

## Step-1

Given system is  $2x + 3y + z = 8$

$$4x + 7y + 5z = 20$$

$$-2y + 2z = 0$$

We have to reduce this system to upper triangular form by two row operations and then solve by back-substitution for  $z, y, x$ .

## Step-2

Given system can be written as

$$\begin{pmatrix} 2 & 3 & 1 & 8 \\ 4 & 7 & 5 & 20 \\ 0 & -2 & 2 & 0 \end{pmatrix}$$

Subtract  $\hat{a}^{\sim}2\hat{a}^{\text{TM}}$  times the row 1 from the row 2

$$\sqcup \begin{pmatrix} 2 & 3 & 1 & 8 \\ 0 & 1 & 3 & 4 \\ 0 & -2 & 2 & 0 \end{pmatrix}$$

Subtract  $\hat{a}^{\sim}2\hat{a}^{\text{TM}}$  times the row 2 from the row 3.

$$\sqcup \begin{pmatrix} 2 & 3 & 1 & 8 \\ 0 & 1 & 3 & 4 \\ 0 & 0 & 8 & 8 \end{pmatrix}$$

which is upper triangular form.

$$\begin{pmatrix} \boxed{2} & 3 & 1 & 8 \\ 0 & \boxed{1} & 3 & 4 \\ 0 & 0 & \boxed{8} & 8 \end{pmatrix}$$

The pivots are circled in

That is 2, 1, 8.

## Step-3

Back ward substitution:-

We have  $2x + 3y + z = 8$

$$y + 3z = 4$$

$$8z = 8$$

$$8z = 8 \Rightarrow \boxed{z = 1}$$

$$y + 3z = 4$$

$$\Rightarrow y + 3(1) = 4$$

$$\Rightarrow \boxed{y = 1}$$

And  $2x + 3y + z = 8$

$$\Rightarrow 2x + 3(1) + 1 = 8$$

$$\Rightarrow \boxed{x = 2}$$

Hence the solution is  $\boxed{x = 2, y = 1, z = 1}$