

# Further Mathematics Units 3 & 4

Cambridge Senior Further Mathematics AC/VCE Units 3 & 4  
 Chapters 13 Revision: Matrices: **Assignment**

## Answers to Chapter 13 Assignment

$$1 \quad \mathbf{a} \quad \begin{bmatrix} 3 & 2 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 0 \\ 2 & 4 & 2 & 1 & 1 \\ 1 & 3 & 1 & 0 & 0 \\ 0 & 2 & 1 & 1 & 0 \end{bmatrix} \begin{bmatrix} t \\ c \\ r \\ w \\ d \end{bmatrix} = \begin{bmatrix} 6030 \\ 1930 \\ 9680 \\ 5850 \\ 4730 \end{bmatrix}$$

**b**

<i>Item</i>	<i>TV</i>	<i>Computer</i>	<i>Refrigerator</i>	<i>Washing machine</i>	<i>Dryer</i>
Average cost	\$320	\$1560	\$850	\$760	\$340

$$2 \quad \mathbf{a} \quad T = \begin{bmatrix} 0.66 & 0.04 & 0.04 & 0.08 \\ 0.09 & 0.84 & 0.15 & 0.09 \\ 0.13 & 0.08 & 0.77 & 0.07 \\ 0.12 & 0.04 & 0.04 & 0.76 \end{bmatrix} \begin{matrix} A \\ C \\ M \\ S \end{matrix}$$

$$\mathbf{b} \quad S_0 = \begin{bmatrix} 25 \\ 25 \\ 25 \\ 25 \end{bmatrix} \begin{matrix} A \\ C \\ M \\ S \end{matrix}$$

$$\mathbf{c} \quad \mathbf{i} \quad S_1 = \begin{bmatrix} 20.5 \\ 29.25 \\ 26.25 \\ 24 \end{bmatrix} \begin{matrix} A \\ C \\ M \\ S \end{matrix}$$

Adelaide 21 cars, Canberra 29 cars, Melbourne 26 cars, Sydney 24 cars

$$\mathbf{ii} \quad S_6 = \begin{bmatrix} 13.5 \\ 39.4 \\ 27.4 \\ 19.7 \end{bmatrix} \begin{matrix} A \\ C \\ M \\ S \end{matrix}$$

Adelaide 14 cars, Canberra 39 cars, Melbourne 27 cars, Sydney 20 cars

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$$\text{iii} \quad S_{\text{longterm}} = \begin{bmatrix} 12.4 \\ 42.5 \\ 27.2 \\ 17.8 \end{bmatrix} \begin{matrix} A \\ C \\ M \\ S \end{matrix}$$

Adelaide 12 cars, Canberra 43 cars, Melbourne 27 cars, Sydney 18 cars. Correct to one decimal place, it takes 22 weeks to reach this steady state solution.