5

5.1

There are no solutions, because the the first two rows give us:

$$\begin{vmatrix} u_1 \\ u_2 \end{vmatrix} = \begin{vmatrix} 1 \\ 1 \end{vmatrix} \tag{1}$$

However the last row gives us:

$$u_1 + u_2 = 1 \tag{2}$$

Clearly (1) is not consistent with (2). Thus there are no solutions for this equation.

5.2

There are infinite solutions, because if we perform row reduction to A, the last row is all zeros. Hence we have:

$$u_3 = 1 - u_1 \tag{1}$$

$$u_2 = 1 - u_3 = u_1 \tag{2}$$

Thus:

$$\begin{vmatrix} u_1 \\ u_2 \\ u_3 \end{vmatrix} = \begin{vmatrix} u_1 \\ u_1 \\ 1 - u_1 \end{vmatrix} = u_1 \begin{vmatrix} 1 \\ 1 \\ -1 \end{vmatrix} + \begin{vmatrix} 0 \\ 0 \\ 1 \end{vmatrix}$$