1.

a. $\begin{pmatrix}4 & 0 & -3\\ 0 & 1 & 5\\ 1 & 1 & 1\end{pmatrix}\begin{pmatrix}x_1\\ x_2\\ x_3\end{pmatrix}=\begin{pmatrix}5\\ 8\\ 6\end{pmatrix}\rightarrow\begin{pmatrix}4 & 0 & -3 & 5\\ 0 & 1 & 5 & 8\\ 1 & 1 & 1 & 6\end{pmatrix}\rightarrow R_1\leftrightarrow R_3\rightarrow$
$\begin{pmatrix}1 & 1 & 1 & 6\\ 0 & 1 & 5 & 8\\ 4 & 0 & -3 & 5\end{pmatrix}\rightarrow R_3-4R_1\rightarrow\begin{pmatrix}1 & 1 & 1 & 6\\ 0 & 1 & 5 & 8\\ 0 & -4 & -7 & -19\end{pmatrix}\rightarrow R_3+4R_2\rightarrow$
$\begin{pmatrix}1 & 1 & 1 & 6\\ 0 & 1 & 5 & 8\\ 0 & 0 & 13 & 13\end{pmatrix}\rightarrow\frac{R_3}{13}\rightarrow\begin{pmatrix}1 & 1 & 1 & 6\\ 0 & 1 & 5 & 8\\ 0 & 0 & 1 & 1\end{pmatrix}$

i. $x_3=1$
ii. $x_2=3$
iii. $x_1=2$

b. $\begin{pmatrix}1 & a & -2\\ 2 & -2 & 3\end{pmatrix}\rightarrow R_2-2R_1\rightarrow\begin{pmatrix}1 & a & -2\\ 0 & -2-2a & 7\end{pmatrix}$

i. $x_2=-\frac{7}{2(a+1)}$
ii. $x_1=-2+\frac{7a}{2(a+1)}$

2. $\begin{pmatrix}4a+2b+o=2.5\\ a+b+0o=0.75\\ 2b+2o=0.5\end{pmatrix}\rightarrow\begin{pmatrix}4 & 2 & 1 & 2.5\\ 1 & 1 & 0 & 0.75\\ 0 & 2 & 2 & 0.5\end{pmatrix}\rightarrow R_1\leftrightarrow R_2\rightarrow\begin{pmatrix}1 & 1 & 0 & 0.75\\ 4 & 2 & 1 & 2.5\\ 0 & 2 & 2 & 0.5\end{pmatrix}\rightarrow R_2-$
$4R_1\rightarrow\begin{pmatrix}1 & 1 & 0 & 0.75\\ 0 & -2 & 1 & -0.5\\ 0 & 2 & 2 & 0.5\end{pmatrix}\rightarrow(R_2+R_3)/3\rightarrow\begin{pmatrix}1 & 1 & 0 & 0.75\\ 0 & 0 & 1 & 0\\ 0 & 2 & 2 & 0.5\end{pmatrix}\rightarrow R_2\leftrightarrow\frac{R_3}{2}\rightarrow$
$\begin{pmatrix}1 & 1 & 0 & 0.75\\ 0 & 1 & 1 & 0.25\\ 0 & 0 & 1 & 0\end{pmatrix}$

a. Oranges are free ($0)
b. Bananas are $0.25
c. Apples are $0.50

3. $\begin{pmatrix}1 & 0 & 1 & 0\\ 1 & 1 & 0 & 0\\ 1 & 1 & 1 & 1\\ 1 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}x_1\\ x_2\\ x_3\\ x_3\end{pmatrix}=\begin{pmatrix}0.63\\ 1.25\\ 2.78\\ 1.44\end{pmatrix}\rightarrow R_2-R_1\rightarrow R_3-R_1\rightarrow R_4-R_1\rightarrow R_3-R_2\rightarrow R_1-$
$R_3\rightarrow R_2+R_3\rightarrow R_4+R_3\rightarrow\frac{R_4}{2}\rightarrow R_1+R_4\rightarrow R_2-R_4\rightarrow R_3-R_4\rightarrow$
$\begin{pmatrix}1 & 0 & 0 & 0 & 0.27\\ 0 & 1 & 0 & 0 & 0.98\\ 0 & 0 & 1 & 0 & 0.36\\ 0 & 0 & 0 & 1 & 1.17\end{pmatrix}$

a. $x_1=0.27$
b. $x_2=0.98$
c. $x_3=0.36$
d. $x_4=1.17$