Step-1

(a)

Consider the following vectors:

$(1,3,2),(2,1,3),(3,2,1)$

The objective is to determine whether the above set of vectors is dependent (or) independent.

Step-2

To prove the dependency of vectors, write the above vectors as the columns of a matrix as follows:

$$A=\begin{bmatrix}1&2&3\\3&1&2\\2&3&1\end{bmatrix}$$

$$=\begin{bmatrix}1&2&3\\0&-5&-7\\0&-1&-5\end{bmatrix}\text{(By row operations } R_2-3R_1\to R_2, R_3-2R_1\to R_3\text{)}$$

$$=\begin{bmatrix}1&2&3\\0&-1&-5\\0&-5&-7\end{bmatrix}\text{(By row operation } R_2\leftrightarrow R_3\text{)}$$

$$=\begin{bmatrix}1&2&3\\0&-1&-5\\0&0&18\end{bmatrix}\text{(By row operation } R_3-5R_2\to R_3\text{)}$$

In the above row echelon form of the matrix, all rows are non-zero.

Therefore, the vectors $(1,3,2),(2,1,3),(3,2,1)$ form linearly independent set.

Step-3

(b)

Consider the following vectors:

$(1,-3,2),(2,1,-3),(-3,2,1)$

The objective is to determine whether the above set of vectors is dependent (or) independent.

Step-4

To prove the dependency of vectors, write the above vectors as the columns of a matrix as follows:

$$A=\begin{bmatrix} 1 & 2 & -3 \\ -3 & 1 & 2 \\ 2 & -3 & 1 \end{bmatrix}$$

$$=\begin{bmatrix} 1 & 2 & -3 \\ 0 & 7 & -7 \\ 0 & -7 & 7 \end{bmatrix} \left(\text{By row operations } R_2+3R_1 \to R_2, R_3-2R_1 \to R_3\right)$$

$$=\begin{bmatrix} 1 & 2 & -3 \\ 0 & 7 & -7 \\ 0 & 0 & 0 \end{bmatrix} \left(\text{By row operation } R_3+R_2 \to R_3\right)$$

In the above row echelon form of the matrix, only two rows are non-zero (the last row is zero).

Therefore, the vectors $(1,-3,2),(2,1,-3),(-3,2,1)$ form linearly dependent set.