

Step-1

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Let us consider the system $Ax = b$ that is $\begin{pmatrix} 2 & 4 \\ 4 & 8 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 6 \end{pmatrix}$

Considering the augmented matrix $\left[\begin{array}{cc|c} 2 & 4 & 3 \\ 4 & 8 & 6 \end{array} \right]$ and applying the row operations on this, we get $\left[\begin{array}{cc|c} 2 & 4 & 3 \\ 0 & 0 & 0 \end{array} \right]$

$$2x + 4y = 3$$

This is the reduced matrix and so, we write the equations again from this as $\Rightarrow x = -2y + \frac{3}{2}$

So, the solution is $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -2y \\ y \end{bmatrix} + \begin{bmatrix} 3/2 \\ 0 \end{bmatrix}$

$= k \begin{bmatrix} -2 \\ 1 \end{bmatrix} + \begin{bmatrix} 3/2 \\ 0 \end{bmatrix}$ where $y = k$ is the parameter.

So, for infinite values of k , this solution gives infinite constant solutions.

Thus, the given system has infinite solutions in two variables.