

Assignment 06.

1. $V = \begin{bmatrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & -1 & 0 & 1 \\ 0 & 0 & -1 & 0 & -1 & -1 \end{bmatrix}$

row 1 + row 2 \rightarrow row 2 + row 3 \rightarrow row 3 + row 4.

$E = \begin{bmatrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ (REF).

$\therefore \text{rank} = 3.$

\therefore largest possible number is 3.

2. (a) Independent.

$U = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{bmatrix}$ $E = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -5 & -7 \\ 0 & 0 & 18 \end{bmatrix}$

(b) Dependent.

$W = \begin{bmatrix} 1 & 2 & -3 \\ -3 & 1 & 2 \\ 2 & -3 & 1 \end{bmatrix}$ $E = \begin{bmatrix} 1 & 2 & -3 \\ 0 & 7 & -7 \\ 0 & 0 & 0 \end{bmatrix}$

3. V actually is the row echelon form of Matrix A , namely V and A have the same reduced row echelon form.

So results should be the same.
the choices of columns

Namely: the [1st, 2nd, 3rd] column, and [1st, 2nd, 4th], [2nd, 3rd, 4th].

For U : $u_1 = \begin{bmatrix} 2 & 3 & 4 \\ 0 & 6 & 7 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ $u_2 = \begin{bmatrix} 2 & 3 & 1 \\ 0 & 6 & 0 \\ 0 & 0 & 9 \\ 0 & 0 & 0 \end{bmatrix}$ $u_3 = \begin{bmatrix} 3 & 4 & 1 \\ 6 & 7 & 0 \\ 0 & 0 & 9 \\ 0 & 0 & 0 \end{bmatrix}$

for A : $a_1 = \begin{bmatrix} 2 & 3 & 4 \\ 0 & 6 & 7 \\ 0 & 0 & 0 \\ 4 & 6 & 8 \end{bmatrix}$ $a_2 = \begin{bmatrix} 2 & 3 & 1 \\ 0 & 6 & 0 \\ 0 & 0 & 9 \\ 4 & 6 & 2 \end{bmatrix}$ $a_3 = \begin{bmatrix} 3 & 4 & 1 \\ 6 & 7 & 0 \\ 0 & 0 & 9 \\ 6 & 8 & 2 \end{bmatrix}$