: recall that $\|\vec{x}\|^2 = \vec{x} \cdot \vec{x}$, and use this fact to expand the expression $\|\vec{a} + \vec{b}\|^2$.)

(See back for next problem!)

Problem 2

(10 points.) Let $P = (1, 2, 3)$, $Q = (4, 2, 4)$, and $R = (2, 5, 3)$. Find an equation for the plane containing P, Q, and R, and write your equation in the form $ax + by + cz = d$, where a, b, c, d are constants. (Suggestion: check your answer by making sure that the given points satisfy your equation.)