Assignment for Section 4.4: Independence, basis and dimension

(1) Decide the dependence or in dependence of

    (a) the vectors $(1, 3, 2)$ and $(2, 1, 3)$ and $(3, 2, 1)$,

    (b) the vectors $(1, -3, 2)$ and $(2, 1, -3)$ and $(-3, 2, 1)$.

(2) Let $A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 3 & 1 \\ 3 & 1 & -1 \end{bmatrix}$, find the dimensions of

    (a) the column space of A,

    (b) the row space of A.

(3) $A = \begin{bmatrix} 1 & 3 & 2 \\ 0 & 1 & 1 \\ 1 & 3 & 2 \end{bmatrix}$ reduces to $U = \begin{bmatrix} 1 & 3 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$ by subtracting row 1 from row 3. Find bases for

    (a) the column spaces of A and U,

    (b) the row spaces of A and U,

    (c) the nullspaces of A and U.