

Math 1090

1.5 Problems

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① $x - y - 8z = 0$

② $y + 4z = 0$

③ $3y + 14z = 22$

Deal w/ ② + ③ first.

② $y + 4z = 0 \Rightarrow y = -4z$

③ $3y + 14z = 22$

Plug $y = -4z$ back into ③ (using substitution).

$$3(-4z) + 14z = 22$$

$$-12z + 14z = 22$$

$$\frac{2z}{2} = \frac{22}{2}$$

$$z = 11$$

Plug $z = 11$ back into ②.

$$y = -4(11) = -44$$

Plug $y = -44$ and $z = 11$ into ①.

$$x - (-44) - 8(11) = 0$$

$$x + 44 - 88 = 0 \Rightarrow x - 44 = 0 \Leftrightarrow x = 44$$

$(44, -44, 11)$

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$$\begin{aligned} \textcircled{1} \quad & x + 4y - 2z = 9 \\ \textcircled{2} \quad & x + 5y + 2z = -2 \\ \textcircled{3} \quad & x + 4y - 28z = 22 \end{aligned}$$

Deal with eqns $\textcircled{1}$ and $\textcircled{3}$ first. (* since they look similar)

$$\textcircled{1} \quad x + 4y - 2z = 9$$

$$\textcircled{3} \quad x + 4y - 28z = 22$$

(use elimination method)

Multiply $\textcircled{3}$ by -1 .

$$\Rightarrow \textcircled{1} \quad x + 4y - 2z = 9$$

(add)

$$+ \quad \textcircled{3} \quad -x - 4y + 28z = -22$$

$$\frac{26z}{26} = \frac{13}{26}$$

$$\boxed{z = \frac{1}{2}}$$

Plug $z = \frac{1}{2}$ into eqns $\textcircled{1}$ and $\textcircled{2}$.

$$\textcircled{1} \quad x + 4y - 1 = 9$$

$$\textcircled{1} \quad x + 4y = 10$$

$$\textcircled{2} \quad x + 5y + 1 = -2$$

$$\Rightarrow \textcircled{2} \quad x + 5y = -3$$

Multiply $\textcircled{1}$ by -1 . (using elimination)

$$\textcircled{1} \quad -x - 4y = -10$$

$$\textcircled{2} \quad x + 5y = -3$$

} add

$$\boxed{y = -13}$$

Plug into $\textcircled{1}$. $\Rightarrow x + 4(-13) = 10$

$$x - 52 = 10 \Leftrightarrow$$

$$\boxed{x = 62}$$