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 $1.414\dots$.

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

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 $\mathbf{p_3}$ to the line through $\mathbf{p_1}$ and $\mathbf{p_2}$.

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