HW # 29 (10.2) 8, 10, 12, 18, 20, 22, 26, 28, 30, 38

8) $\begin{cases} x+y-3z=8 \\ y-3z=5 \\ z=-1 \end{cases}$

$y-3(-1)=5$ $\quad x+(2)-3(-1)=8$

$y+3=5$ $\quad x+5=8$

$y=2$ $\quad x=3$

$\boxed{(3,2,-1)}$

10) $\begin{cases} x-2y+3z=10 \\ 2y-z=2 \\ 3z=12 \end{cases}$

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

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

$y=3$ $\quad x=4$

$\boxed{(4,3,4)}$

12) $\begin{cases} 4x+3z=10 \\ 2y-z=-6 \\ \frac{1}{2}z=4 \end{cases}$

$\frac{1}{2}z=4$ $\quad 2y-(8)=-6$ $\quad 4x+3(8)=10$

$z=8$ $\quad 2y=2$ $\quad 4x=-14$

$y=1$ $\quad x=-\frac{7}{2}$

$\boxed{(-\frac{7}{2},1,8)}$

18) $\begin{cases} x-y+z=0 \\ y+2z=-2 \\ x+y-z=2 \end{cases} \rightarrow 2x=2$

$x=1$

$(1)-y+z=0$

$y+2z=-2$ $\rightarrow 1+3z=-2$

$3z=-3$

$z=-1$

$y+2(-1)=-2$

$y=0$

$\boxed{(1,0,-1)}$

20) $\begin{cases} x+y+z=0 \\ -x+2y+5z=3 \\ 3x-y=6 \end{cases}$

$y=-6+3x \Rightarrow$ $\quad x+-6+3x+z=0 \Rightarrow (4x+z=6)\cdot -5 \Rightarrow -20x-5z=-30$

$-x+-12+6x+5z=3$ $\quad 5x+5z=15$ $\quad +\ 5x+5z=15$

$-15x+0z=-15$

$x=1$

$3(1)-y=6$ $\quad (1)+(-3)+z=0$

$y=-3$ $\quad z=2$

$\boxed{(1,-3,2)}$

22) $\begin{cases} x-y+2z=2 \\ 3x+y+5z=8 \\ 2x-y-2z=-7 \end{cases} \rightarrow (4x+7z=10)\cdot 5 \rightarrow 0x+23z=46$

$(5x+3z=1)\cdot -4$

$z=2$

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

$5x=-5$ $\quad -y=-1$

$x=-1$ $\quad y=1$

$\boxed{(-1,1,2)}$

26, 28, 30, 38

26) $\begin{cases} 2y + z = 3 \\ 5x + 4y + 3z = -1 \\ x - 3y = -2 \end{cases}$

$x = -2 + 3y$

$x = -2 + 3(0)$

$x = -2$

$5(-2+3y) + 4y + 3z = -1 \Rightarrow$

$5(-2) + 4(0) + 3z = -1$

$3z = 9$

$z = 3$

$19y + 3z = 9$

$-3(2y + z = 3)$

$13y + 0z = 0$

$y = 0$

$\boxed{(-2, 0, 3)}$

28) $\begin{cases} -x + 2y + 5z = 4 \\ x - 2z = 0 \\ 4x - 2y - 11z = 2 \end{cases}$

$3x - 6z = 6$

$-3 \cdot (x - 2z = 0)$

$0x + 0z = 6$

$0 = 6$ False!

System is inconsistant

30) $\begin{cases} x - 2y - 3z = 5 \\ 2x + y - z = 5 \\ 4x - 2y - 11z = 5 \end{cases}$

$\Rightarrow \begin{cases} x - 2y - 3z = 5 \\ 5y + 5z = -5 \\ 5y + 5z = 5 \end{cases} \Rightarrow \begin{cases} x - 2y - 3z = 5 \\ 5y + 5z = -5 \\ 0 = 10 \end{cases}$ False!

system is inconsistant

38) x = amount invested @ 4%; y = amount invested @ 6%; z = amount invested @ 8%

$\begin{cases} \text{Total money: } x + y + z = 100{,}000 \\ \text{annual income: } 0.04x + 0.06y + 0.08z = 6700 \\ \text{Equal amounts: } y = z \end{cases}$

$\Rightarrow \begin{cases} x + y + z = 100000 \\ 4x + 6y + 8z = 670000 \\ y - z = 0 \end{cases} \Rightarrow \begin{cases} x + y + z = 100000 \\ 2y + 4z = 270000 \\ y - z = 0 \end{cases}$

$\Rightarrow \begin{cases} x + y + z = 100000 \\ 2y + 4z = 270000 \\ -6z = -270000 \end{cases}$

So, $z = 45000$ $\quad y = z = 45000$

$x + 45000 + 45000 = 100000$

$x = 10000$

so,

$\boxed{\begin{array}{l} \$10{,}000 \rightarrow \text{short term} \\ \$45{,}000 \rightarrow \text{intermediate term} \\ \$45{,}000 \rightarrow \text{long term} \end{array}}$