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$$\begin{aligned} 19. \quad x + y - z &= 14 \\ 4x - y + 5z &= 22 \\ 2x + 2y - 3z &= 35 \end{aligned}$$

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Elementary
Row
Operations

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 14 \\ 4 & -1 & 5 & 22 \\ 2 & 2 & -3 & 35 \end{array} \right] \quad \left[\begin{array}{ccc|c} 1 & 0 & 0 & c_1 \\ 0 & 1 & 0 & c_2 \\ 0 & 0 & 1 & c_3 \end{array} \right]$$

$R_1 \cdot 4$
 $+ R_2$
 \rightarrow New R_2

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 14 \\ 0 & -5 & 9 & -78 \\ 2 & 2 & -3 & 35 \end{array} \right] \quad \begin{array}{l} 14 \\ - \\ -78 \\ - \\ 35 \\ - \\ -78 \\ - \\ 7 \end{array}$$

$R_1 \cdot 2$
 $+ R_3$
 \rightarrow New R_3

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 14 \\ 0 & -5 & 9 & -78 \\ 0 & 0 & -5 & 17 \end{array} \right]$$

$R_3 \cdot \frac{1}{-5}$
 \rightarrow New R_3

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 14 \\ 0 & -5 & 9 & -78 \\ 0 & 0 & 1 & -7 \end{array} \right]$$

$R_2 \cdot \frac{1}{-5}$
 \rightarrow New R_2

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 14 \\ 0 & 1 & -9 & \frac{78}{5} \\ 0 & 0 & 1 & -7 \end{array} \right]$$

$R_3 \cdot \frac{9}{5}$
 $+ R_2$
 \rightarrow New R_2

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 14 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -7 \end{array} \right] \quad \begin{array}{l} -7 \cdot \frac{9}{5} \\ \frac{78}{5} \\ + \\ \frac{63}{5} \\ \frac{15}{5} \end{array}$$

$R_3 + R_1$
 \rightarrow New R_1

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -7 \end{array} \right]$$

$R_2 \cdot -1$
 $+ R_1$
 \rightarrow New R_1

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -7 \end{array} \right] \quad \begin{array}{l} x=4 \\ y=3 \\ z=-7 \end{array}$$

(4, 3, -7)

Reduced Row Echelon Form
3x4 rref $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -7 \end{array} \right]$

Home Screen
Matrix
 \rightarrow Math
B rref

Matrix
Name

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -7 \end{array} \right] \quad \begin{array}{l} x=4 \\ y=3 \\ z=-7 \end{array}$$

1st [!]	9th ^o	8th ^o				
2nd ^o	5th or 6th [!]	7th ^o				
3rd ^o	4th ^o	5th or 6th [!]				

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20-28 E

22.
$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 4 & -1 & 1 & -1 \\ 3 & -4 & 3 & -5 \end{array} \right]$$

zero
Opposites

$R_1 \cdot -4$
 R_2
New R_2

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & -13 & 9 & -17 \\ 3 & -4 & 3 & -5 \end{array} \right]$$

$R_1 \cdot -3$ → -3
+ R_3
→ New R_3

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & -13 & 9 & -17 \\ 0 & -13 & 9 & -17 \end{array} \right]$$

$R_2 \cdot -1$
+ R_3
→ New R_3

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & -13 & 9 & -17 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

Infinitely Many Solutions