

Name: _____

15 minutes

This quiz is out of 12 points: Problems 1, 2, and 3 are each worth 4 points. No calculators, notes, or other materials allowed. Show your work and explain your reasoning, I want to give you partial credit!

Problem 1. Let $\mathbf{u} = \langle 1, 2, -1 \rangle$ and $\mathbf{v} = \langle 3, 0, 2 \rangle$. Compute $\mathbf{u} \times \mathbf{v}$, and then find the area of the triangle having $\mathbf{u}$, $\mathbf{v}$, and $\mathbf{u} - \mathbf{v}$ as its sides.

Problem 2. Let $P = (2, 1, 0)$ and $Q = (4, 0, 3)$. Find parametric equations for the line through P and Q , and determine whether the point $(8, -2, 9)$ lies on this line.

Problem 3. Find an equation of the plane that contains the line $x = 1 + t$, $y = 2t$, $z = 3 - t$ and the point $(4, 0, 5)$.

The Challenge Problem on the back of this quiz is worth 2 points of extra credit (no partial credit).

Challenge Problem. The lines

$$L_1 : x = t, y = 1 + t, z = 2 - t \quad \text{and} \quad L_2 : x = 1 + s, y = 2s, z = 3 + s$$

are skew. Find an equation of the plane that is parallel to both lines and lies halfway between them.