Math 12H Answer Key Section 9.3 pp 657-58

#6) $x + y - 3z = 8$

$y - 3z = 5$

$z = -1$

$y - 3(-1) = 5 \quad y + 3 = 5 \quad y = 2$

$x + y - 3z = 8 \quad x + (2) - 3(-1) = 8 \quad x + 2 + 3 = 8 \quad x = 3$

$x = 3,\ y = 2,\ z = -1 \qquad (3, 2, -1)$

#8) $x - 2y + 3z = 10$

$2y - z = 2$

$3z = 12 \quad z = 4$

$2y - (4) = 2 \quad 2y = 6 \quad y = 3$

$x - 2y + 3z = 10 \quad x - 2(3) + 3(4) = 10 \quad x - 6 + 12 = 10 \quad x = 4$

$x = 4,\ y = 3,\ z = 4 \qquad (4, 3, 4)$

#10) $4x + 3z = 10$

$2y - z = -6$

$\frac{1}{2}z = 4 \quad z = 8$

$2y - (8) = -6 \quad 2y = 2 \quad y = 1$

$4x + 3(8) = 10 \quad 4x + 24 = 10 \quad 4x = -14 \quad x = \frac{-14}{4} = -3\frac{1}{2}$

$x = -3\frac{1}{2},\ y = 1,\ z = 8 \qquad (-3\frac{1}{2}, 1, 8)$

#16) $\begin{matrix} x+y+z=0 \\ -x+2y+5z=3 \\ 3x-y=6 \end{matrix}$ $R_1+R_2 \rightarrow$ $\begin{matrix} x+y+z=0 \\ / \; 3y+6z=3 \\ 3x-y=6 \end{matrix}$

$\begin{matrix} x+y+z=0 \\ 3y+6z=3 \\ 3x-y=6 \end{matrix}$ $-3R_1+R_3$

$\begin{matrix} x+y+z=0 \\ 3y+6z=3 \\ / \; -4y-3z=6 \end{matrix}$ $\begin{matrix} \\ \\ 3R_2 \end{matrix}$ $4R_2$

$\begin{matrix} x+y+z=0 \\ 12y+24z=12 \\ -12y-9z=18 \end{matrix}$

$\begin{matrix} x+y+z=0 \\ 12y+24z=12 \\ -12y-9z=18 \end{matrix}$ R_2+R_3

$\begin{matrix} x+y+z=0 \\ 12y+24z=12 \\ / \; 15z=30 \end{matrix}$ $\leftarrow z=2$

$x+(-3)+2=0 \quad x=1$

$12y+48=12 \rightarrow y=-3$

$x=1, \; y=-3, \; z=2 \qquad (1,-3,2)$

#20) $\begin{matrix} 2x+y-z=-8 \\ -x+y+z=3 \\ -2x+4z=18 \end{matrix}$

$\begin{matrix} -x+y+z=3 \\ 2x+y-z=-8 \\ -2x+4z=18 \end{matrix}$ $\begin{matrix} \\ +2R_1+R_2 \\ -2R_1+R_3 \end{matrix}$

$\begin{matrix} -x+y+z=3 \\ / \; +3y+z=-2 \\ / \; -2y+2z=12 \end{matrix}$

$\begin{matrix} -x+y+z=3 \\ 3y+z=-2 \\ -2y+2z=12 \end{matrix}$ $2R_2+3R_3$

$\begin{matrix} -x+y+z=3 \\ 3y+z=-2 \\ / \; +8z=32 \end{matrix}$

$z=4$

$3y+4=-2 \rightarrow y=-2$

$-x+(-2)+4=3 \quad x=-1$

$x=-1, \; y=-2, \; z=4 \qquad (-1,-2,4)$