SOLUTION

$R_3 = R_3 - 4R_1$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 5 \\ 2 & 3 & 5 & 8 \\ 0 & -4 & 1 & -18 \end{array}\right]$$

$R_2 = R_2 - 2R_1$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 5 \\ 0 & 1 & 3 & -2 \\ 0 & -4 & 1 & -18 \end{array}\right]$$

$R_3 = R_3 + 4R_2$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 5 \\ 0 & 1 & 3 & -2 \\ 0 & 0 & 13 & -26 \end{array}\right]$$

$R_3 = \frac{1}{13} R_3$

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

$R_2 = R_2 - 3R_3$

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

$R_1' = R_1 - R_3 - R_2$

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

$x = 3$

$y = 4$

$z = -2$

CHEAT SHEET FOR GRUASS ELIMINATION

STEP 1: Make $a_{11} = 1$, if not already 1

STEP 2: Make $a_{21} = 0$. By $R_2 = R_2 - a_{21} R_1$

STEP 3: Make $a_{31} = 0$. By $R_3 = R_3 - a_{31} R_1$

STEP 4: Make $a_{32} = 0$. By $R_3 = R_3 - a_{32} R_2$. But only if R_2's $a_{22} = 1$. If it isn't make it 1 before step 4 By. $R_2 = \frac{1}{a_{22}} \cdot R_2$

STEP 5: Make $a_{33} = 1$. if not already 1

STEP 6: When all diagonals are 1 and a_{21}, a_{31}, a_{32} are all ZERO we can solve for x and then y and then z

OR

STEP 6: Make a_{12}, a_{13} and $a_{23} = 0$. To easily pick x, y and z result