

Answer **all** the questions.

- 1 (a) Solve the equation  $\frac{x}{x^2 - 3x - 4} - \frac{x + 5}{4 - x} = 1$ . [3]
- (b) Make  $t$  the subject in the formula  $x = 2t\sqrt{\frac{k^2}{2k^2 + 3t^2}}$ . [3]
- (c) Simplify the expression  $\sqrt[3]{\frac{y}{x^2}} \times \frac{y}{x} \div \sqrt{9y^{-2}}$ . [2]

- 2 A shop sells two flavours of ice-cream, Rum Raisin and Super Chunkies. Each flavour is sold in cups of three different sizes, small, medium and large, and of different prices. The sales in two successive days are given in the table below.

Size	Saturday			Sunday		
	Small	Medium	Large	Small	Medium	Large
Cost of ice-cream per cup	\$2.50	\$3.20	\$4.50	\$2.50	\$3.20	\$4.50
Number of cups of Rum Raisin sold	12	17	8	14	12	10
Number of cups of Super Chunkies sold	18	15	11	13	21	16

The information for Saturday's sales can be represented by the matrix,

$\mathbf{M} = \begin{pmatrix} 12 & 17 & 8 \\ 18 & 15 & 11 \end{pmatrix}$  and the cost of each flavour for each size can be represented by the matrix

$\mathbf{C} = \begin{pmatrix} 2.5 \\ 3.2 \\ 4.5 \end{pmatrix}$ . The information for the Sunday's sales can be represented by a  $2 \times 3$  matrix  $\mathbf{N}$ .

- (a) Write down the matrix  $\mathbf{N}$ . [1]
- (b) Calculate  $\mathbf{P} = (\mathbf{M} + \mathbf{N})$ . [1]
- (c) Describe what is represented by the elements in  $\mathbf{P}$ . [1]
- (d) Calculate  $\mathbf{Q} = \frac{1}{2}\mathbf{PC}$ . [2]
- (e) Describe what is represented by the elements of  $\mathbf{Q}$ . [1]
- (f) Calculate and describe what is represented by the elements of  $\mathbf{R} = (\mathbf{1} \ \mathbf{1})\mathbf{PC}$ . [2]