



Transforming a matrix to reduced row echelon form

TRANSFORMING MATRIX TO THE REDUCED ROW ECHELON FORM

Row
Operation
1:

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 2 & 0 & 1 & 3 & 3 & 0 \\ -2 & -4 & 1 & -9 & 7 & 0 \\ 1 & 3 & -1 & 6 & -6 & 0 \end{bmatrix}$$

add -2 times the 1st row to the 2nd row

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \\ -2 & -4 & 1 & -9 & 7 & 0 \\ 1 & 3 & -1 & 6 & -6 & 0 \end{bmatrix}$$

Row
Operation
2:

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \\ -2 & -4 & 1 & -9 & 7 & 0 \\ 1 & 3 & -1 & 6 & -6 & 0 \end{bmatrix}$$

add 2 times the 1st row to the 3rd row

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \\ 0 & -10 & 5 & -15 & 25 & 0 \\ 1 & 3 & -1 & 6 & -6 & 0 \end{bmatrix}$$

Row
Operation
3:

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \\ 0 & -10 & 5 & -15 & 25 & 0 \\ 1 & 3 & -1 & 6 & -6 & 0 \end{bmatrix}$$

add -1 times the 1st row to the 4th row

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \\ 0 & -10 & 5 & -15 & 25 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \end{bmatrix}$$

Row
Operation
4:

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \\ 0 & -10 & 5 & -15 & 25 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \end{bmatrix}$$

multiply the 2nd row by 1/6

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 1 & -\frac{1}{2} & \frac{3}{2} & -\frac{5}{2} & 0 \\ 0 & -10 & 5 & -15 & 25 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \end{bmatrix}$$

Row
Operation
5:

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 1 & -\frac{1}{2} & \frac{3}{2} & -\frac{5}{2} & 0 \\ 0 & -10 & 5 & -15 & 25 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \end{bmatrix}$$

add 10 times the 2nd row to the 3rd row

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 1 & -\frac{1}{2} & \frac{3}{2} & -\frac{5}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \end{bmatrix}$$

Row
Operation

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 1 & -\frac{1}{2} & \frac{3}{2} & -\frac{5}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 6 & -3 & 9 & -15 & 0 \end{bmatrix}$$

add -6 times the 2nd row to the 4th row

$$\begin{bmatrix} 1 & -3 & 2 & -3 & 9 & 0 \\ 0 & 1 & -\frac{1}{2} & \frac{3}{2} & -\frac{5}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

6:

$$\begin{array}{|c|c|c|c|c|c|} \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 6 & -3 & 9 & -15 & 0 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|c|c|c|} \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline \end{array}$$

Row
Operation
7:

$$\begin{array}{|c|c|c|c|c|c|} \hline 1 & -3 & 2 & -3 & 9 & 0 \\ \hline 0 & 1 & -1 & 3 & -5 & 0 \\ \hline 0 & 0 & 2 & 2 & 2 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline \end{array}$$

add 3 times the 2nd row to the 1st row

$$\begin{array}{|c|c|c|c|c|c|} \hline 1 & 0 & 1 & 3 & 3 & 0 \\ \hline 0 & 1 & -1 & 3 & -5 & 0 \\ \hline 0 & 0 & 2 & 2 & 2 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline \end{array}$$