Math115 Test4: Vectors and Planes

1. Given these two planes

$$P: \begin{pmatrix} x \\ y \\ z \end{pmatrix} \circ \begin{pmatrix} 3 \\ 1 \\ 9 \end{pmatrix} = 37 \quad Q: \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix} + \alpha \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} + \beta \begin{pmatrix} 1 \\ 2 \\ -2 \end{pmatrix}$$

   find the dot product form for Q. [7]

2. Hence or otherwise find the line where P and Q intersect. [5]

3. Where does this line intersect with P? [3]

$$K: \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -1 \\ -4 \\ 2 \end{pmatrix} + \gamma \begin{pmatrix} -5 \\ 1 \\ 3 \end{pmatrix}$$

4. What is the shortest distance from Q to the point of intersection of P and K? [5]