



1 (a) On a map, the height of Hillibar Station is 1047 m and the height of Sular Junction is 297 m.

(i) Calculate the difference in these heights.

*Answer(a)(i)* ..... m [1]

(ii) The temperature falls by  $1^{\circ}\text{C}$  for every 100 m increase in height.  
One day the temperature in Sular Junction is  $19^{\circ}\text{C}$ .

Work out the temperature at Hillibar Station.

*Answer(a)(ii)* .....  $^{\circ}\text{C}$  [1]

(iii) Write 297 correct to the nearest ten.

*Answer(a)(iii)* ..... [1]

(iv) Write 1047 correct to the nearest hundred.

*Answer(a)(iv)* ..... [1]

(b) (i) Kim arrives at Hillibar Station at 12 35.  
The taxi to her hotel takes 27 minutes.

Work out the time Kim arrives at her hotel.

*Answer(b)(i)* ..... [1]

(ii) Henry takes 17 minutes to walk from his home to Sular Junction.  
He must arrive there by 10 43.

Work out the latest time he can leave home.

*Answer(b)(ii)* ..... [1]

- (c) Here is part of a train timetable.  
Each journey from Sular Junction to Hillibar Station takes the same time.

Sular Junction	<i>departs</i>	10 59	12 32	14 48
Hillibar Station	<i>arrives</i>	12 35	14 08	

- (i) Complete the timetable. [2]
- (ii) The distance between Sular Junction and Hillibar Station is 64 km.

Calculate the average speed, in kilometres per hour, of a train between these two stations.

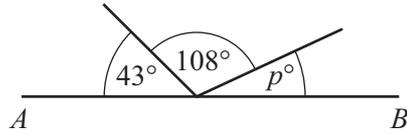
*Answer(c)(ii)* ..... km/h [2]

- (iii) Joel arrives at Sular Junction at 11 48.

At what time is the next train to Hillibar Station due to depart?

*Answer(c)(iii)* ..... [1]

2 (a)



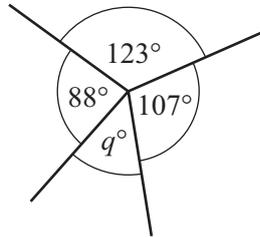
NOT TO SCALE

$AB$  is a straight line.

Find the value of  $p$ .

Answer(a)  $p = \dots\dots\dots$  [1]

(b)

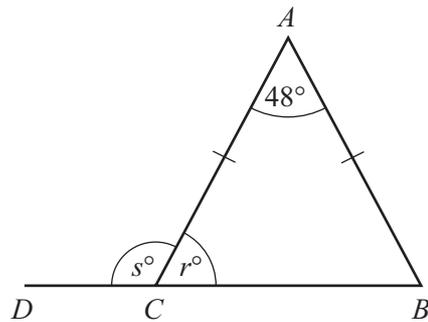


NOT TO SCALE

Find the value of  $q$ .

Answer(b)  $q = \dots\dots\dots$  [1]

(c)



NOT TO SCALE

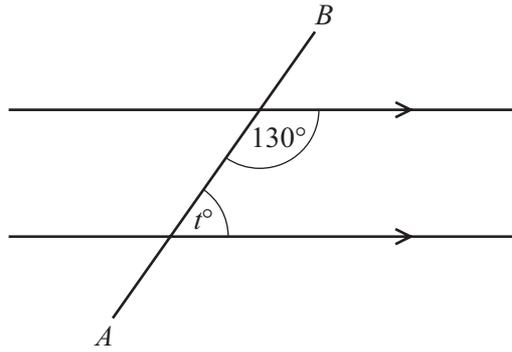
$DCB$  is a straight line and  $AB = AC$ .

Find the values of  $r$  and  $s$ .

Answer(c)  $r = \dots\dots\dots$

$s = \dots\dots\dots$  [2]

(d)



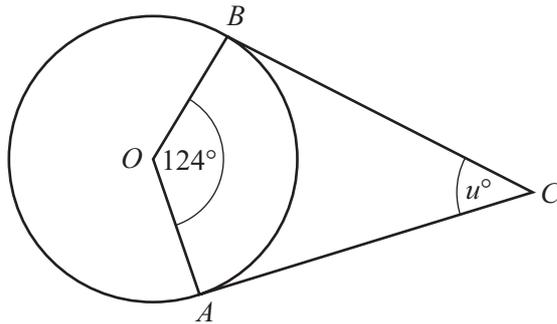
NOT TO SCALE

The straight line  $AB$  crosses two parallel lines.

Find the value of  $t$ .

Answer(d)  $t = \dots\dots\dots$  [1]

(e)

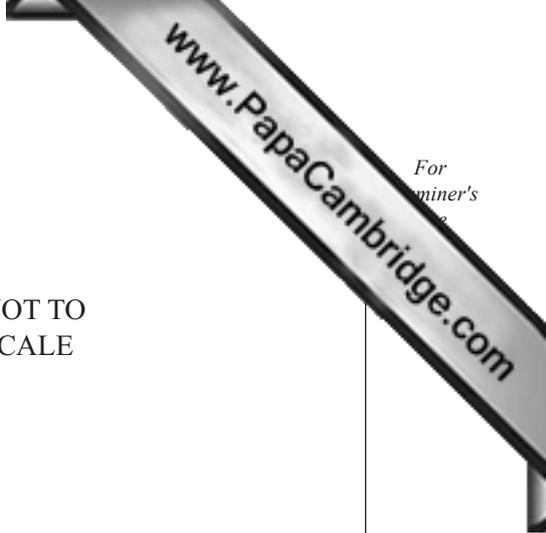


NOT TO SCALE

$A$  and  $B$  lie on a circle, centre  $O$ .  
 $AC$  and  $BC$  are tangents to the circle.

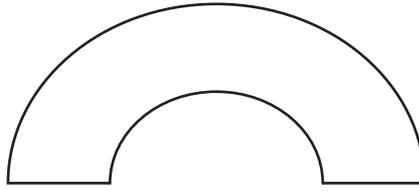
Find the value of  $u$ .

Answer(e)  $u = \dots\dots\dots$  [2]



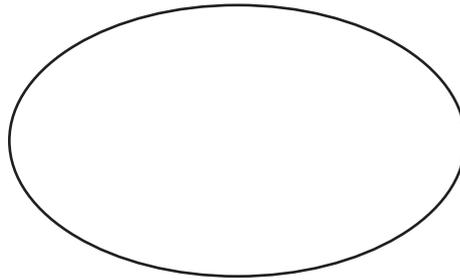
3 (a) On each of the following shapes draw any lines of symmetry.

(i)



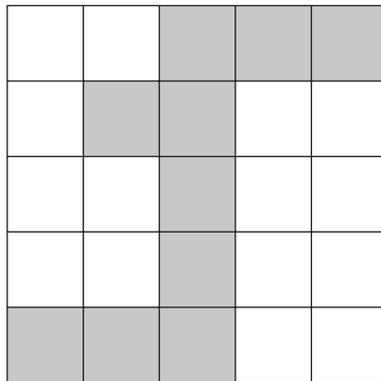
[1]

(ii)



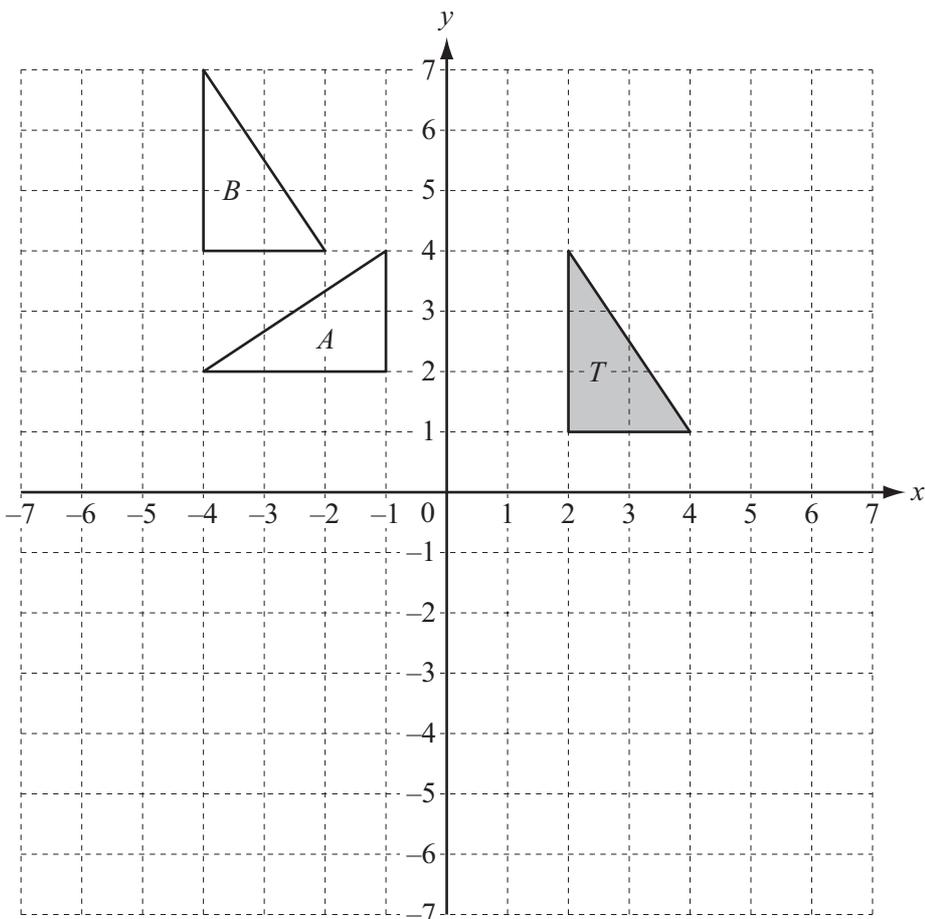
[2]

(b) Complete this shape by shading **one** square so that it has rotational symmetry of order 2.



[1]

(c)



On the grid, draw the image of triangle *T* after a

- (i) reflection in the line  $x = 4$ , [2]
- (ii) translation by the vector  $\begin{pmatrix} -5 \\ -4 \end{pmatrix}$ , [2]
- (iii) rotation, centre  $(4, 1)$  through  $180^\circ$ . [2]

(d) Describe fully the **single** transformation that maps

- (i) triangle *T* onto triangle *A*,

Answer(d)(i) ..... [3]

- (ii) triangle *T* onto triangle *B*.

Answer(d)(ii) ..... [2]

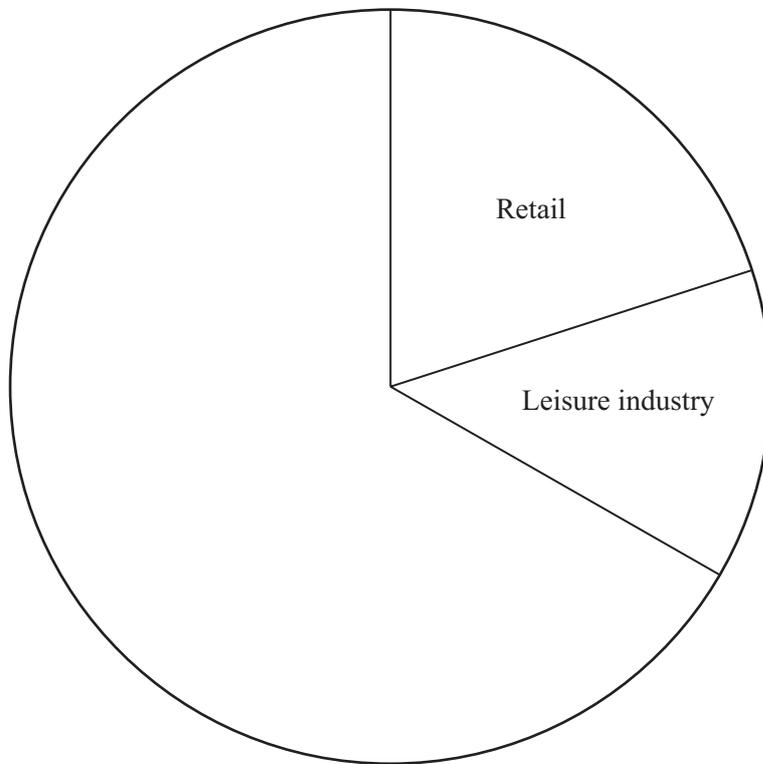
- 4 The table shows a summary of the types of employment for 90 people.

Employment	Frequency	Pie chart sector angle
Retail	18	$72^\circ$
Leisure industry	12	$48^\circ$
Public service	35	
Other	25	

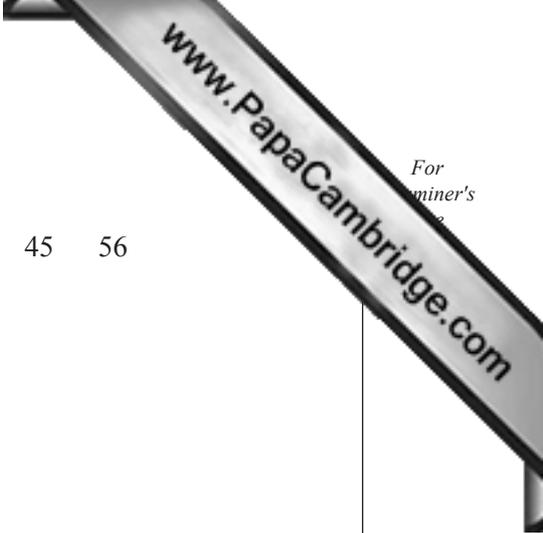
- (a) (i) Complete the table.

[2]

- (ii) Complete the pie chart and label the sectors.



[2]



**(b)** Here are the ages of the people working in the leisure industry.

16 17 19 23 23 24 27 31 33 40 45 56

**(i)** Work out the range.

*Answer(b)(i)* ..... years [1]

**(ii)** Calculate the mean.

*Answer(b)(ii)* ..... years [2]

**(iii)** Sabrina wants to interview someone working in the leisure industry. She chooses one person at random.

Write down the probability that the person chosen is under 30 years old.

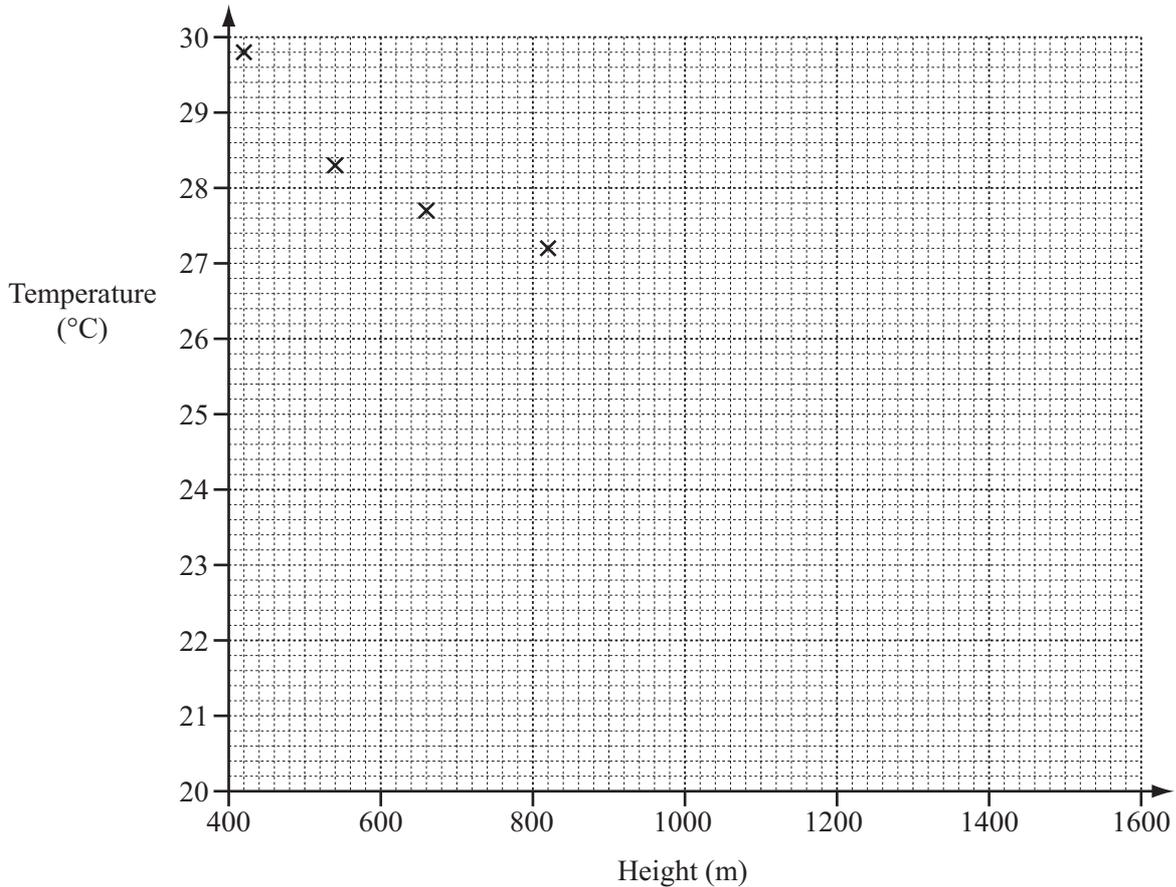
*Answer(b)(iii)* ..... [1]

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- 5 The table shows the height, in metres, above sea-level and the temperature, in °C, at midday at nine places on a mountain.

Height above sea-level (m)	420	540	660	820	960	1100	1240	1580
Temperature (°C)	29.8	28.3	27.7	27.2	25.4	25.0	24.2	21.0

- (a) Complete the scatter diagram for these results.  
The first four points have been plotted for you.



[2]

- (b) What type of correlation does this scatter diagram show?

Answer(b) ..... [1]

- (c) On the grid, draw the line of best fit.

[1]

- (d) Use your line of best fit to estimate the temperature at a height of 1400 m.

Answer(d) ..... °C [1]

- 6 (a) (i) Write down all the factors of 22.

Answer(a)(i) ..... [2]

- (ii) Write down a multiple of 13 between 30 and 50.

Answer(a)(ii) ..... [1]

- (b)            1      2      6      9      15      17      19      21      27

- (i) Write down all the prime numbers in this list.

Answer(b)(i) ..... [2]

- (ii) Write down a cube number from this list.

Answer(b)(ii) ..... [1]

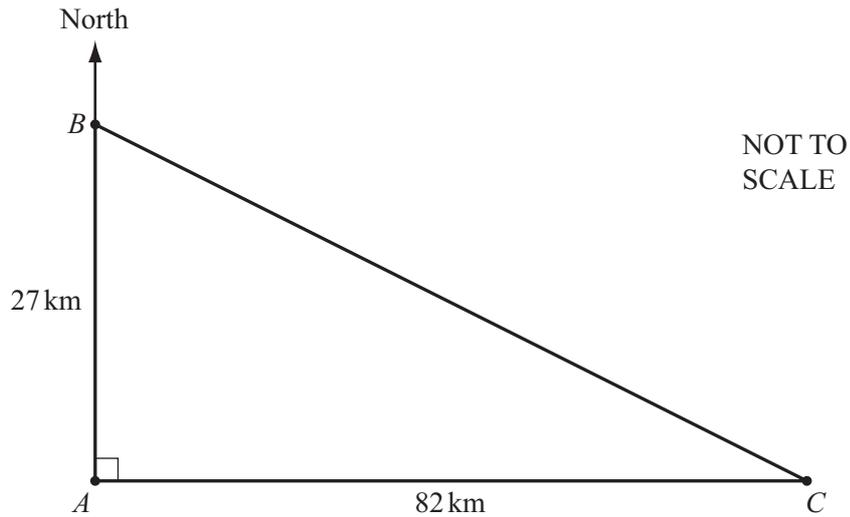
- (c) (i) Write 0.0035 in standard form.

Answer(c)(i) ..... [1]

- (ii) Calculate  $(6.3 \times 10^6) \div (1.5 \times 10^2)$ .  
Write your answer in standard form.

Answer(c)(ii) ..... [2]

7



The diagram shows the positions of three towns  $A$ ,  $B$  and  $C$ .  
 $B$  is 27 km north of  $A$  and the distance between  $A$  and  $C$  is 82 km.

(a) Calculate  $BC$ .

Answer(a)  $BC = \dots\dots\dots$  km [2]

(b) Write down the **three figure** bearing of  $C$  from  $A$ .

Answer(b)  $\dots\dots\dots$  [1]

(c) (i) Use trigonometry to calculate angle  $ABC$ .

Answer(c)(i) Angle  $ABC = \dots\dots\dots$  [2]

(ii) Work out the bearing of  $C$  from  $B$ .

Answer(c)(ii)  $\dots\dots\dots$  [1]

- (d) (i) Calculate the area of triangle  $ABC$ .

*Answer(d)(i)* ..... km<sup>2</sup> [2]

- (ii) The land forming the triangle  $ABC$  is valued at \$8400 for each square kilometre.

Calculate the value of this land.

*Answer(d)(ii)* \$ ..... [1]

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8 Ben and Ruth own a company.

(a) The company's profits of \$43 680 are shared in the ratio Ben : Ruth = 2 : 5 .

Calculate Ruth's share of the profits.

*Answer(a)* \$ ..... [2]

(b) Ruth invests \$15 000 at a rate of 4% per year simple interest.

Calculate how much her investment is worth at the end of 3 years.

*Answer(b)* \$ ..... [3]

(c) The company employs 450 people.  
14% of these people work in sales.

Calculate the number of people who work in sales.

*Answer(c)* ..... [2]

(d) Every year Ben travels 32 000 km on business.

(i)

<p><b>Car-rent</b></p> <p>Cost (\$) = <math>600 + 0.35d</math></p> <p>where <math>d</math> is the distance travelled in kilometres</p>
--

Calculate the cost of hiring a car from Car-rent to travel 32 000 km.

Answer(d)(i) \$ ..... [2]

(ii)

<p><b>Drive-easy</b></p> <p>Cost = \$100 plus \$4 for every 10 km travelled</p>
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Calculate the cost of hiring a car from Drive-easy to travel 32 000 km.

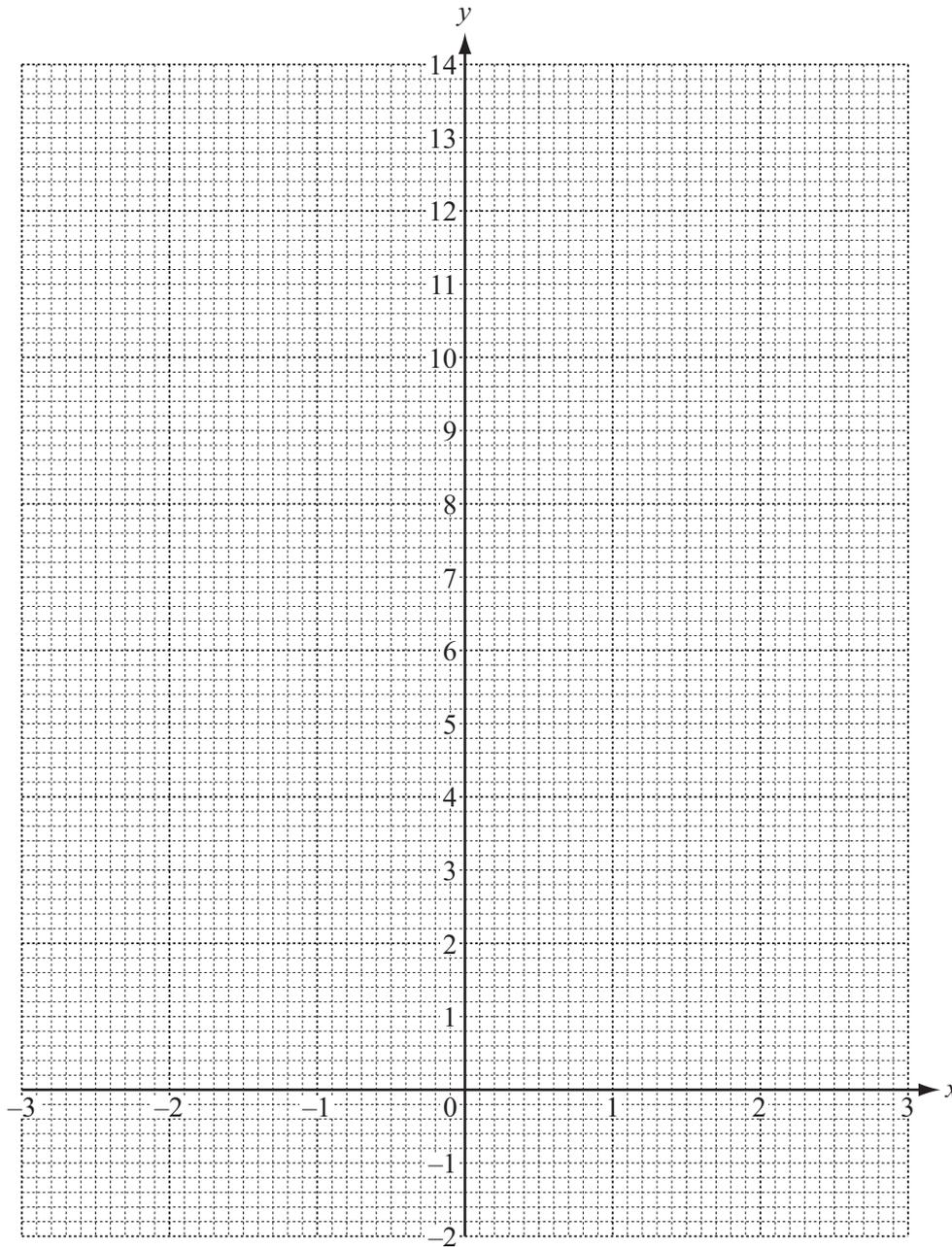
Answer(d)(ii) \$ ..... [2]

9 (a) (i) Complete the table of values for  $y = x^2 + x$ .

$x$	-3	-2	-1	0	1	2	3
$y$	6		0	0		6	

[2]

(ii) On the grid, draw the graph of  $y = x^2 + x$  for  $-3 \leq x \leq 3$ .



[4]

(iii) On the grid, draw the line  $y = 10$ .

[1]

(iv) Use both your graphs to solve  $x^2 + x = 10$  for  $-3 \leq x \leq 3$ .

Answer(a)(iv)  $x = \dots\dots\dots$  [1]

(b) Another line,  $L$ , has the equation  $y = \frac{2}{3}x - 5$ .

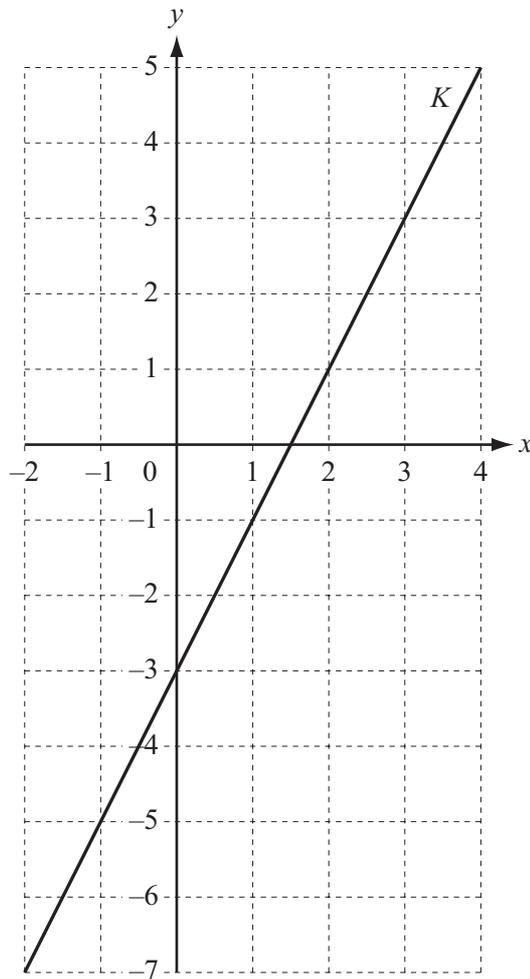
(i) Write down the gradient of  $L$ .

Answer(b)(i) ..... [1]

(ii) Write down the equation of a straight line that is parallel to  $L$ .

Answer(b)(ii) ..... [1]

(c)



Write the equation of the line,  $K$ , in the form  $y = mx + c$ .

Answer(c)  $y =$  ..... [3]

- 10 (a) In 2001 Arnold was  $x$  years old.  
Ken is **34 years younger** than Arnold.

- (i) Complete the table, in terms of  $x$ , for Arnold's and Ken's ages.

	2001	2013
Arnold's age	$x$	
Ken's age		

[3]

- (ii) In 2013 Arnold is **three** times as old as Ken.

Write down an equation in  $x$  and solve it.

*Answer(a)(ii)*  $x = \dots\dots\dots$  [4]

(b) Solve the simultaneous equations.

$$\begin{aligned}3x + 2y &= 18 \\2x - y &= 19\end{aligned}$$

*Answer(b)*  $x =$  .....

$y =$  ..... [3]

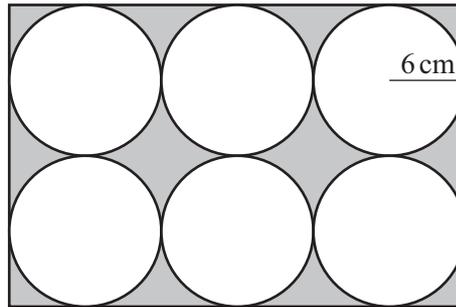
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**Question 11 is printed on the next page.**

- 11 (a) Calculate the area of a circle of radius 6 cm.

Answer(a) ..... cm<sup>2</sup> [2]

(b)



NOT TO  
SCALE

Each circle in this rectangle has a radius of 6 cm.  
The circles fit exactly in the rectangle.

Calculate the shaded area.

Answer(b) ..... cm<sup>2</sup> [4]

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