

## Further Practice

12. Find the values of the unknowns in each of the following.

(a)  $\begin{pmatrix} a+b & a-b \end{pmatrix} = \begin{pmatrix} -2 & 10 \end{pmatrix}$

(b)  $\begin{pmatrix} 7 & 2c+d & 3 \\ 0 & -5 & 17 \end{pmatrix} = \begin{pmatrix} 7 & -6 & 3 \\ 0 & -5 & -c+3d \end{pmatrix}$

(c)  $\begin{pmatrix} 9 & 3e+1 \\ 2f & 7 \end{pmatrix} = \begin{pmatrix} 9 & f \\ 7e-1 & 7 \end{pmatrix}$

(d)  $\begin{pmatrix} w+2x \\ w-x-4 \\ y \end{pmatrix} = \begin{pmatrix} -w+x \\ 4w+x \\ 2w-5x \end{pmatrix}$

13. The official reporting and leaving times in a company are 9 a.m. and 5 p.m. respectively. The actual reporting and leaving times of Mr Liew on 5 consecutive working days are represented by the matrices

$$\begin{array}{ccccc} & \text{Reporting time} & & & \text{Leaving time} \\ \mathbf{R} = \begin{pmatrix} 0850 \\ 0855 \\ 0900 \\ 0905 \\ 0905 \end{pmatrix} & \begin{array}{l} \text{Mon} \\ \text{Tue} \\ \text{Wed} \\ \text{Thu} \\ \text{Fri} \end{array} & \text{and} & \mathbf{L} = \begin{pmatrix} 1650 \\ 1715 \\ 1700 \\ 1710 \\ 1655 \end{pmatrix} & \begin{array}{l} \text{Mon} \\ \text{Tue} \\ \text{Wed} \\ \text{Thu} \\ \text{Fri} \end{array} \end{array}$$

respectively.

(a) List the day on which Mr Liew was late for work and left early.

(b) List the days on which Mr Liew worked more than the official number of working hours.

14. The following table shows the prices, in dollars, of two models of printers in three shops.

	Shop A	Shop B	Shop C
Model 1	97	95	100
Model 2	101	105	103

(a) Represent the data in the above table by a  $2 \times 3$  matrix  $\mathbf{P}$ .

(b) In which shop is the price of model 1 printer the lowest?

(c) (i) Divide the sum of the elements in the second row of  $\mathbf{P}$  by 3.

(ii) Interpret the result in (i).

15. It is given that  $\mathbf{A} = \begin{pmatrix} 2 & 3 \\ -5 & -1 \end{pmatrix}$ ,  $\mathbf{B} = \begin{pmatrix} 2 & -4 \\ -2 & 6 \end{pmatrix}$  and  $\mathbf{C} = \begin{pmatrix} -1 & 2 \\ 7 & -3 \end{pmatrix}$ .

Evaluate each of the following.

(a)  $\mathbf{A} + \mathbf{B} + \mathbf{C}$

(c)  $3\mathbf{A} + \mathbf{B} + 2\mathbf{C}$

(e)  $3\mathbf{C} - 2(\mathbf{B} - 2\mathbf{A})$

(g)  $\mathbf{A} + 3\left(\mathbf{C} - \frac{1}{2}\mathbf{B}\right)$

(b)  $\mathbf{A} - (\mathbf{B} + \mathbf{C})$

(d)  $-2\mathbf{A} + 3\mathbf{B} - 5\mathbf{C}$

(f)  $\frac{1}{2}\mathbf{B} + \mathbf{C} - 4\mathbf{A}$

(h)  $2\left(\mathbf{A} + \frac{5}{2}\mathbf{B}\right) - 4\mathbf{C}$