

## 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  $\mathbf{p}_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ ,  $\mathbf{p}_2 = \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}$ ,  $\mathbf{p}_3 = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}$  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 through 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  $\begin{bmatrix} 2 \\ 2 \\ 3 \end{bmatrix} + t \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}$  and  $\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} + s \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$ .