

- 1 The lowest temperature recorded at Scott Base in Antarctica is  $-57.0^{\circ}\text{C}$ .  
The highest temperature recorded at Scott Base is  $63.8^{\circ}\text{C}$  more than this.

What is the highest temperature recorded at Scott Base?

..... $^{\circ}\text{C}$  [1]

- 2 Calculate.

$$\frac{5}{8} + \sqrt[3]{340}$$

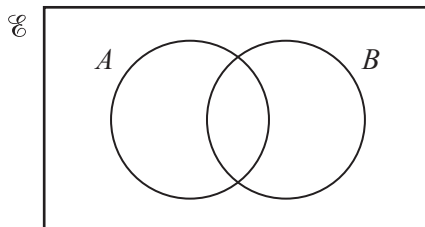
..... [1]

- 3 Expand.

$$a(a^3 + 3)$$

..... [1]

- 4 On the Venn diagram, shade the region  $(A \cap B)'$ .



[1]

- 5 The mass, correct to the nearest kilogram, of each of 11 parcels is shown below.

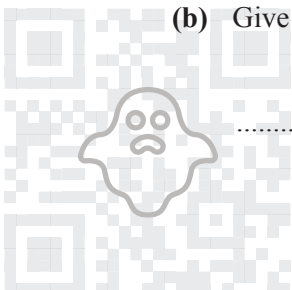
24 23 23 26 25 27 18 96 16 17 32

- (a) Find the mode.

..... kg [1]

- (b) Give a reason why the mean would be an unsuitable average to use.

..... [1]



6 The table shows how children in Ivan’s class travel to school.

Travel to school	Number of children
Walk	12
Car	7
Bicycle	9
Bus	4

Ivan wants to draw a pie chart to show this information.

Find the sector angle for children who walk to school.

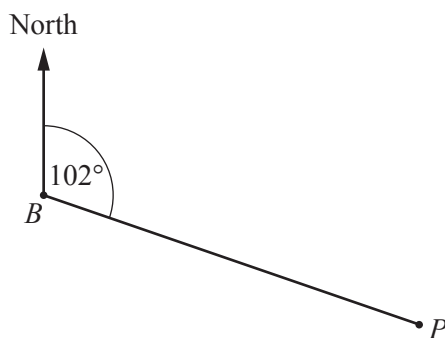
..... [2]

7 Rashid changes 30 000 rupees to dollars when the exchange rate is \$1 = 68.14 rupees.

How many dollars does he receive?

\$ ..... [2]

8



NOT TO SCALE

The bearing of  $P$  from  $B$  is  $102^\circ$ .

Find the bearing of  $B$  from  $P$ .

..... [2]



9 Solve the inequality.

$$\frac{x}{2} - 13 > 12 + 3x$$

..... [2]

10 Write the recurring decimal  $0.6\dot{7}$  as a fraction.  
Show all your working and give your answer in its simplest form.

..... [2]

11 **Without using a calculator**, work out  $3\frac{5}{8} - 1\frac{2}{3}$ .  
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

12 A regular polygon has an interior angle of  $176^\circ$ .  
Find the number of sides of this polygon.

..... [3]



- 13 Two mathematically similar containers have heights of 30 cm and 75 cm. The larger container has a capacity of 5.5 litres.

Calculate the capacity of the smaller container.  
Give your answer in millilitres.

..... ml [3]

- 14 Show that the line  $4y = 5x - 10$  is perpendicular to the line  $5y + 4x = 35$ .

[3]

- 15 Esme buys  $x$  magazines at \$2.45 each and  $y$  cards at \$3.15 each.

(a) Write down an expression, in terms of  $x$  and  $y$ , for the total cost, in dollars, of the magazines and the cards.

\$ ..... [2]

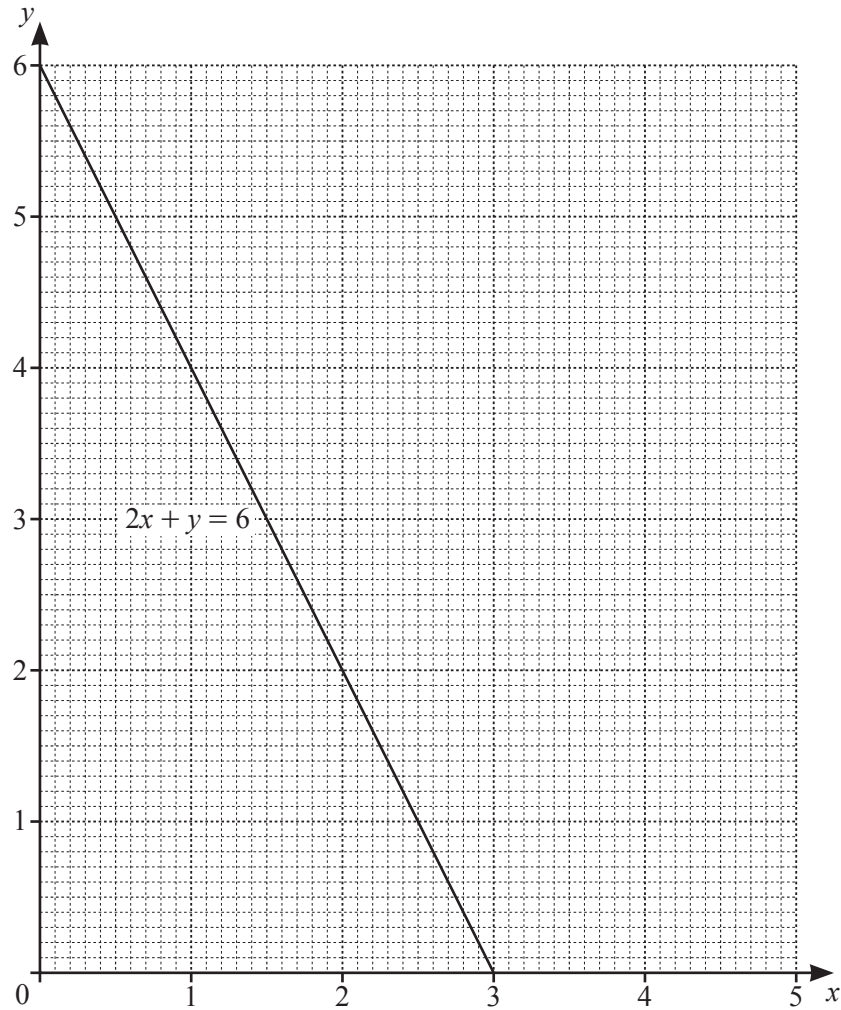
(b) Esme spends \$60.55 in total.  
She buys 8 magazines.

How many cards does she buy?

..... [2]



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By shading the **unwanted** regions of the grid, find and label the region  $R$  that satisfies the following inequalities.

$$y \leq 5$$

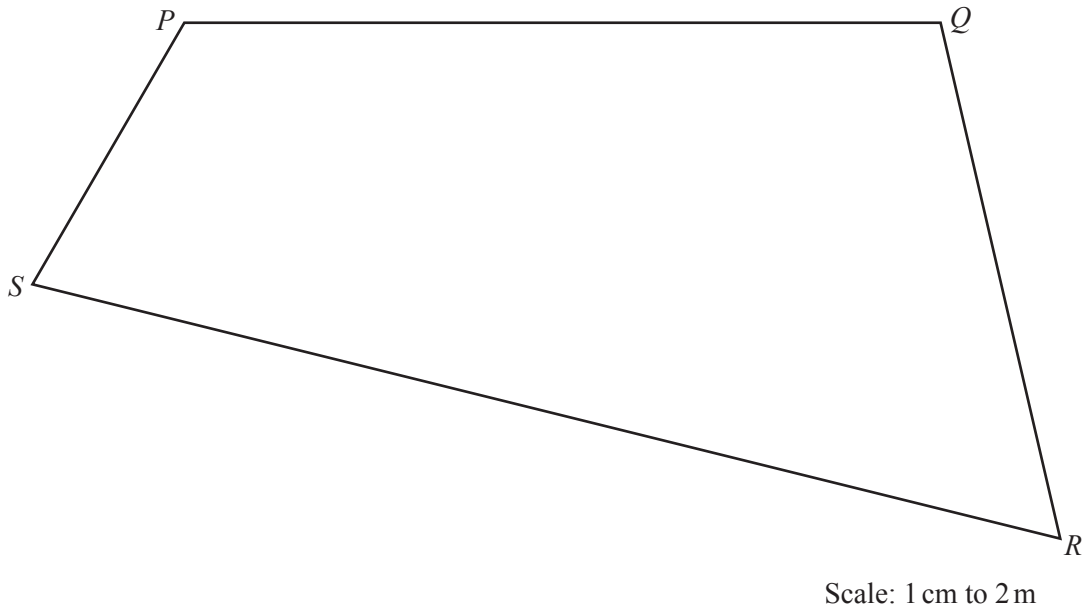
$$2x + y \geq 6$$

$$y \geq x + 1$$

[4]



- 17 The diagram shows a scale drawing of Lei's garden,  $PQRS$ .  
The scale is 1 centimetre represents 2 metres.



Lei has a bird table in the garden that is

- equidistant from  $PQ$  and  $QR$
- and
- 13 m from  $R$ .

On the diagram, construct the position of the bird table.

Use a ruler and compasses only and show all your construction arcs.

[4]

- 18 Harris is taking a driving test.  
The probability that he passes the driving test at the first attempt is 0.6 .  
If he fails, the probability that he passes at any further attempt is 0.75 .

Calculate the probability that Harris

- (a) passes the driving test at the second attempt,

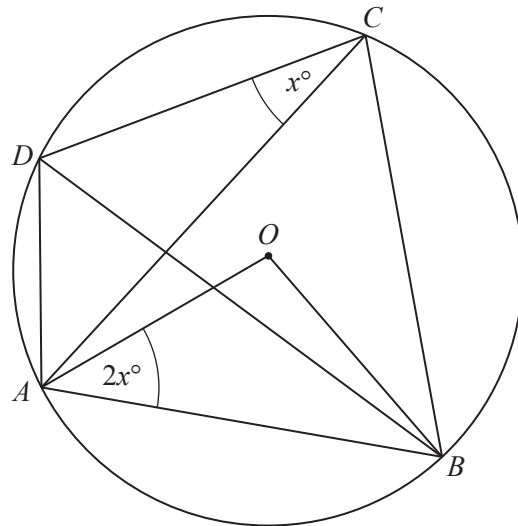
..... [2]

- (b) takes no more than three attempts to pass the driving test.

..... [2]



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NOT TO SCALE

In the diagram,  $A$ ,  $B$ ,  $C$  and  $D$  lie on the circumference of a circle, centre  $O$ .  
 Angle  $ACD = x^\circ$  and angle  $OAB = 2x^\circ$ .

Find an expression, in terms of  $x$ , in its simplest form for

(a) angle  $AOB$ ,

Angle  $AOB = \dots\dots\dots$  [1]

(b) angle  $ACB$ ,

Angle  $ACB = \dots\dots\dots$  [1]

(c) angle  $DAB$ .

Angle  $DAB = \dots\dots\dots$  [2]



20 (a) Factorise.  
 $18y - 3ay + 12x - 2ax$

..... [2]

(b) Factorise.  
 $3x^2 - 48y^2$

..... [3]

21 (a)  $3^{-2} \times 3^x = 81$   
Find the value of  $x$ .

$x =$  ..... [2]

(b)  $x^{-\frac{1}{3}} = 32x^{-2}$   
Find the value of  $x$ .

$x =$  ..... [3]





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$$\mathbf{A} = \begin{pmatrix} 3 & 2 \\ -5 & 0 \end{pmatrix}$$

$$\mathbf{B} = \begin{pmatrix} -2 & 5 \\ 4 & 1 \end{pmatrix}$$

$$\mathbf{C} = (-1 \ k)$$

(a) Find  $\mathbf{AB}$ .

$$\begin{pmatrix} & \\ & \end{pmatrix} \quad [2]$$

(b)  $\mathbf{CA} = (-13 \ -2)$

Find the value of  $k$ .

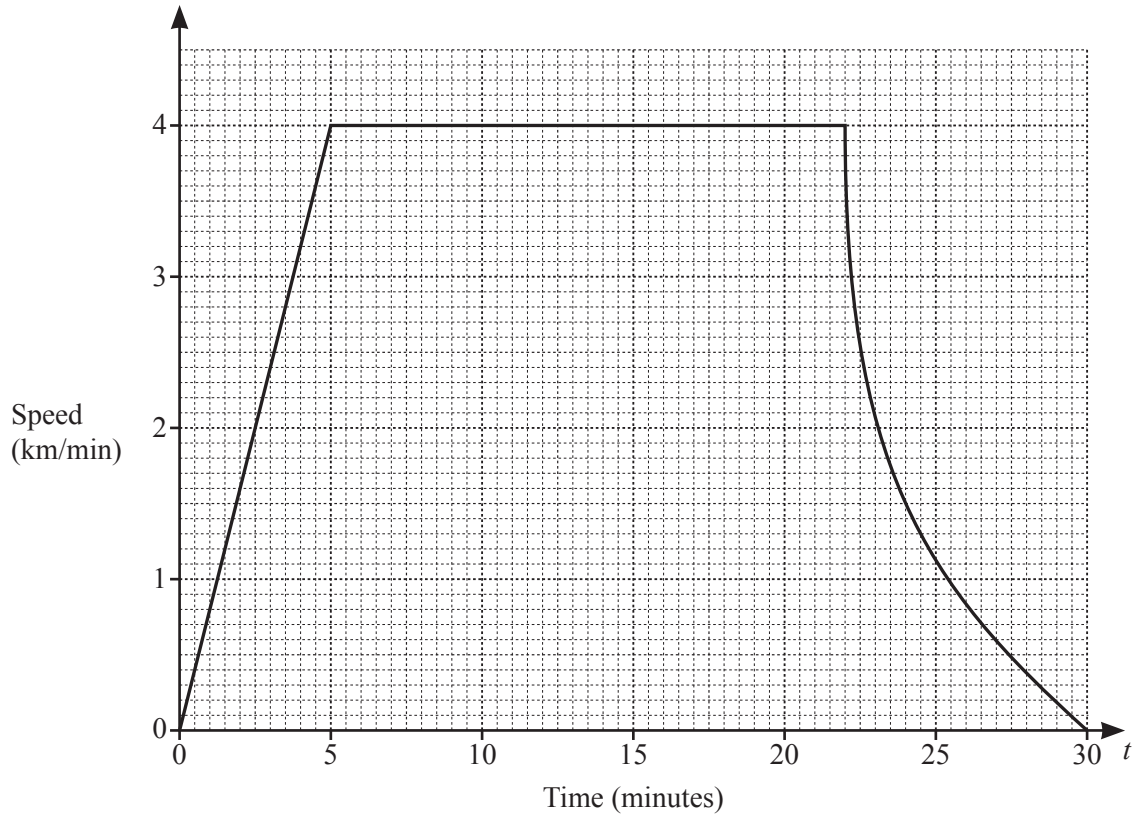
$$k = \dots\dots\dots [2]$$

(c) Find  $\mathbf{A}^{-1}$ .

$$\begin{pmatrix} & \\ & \end{pmatrix} \quad [2]$$



23



The speed–time graph shows information about a train journey.

(a) By drawing a suitable tangent to the graph, estimate the gradient of the curve at  $t = 24$ .

..... [3]

(b) What does this gradient represent?

..... [1]

(c) Work out the distance travelled by the train when it is travelling at constant speed.

..... km [2]

