



1



For the diagram above write down

(a) the order of rotational symmetry,

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

(b) the number of lines of symmetry.

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

2 Write down the next two prime numbers after 43.

Answer ..... and ..... [2]

3 Use your calculator to find the value of  $\frac{(\cos 30^\circ)^2 - (\sin 30^\circ)^2}{2(\sin 120^\circ)(\cos 120^\circ)}$ .

Answer ..... [2]

4 Simplify  $\frac{5}{8}x^{\frac{3}{2}} \div \frac{1}{2}x^{-\frac{5}{2}}$ .

Answer ..... [2]

5 In 1970 the population of China was  $8.2 \times 10^8$ .  
 In 2007 the population of China was  $1.322 \times 10^9$ .  
 Calculate the population in 2007 as a percentage of the population in 1970.

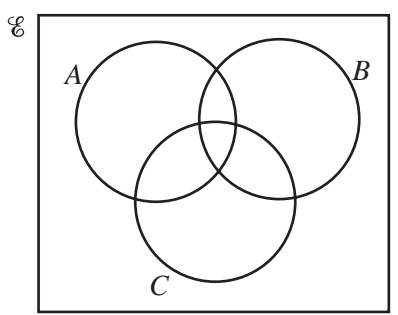
Answer ..... % [2]

6  $A = \begin{pmatrix} 0 & 1 \\ -8 & -4 \end{pmatrix}$      $B = \begin{pmatrix} 7 & 1 \\ 0 & -5 \end{pmatrix}$

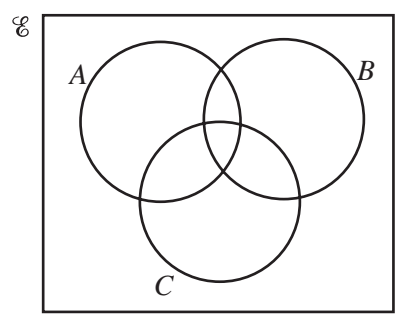
Calculate the value of  $5|A| + |B|$ , where  $|A|$  and  $|B|$  are the determinants of  $A$  and  $B$ .

Answer ..... [2]

7 Shade the region required in each Venn Diagram.



$A' \cap (B \cap C)$



$A' \cap (B \cup C)$

[2]

8 Find the length of the line joining the points  $A(-4, 8)$  and  $B(-1, 4)$ .

Answer  $AB =$  ..... [2]

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9 Solve the simultaneous equations

$$\begin{aligned} 6x + 18y &= 57, \\ 2x - 3y &= -8. \end{aligned}$$

Answer  $x =$  .....  
 $y =$  ..... [3]

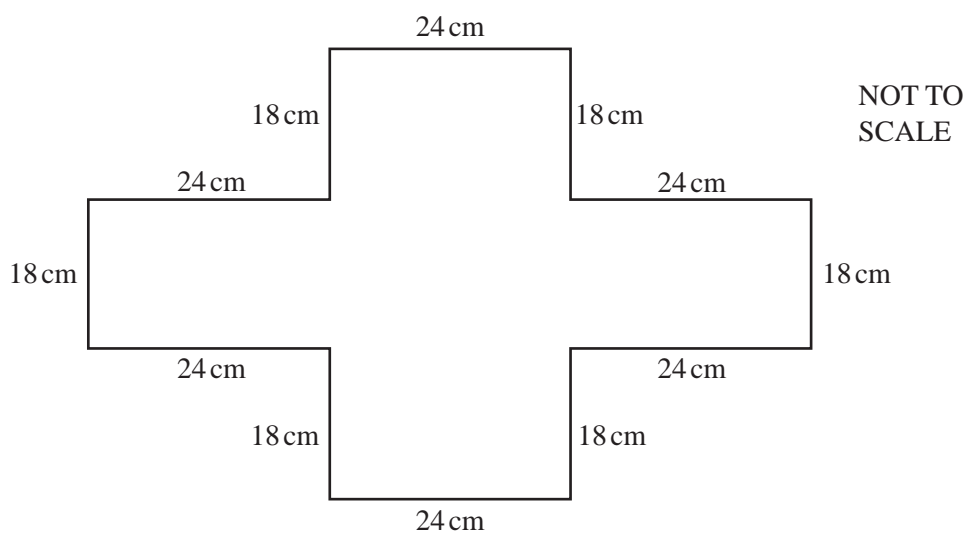
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10 The braking distance,  $d$ , of a car is directly proportional to the square of its speed,  $v$ .  
When  $d = 5$ ,  $v = 10$ .  
Find  $d$  when  $v = 70$ .

Answer  $d =$  ..... [3]

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11



Each of the lengths 24 cm and 18 cm is measured correct to the nearest centimetre.  
Calculate the upper bound for the perimeter of the shape.

*Answer* ..... cm [3]

12 Simplify  $16 - 4(3x - 2)^2$ .

*Answer* ..... [3]

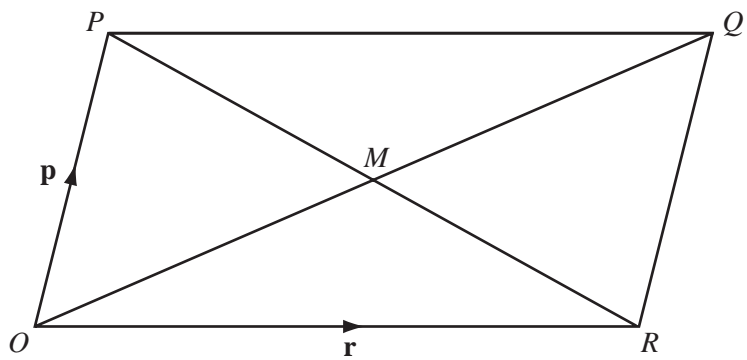
13 Solve the inequality  $6(2 - 3x) - 4(1 - 2x) \leq 0$ .

Answer ..... [3]

14 Zainab borrows \$198 from a bank to pay for a new bed.  
The bank charges compound interest at 1.9% per month.  
Calculate how much **interest** she owes at the end of 3 months.  
Give your answer correct to 2 decimal places.

Answer \$ ..... [3]

15



O is the origin and OPQR is a parallelogram whose diagonals intersect at M.

The vector  $\vec{OP}$  is represented by  $\mathbf{p}$  and the vector  $\vec{OR}$  is represented by  $\mathbf{r}$ .

(a) Write down a single vector which is represented by

(i)  $\mathbf{p} + \mathbf{r}$ ,

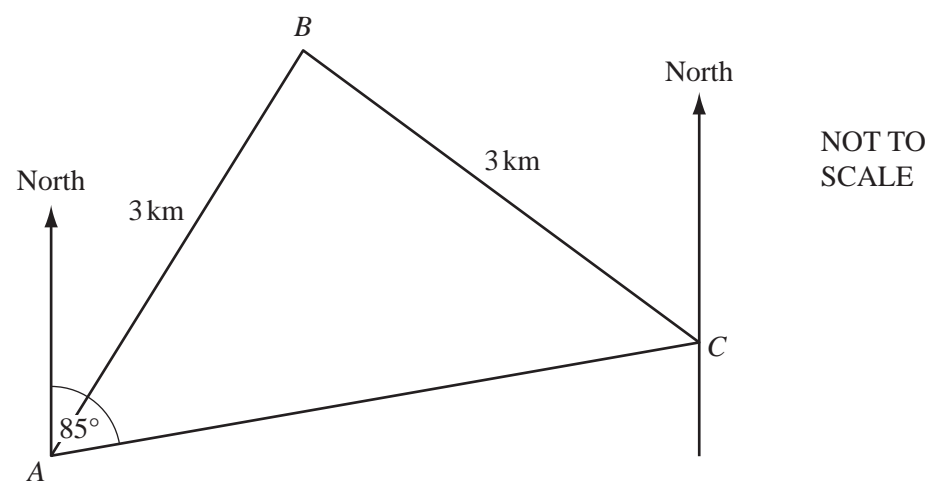
Answer(a)(i) ..... [1]

(ii)  $\frac{1}{2}\mathbf{p} - \frac{1}{2}\mathbf{r}$ .

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

(b) On the diagram, mark with a cross (x) and label with the letter S the point with position vector  $\frac{1}{2}\mathbf{p} + \frac{3}{4}\mathbf{r}$ . [2]

16



*A, B and C are three places in a desert. Tom leaves A at 06 40 and takes 30 minutes to walk directly to B, a distance of 3 kilometres. He then takes an hour to walk directly from B to C, also a distance of 3 kilometres.*

**(a)** At what time did Tom arrive at C?

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

**(b)** Calculate his average speed for the whole journey.

*Answer (b)* ..... km/h [2]

**(c)** The bearing of C from A is 085°. Find the bearing of A from C.

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

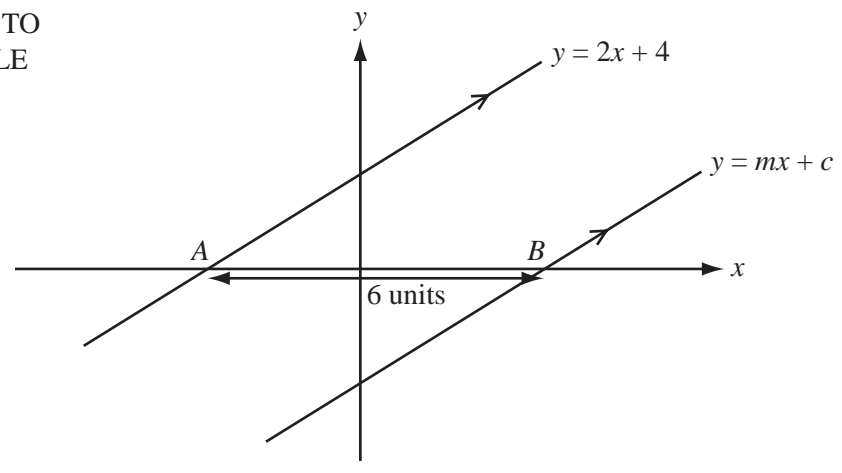
**17 (a)** In 2007, a tourist changed 4000 Chinese Yuan into pounds (£) when the exchange rate was £1 = 15.2978 Chinese Yuan. Calculate the amount he received, giving your answer correct to 2 decimal places.

*Answer(a)* £ ..... [2]

**(b)** In 2006, the exchange rate was £1 = 15.9128 Chinese Yuan. Calculate the percentage decrease in the number of Chinese Yuan for each £1 from 2006 to 2007.

*Answer(b)* ..... % [2]

NOT TO  
SCALE



The line  $y = mx + c$  is parallel to the line  $y = 2x + 4$ .  
The distance  $AB$  is 6 units.

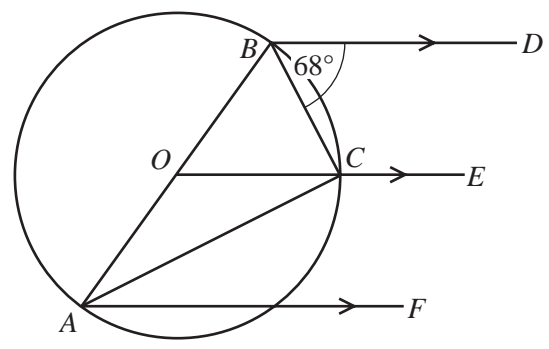
Find the value of  $m$  and the value of  $c$ .

Answer  $m = \dots\dots\dots$  and  $c = \dots\dots\dots$  [4]





NOT TO  
SCALE



Points  $A$ ,  $B$  and  $C$  lie on a circle, centre  $O$ , with diameter  $AB$ .  
 $BD$ ,  $CE$  and  $AF$  are parallel lines.  
Angle  $CBD = 68^\circ$ .

Calculate

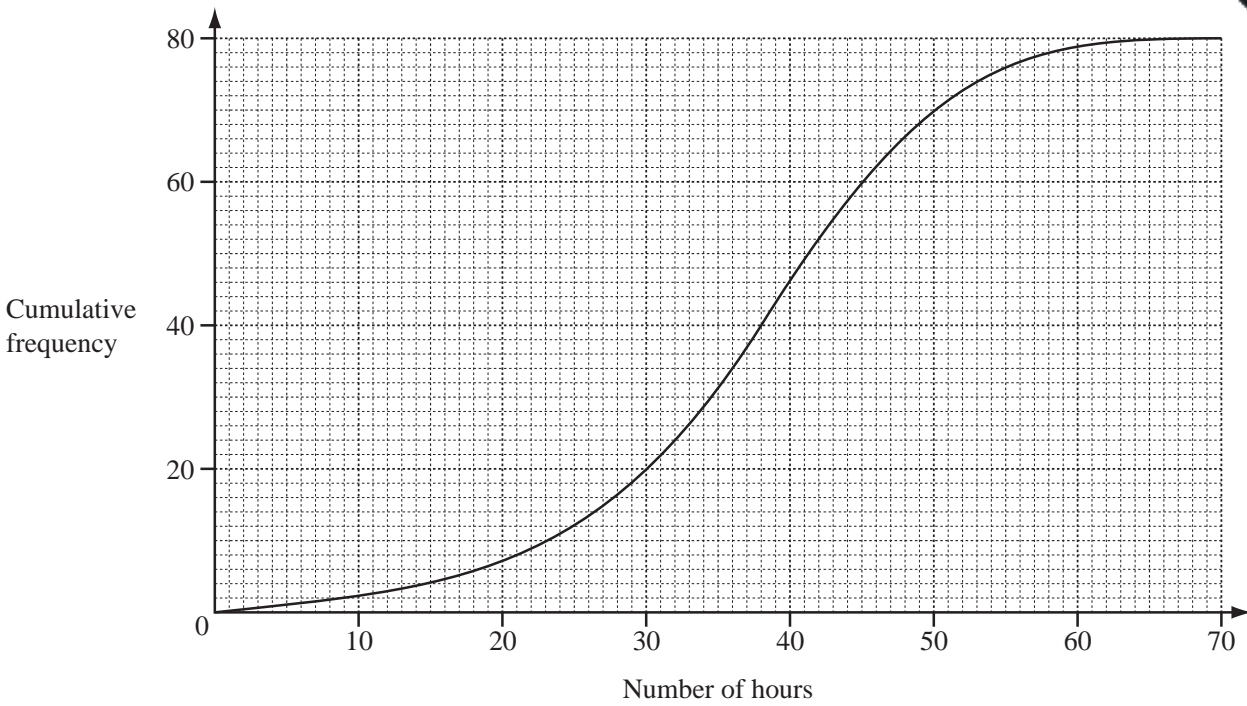
(a) angle  $BOC$ ,

Answer(a) Angle  $BOC = \dots\dots\dots$  [2]

(b) angle  $ACE$ .

Answer(b) Angle  $ACE = \dots\dots\dots$  [2]

20 The number of hours that a group of 80 students spent using a computer in a week was recorded. The results are shown by the cumulative frequency curve.



Use the cumulative frequency curve to find

(a) the median,

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

(b) the upper quartile,

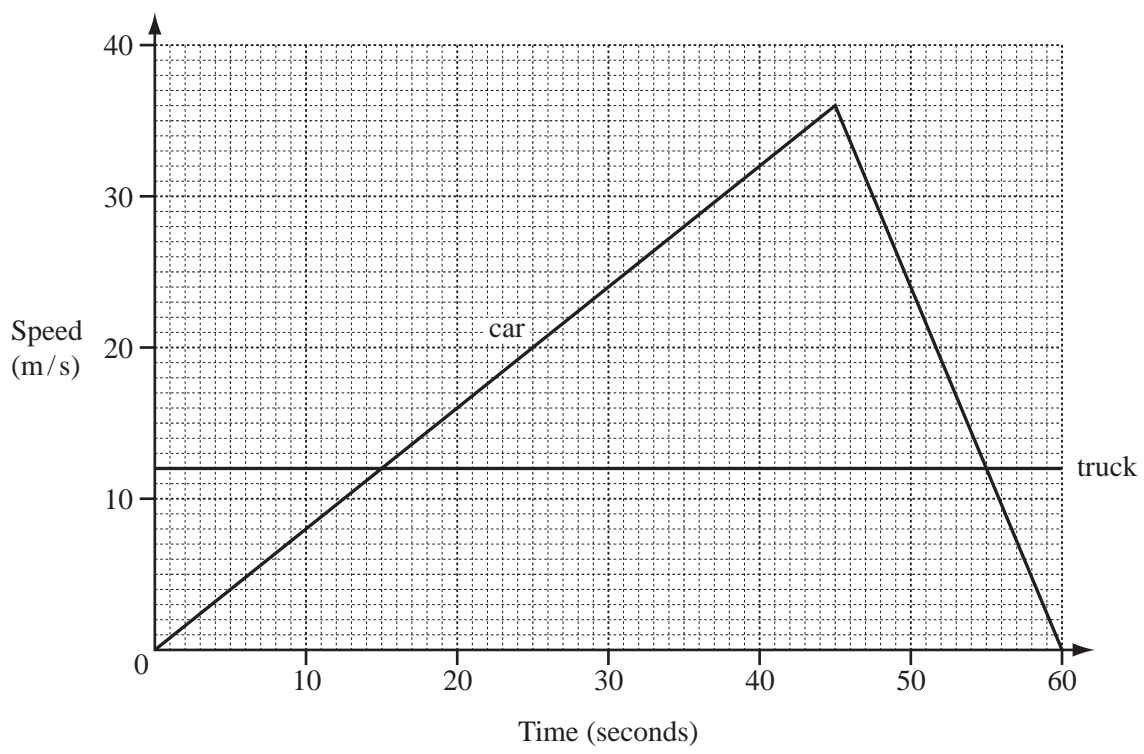
Answer(b) ..... h [1]

(c) the interquartile range,

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

(d) the number of students who spent more than 50 hours using a computer in a week.

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



The graph shows the speed of a truck and a car over 60 seconds.

(a) Calculate the acceleration of the car over the first 45 seconds.

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

(b) Calculate the distance travelled by the car while it was travelling faster than the truck.

Answer(b) ..... m [3]

12

22

$$f(x) = 4x + 1$$

$$g(x) = x^3 + 1$$

$$h(x) = \frac{2x + 1}{3}$$

(a) Find the value of  $gf(0)$ .

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

(b) Find  $fg(x)$ . Simplify your answer.

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

(c) Find  $h^{-1}(x)$ .

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