Quiz 1 for Calculus ++, Math 2605 J1-2, August 28, 2007

Name:

This quiz is to be taken without calculators and notes of any sorts. The allowed time is 20 minutes. Provide exact answers; not decimal approximations! For example, if you mean $\sqrt{2}$ do not write 1.414... .

Let $P_1$ be the plane passing through the points $p_1 = \begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}, p_2 = \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, p_3 = \begin{bmatrix} -1 \\ 1 \\ 2 \end{bmatrix}$

and let $P_2$ be the plane given by the equation $x + y + z = 1$.

**I:** (3 points) Find the equation of the plane passing through the points $p_1, p_2, p_3$. 

**II:** (3 points) Give a parametric form of the line that is formed by the intersection of $P_1$ and $P_2$.

**III:** (4 points) Find the distance of the point $p_3$ to the line through $p_1$ and $p_2$.

**Extra credit:** (3 points) Find the distance between the lines given by $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + t \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix}$

and $\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} + s \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$. 