

### Solutions for Test 3

I)

$$\begin{bmatrix} 6 & 2 & -3 \\ -3 & 0 & 1 \\ -1 & -1 & 1 \end{bmatrix}$$

II)  $x = 3/50, y = 4/25$ .

III) a)  $-x - y + z = 0$

III) b) Any multiple of the vector

$$\begin{bmatrix} 3 \\ -1 \\ -2 \end{bmatrix}$$

III) c) Every solution is of the form

$$\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} + t \begin{bmatrix} 3 \\ -1 \\ -2 \end{bmatrix}$$

for some real number  $t$ .

IV) a) The subspace in question is the same as the null space of the matrix

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -1 & -1 & 1 \end{bmatrix}$$

and therefore a subspace.

IV) b) Dimension is 2

IV) c) A basis is given by the two vectors

$$\begin{bmatrix} 1 \\ 1 \\ -1 \\ -1 \end{bmatrix} \quad \text{and} \quad \begin{bmatrix} 1 \\ -1 \\ 1 \\ -1 \end{bmatrix}$$