

a) write in matrix form:

$$\begin{pmatrix} 1 & -0.75 & 0 & 0 \\ 1 & -1 & -1 & 1 \\ -0.2 & 0 & 1 & -0.2 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} C \\ Y \\ S \\ I \end{pmatrix} = \begin{pmatrix} 95 \\ 0 \\ -34 \\ 95 \end{pmatrix}$$

we have $I = 95$, so substitute in other three equations:

(b) ④

③ • $I = 95$

③ • $S = 0.2C + 0.2I - 34 \Rightarrow S = 0.2C + \left(\frac{1}{5}\right)(95) - 34 \Rightarrow$

$\Rightarrow S = 0.2C + 19 - 34 \Rightarrow$

$\Rightarrow \boxed{S = 0.2C - 15} \text{ (3')}$

② diff: $Y = C - S + 95 \text{ (2')}$

→ insert (3') into (2') so that we get Y only in terms of C

(2') $\Rightarrow Y = C - 0.2C + 15 + 95 \Rightarrow$

$\Rightarrow Y = (1 - 0.2)C + 110$

$\Rightarrow \boxed{Y = 0.8C + 110} \text{ (2'')}$

① • Insert (2'') in (1) to get C in terms of just C :

$C = 0.75 \cdot 0.8C + 0.75 \cdot 110 + 95$

$\Rightarrow C = \frac{3}{4} \cdot \frac{4}{5} \cdot C + \frac{3}{4} \cdot 110 + 95$

$\Rightarrow C = \frac{3}{5} \cdot C + \frac{330}{4} + 95$

$\Rightarrow C = 0.6C + \frac{330}{4} + 95$

$\Rightarrow (1 - 0.6)C = \frac{330}{4}$

$\Rightarrow C = \frac{82.5 + 95}{0.4}$

$\boxed{I = 95}$

$\Rightarrow C = \frac{177.5}{0.4} \Rightarrow \boxed{C = 443.75}$

• Insert C in (2'')

$Y = (0.8) \cdot (443.75) + 110 = 355 + 110 = \boxed{465 = Y}$

• Insert C in (3') : $S = (0.2)(443.75) - 15 = 88.75 - 15 = \boxed{73.75 = S}$