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NEED 0s here

$$\left[\begin{array}{ccc|c} 1 & -2 & -1 & 2 \\ 2 & -1 & 1 & 4 \\ -1 & 1 & -2 & -4 \end{array} \right]$$

$\begin{matrix} -2R_1+R_2 \\ 1R_1+R_3 \end{matrix}$

$$\left[\begin{array}{ccc|c} 1 & -2 & -1 & 2 \\ 0 & 3 & 3 & 0 \\ 0 & -1 & -3 & -2 \end{array} \right]$$

Need a 1 here

$\frac{1}{3}R_2$

need a 0 here

$$\left[\begin{array}{ccc|c} 1 & -2 & -1 & 2 \\ 0 & 1 & 1 & 0 \\ 0 & -1 & -3 & -2 \end{array} \right]$$

R_2+R_3

$$\left[\begin{array}{ccc|c} 1 & -2 & -1 & 2 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & -2 & -2 \end{array} \right]$$

$-\frac{1}{2}R_3$

need a 1 here

$$\left[\begin{array}{ccc|c} 1 & -2 & -1 & 2 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \end{array} \right]$$

$z=1$

$$\begin{cases} x-2y-z=2 \\ x-2(-1)-1=2 \\ x+2-1=2 \\ x+1=2 \\ x=z-1 \\ \boxed{x=1} \end{cases}$$

Solution $\rightarrow (1, -1, 1)$

Solution Set $\rightarrow \{(1, -1, 1)\}$

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$$\left[\begin{array}{ccc|c} 0 & 3 & -1 & -1 \\ 1 & 5 & -1 & -4 \\ -3 & 6 & 2 & 11 \end{array} \right]$$

$R_1 \leftrightarrow R_2$

$$\left[\begin{array}{ccc|c} 1 & 5 & -1 & -4 \\ 0 & 3 & -1 & -1 \\ -3 & 6 & 2 & 11 \end{array} \right]$$

$3R_1 + R_3$

need a 0 here

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$$\left[\begin{array}{ccc|c} 1 & 5 & -1 & -4 \\ 0 & 3 & -1 & -1 \\ 0 & 21 & -1 & 1 \end{array} \right]$$

$\frac{1}{3}R_2$

$$\left[\begin{array}{ccc|c} 1 & 5 & -1 & -4 \\ 0 & 1 & -\frac{1}{3} & -\frac{1}{3} \\ 0 & 21 & -1 & 1 \end{array} \right]$$

$-21R_2 + R_3$

need a 0 here

$$\left[\begin{array}{ccc|c} 1 & 5 & -1 & -4 \\ 0 & 1 & -\frac{1}{3} & -\frac{1}{3} \\ 0 & 0 & 6 & 6 \end{array} \right]$$

$\frac{1}{6}R_3$

$$\left[\begin{array}{ccc|c} 1 & 5 & -1 & -4 \\ 0 & 1 & -\frac{1}{3} & -\frac{1}{3} \\ 0 & 0 & 1 & 1 \end{array} \right]$$

$Z=1$

need a 1 here

$$\begin{aligned} x + 5y - z &= -4 \\ x + 5(0) - (1) &= -4 \\ x - 1 &= -4 \\ x &= -4 + 1 \\ \mathbf{x} &= \mathbf{-3} \end{aligned}$$

$$\begin{aligned} y - \frac{1}{3}z &= -\frac{1}{3} \\ y - \frac{1}{3}(1) &= -\frac{1}{3} \\ y - \frac{1}{3} &= -\frac{1}{3} \\ y &= -\frac{1}{3} + \frac{1}{3} = 0 \\ \mathbf{y} &= \mathbf{0} \end{aligned}$$

Solution $\rightarrow (-3, 0, 1)$
 Solution Set $\rightarrow \{(-3, 0, 1)\}$