

Chapter 4 Matrices: **Assignment**

Name: \_\_\_\_\_

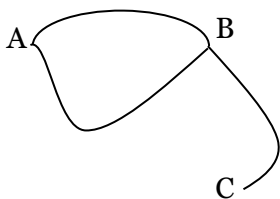
- 1 The matrix shows the number of hours that Bob and Estie have been studying each subject during the past week.

	English	Maths	History
Bob	2	5	2
Estie	3	4	1

- a How many hours did Bob spend studying Maths?
  - b On which subject did Estie spend the least time?
  - c What was the total number of hours that each person spent studying?
  - d What was the total time spent studying Maths?
- 2 a Give the order of the matrix  $A$ .

$$A = \begin{bmatrix} 3 & -2 \\ 0 & 7 \\ -6 & 4 \end{bmatrix}$$

- b State the value of the elements:
    - i  $a_{2,1}$
    - ii  $a_{1,2}$
    - iii  $a_{2,2}$
- 3 Write a matrix to represent the direct connections between towns  $A$ ,  $B$  and  $C$  in the diagram shown.



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- 4 Using the matrices  $B$  and  $C$

$$B = \begin{bmatrix} 3 & -2 \\ 1 & 6 \end{bmatrix} \quad C = \begin{bmatrix} -4 & -5 \\ 7 & 8 \end{bmatrix}$$

Find:

- a  $B+C$
  - b  $B-C$
  - c  $5B$
  - d  $3B-2C$
  - e  $BC$
  - f  $B^{-1}$
- 5 Dodgy Dave's Car Yard, "Where Bargains are Hard to Drive", recorded the sales of cars and vans by Dave and Dudley in the matrix  $S$ .
- Each car sold for \$10000 and came with 12 months' supply of free petrol. Each van sold for \$9000 and came with 6 months' supply of free petrol. This is recorded in matrix  $P$ .

$$S = \begin{matrix} & \begin{matrix} \text{Cars} & \text{vans} \end{matrix} \\ \begin{matrix} \text{Dave} \\ \text{Dudley} \end{matrix} & \begin{bmatrix} 8 & 7 \\ 5 & 9 \end{bmatrix} \end{matrix} \quad P = \begin{matrix} \begin{matrix} \$ & \text{Petrol} \end{matrix} \\ \begin{matrix} \text{Car} \\ \text{Van} \end{matrix} & \begin{bmatrix} 10000 & 12 \\ 9000 & 6 \end{bmatrix} \end{matrix}$$

Use matrix multiplication to find a matrix showing the total value of the sales and the total number of months of free petrol given by each salesman.

- 6 Use matrix methods on your CAS calculator to solve the simultaneous equations:

$$\begin{aligned} 7x - 2y &= 31 \\ 9x - 4y &= 47 \end{aligned}$$

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- 7 The monthly sales each salesperson has made for four car brands is shown in the matrix  $S$  below.

$$S = \begin{array}{l} \text{Andrew} \\ \text{Blake} \\ \text{Cate} \end{array} \begin{array}{cccc} \text{Ford} & \text{Holden} & \text{Kia} & \text{Toyota} \\ \left[ \begin{array}{cccc} 9 & 11 & 8 & 13 \\ 8 & 7 & 5 & 4 \\ 10 & 6 & 14 & 12 \end{array} \right] \end{array} \quad R = \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \end{bmatrix}$$

What information would be obtained by the matrix product?

- 8 The matrix below shows when communication exists between people in the group Alex, Beth, Chen and Dom. Communication between two people is shown by a 1 and no communication by a 0.

$$\begin{array}{cccc} A & B & C & D \\ \left[ \begin{array}{cccc} 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{array} \right] & A \\ & B \\ & C \\ & D \end{array}$$

Draw a diagram with double-headed arrows connecting the people who communicate with each other.