

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

Answer % [2]

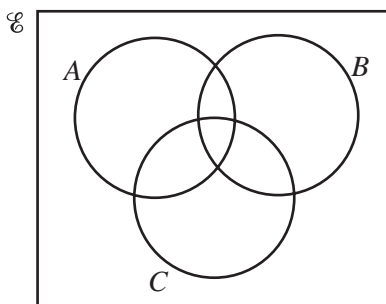
6

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

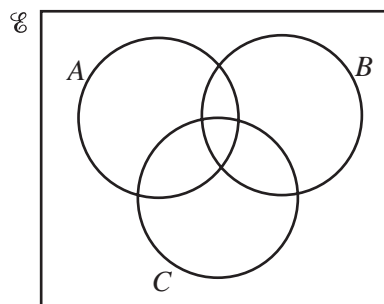
Calculate the value of $5|\mathbf{A}| + |\mathbf{B}|$, where $|\mathbf{A}|$ and $|\mathbf{B}|$ are the determinants of \mathbf{A} and \mathbf{B} .

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]

- 9 Solve the simultaneous equations

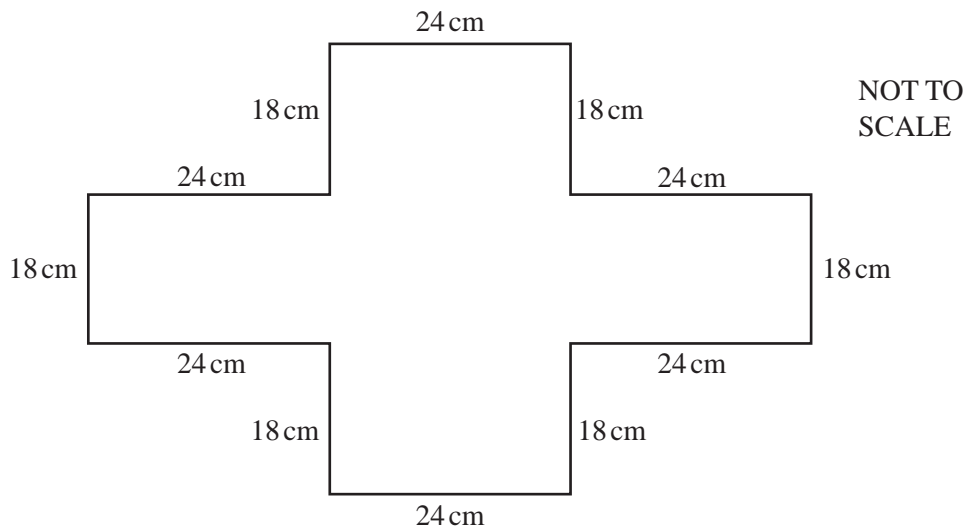
$$\begin{aligned}6x + 18y &= 57, \\2x - 3y &= -8.\end{aligned}$$

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

- 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]

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]

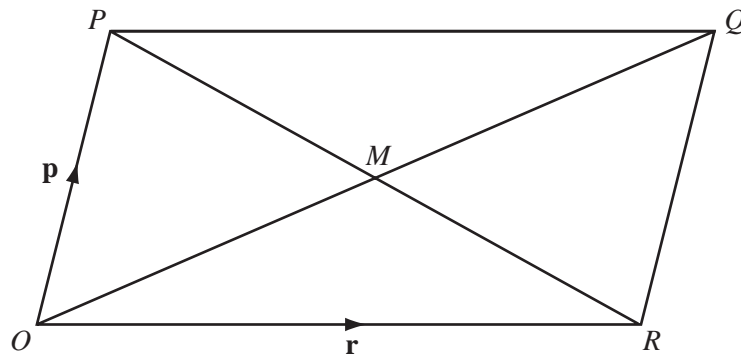
- 13 Solve the inequality $6(2 - 3x) - 4(1 - 2x) \leq 0$.

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

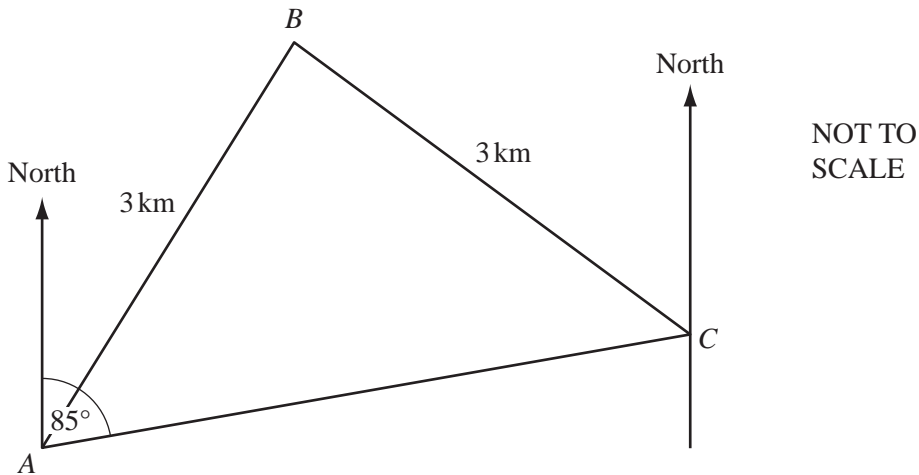
(i) $\mathbf{p} + \mathbf{r}$,

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]



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 .

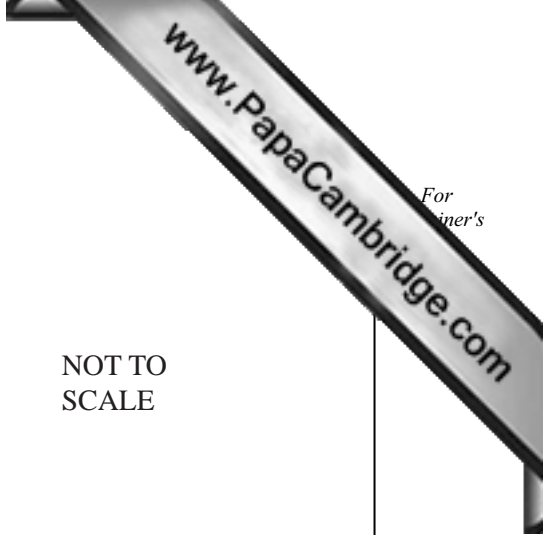
Answer (c) [1]

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.

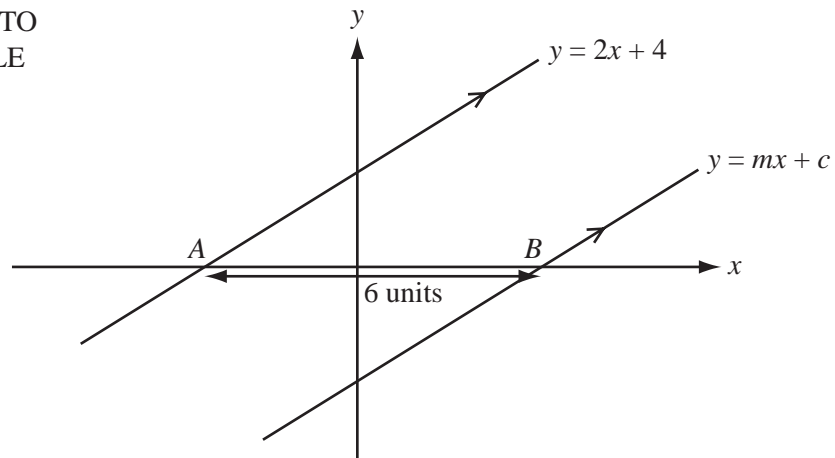
Answer(a) £ [2]

(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

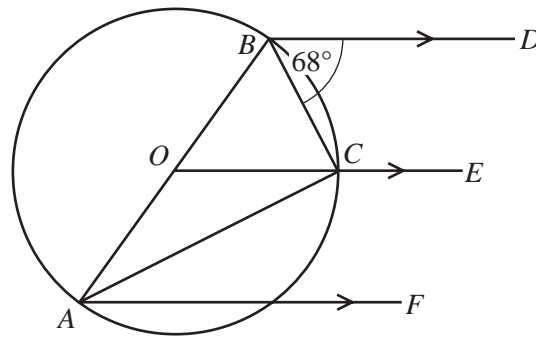


The line $y = mx + c$ is parallel to the line $y = 2x + 4$.
The distance AB is 6 units.

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 $CBD = 68^\circ$.

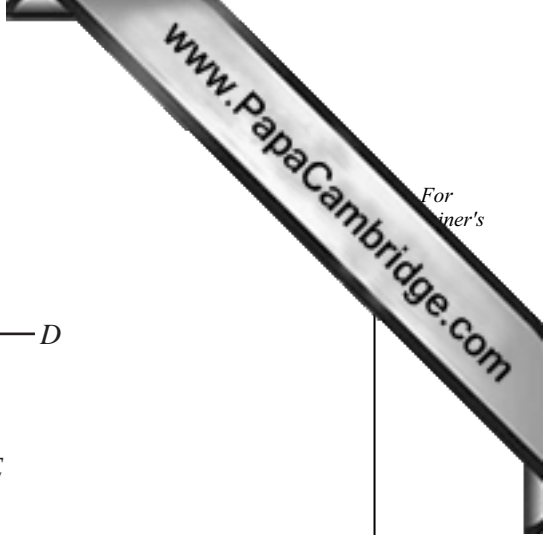
Calculate

(a) angle BOC ,

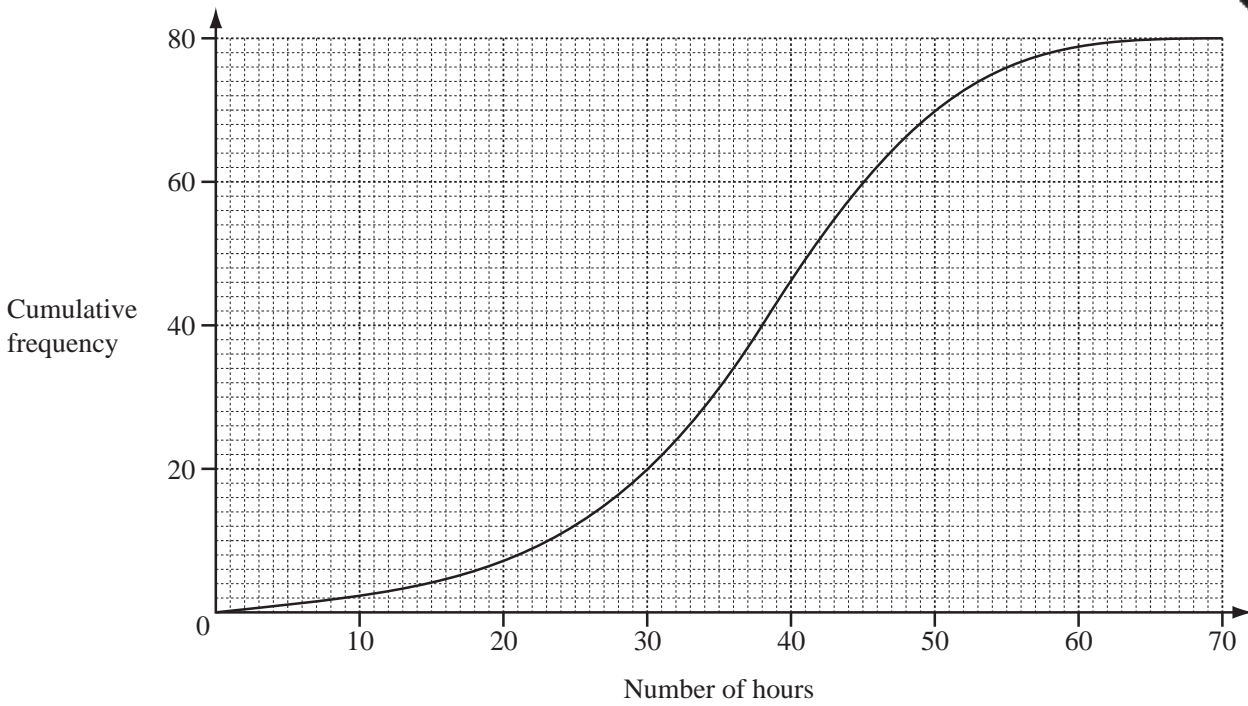
Answer(a) Angle $BOC = \dots\dots\dots$ [2]

(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,

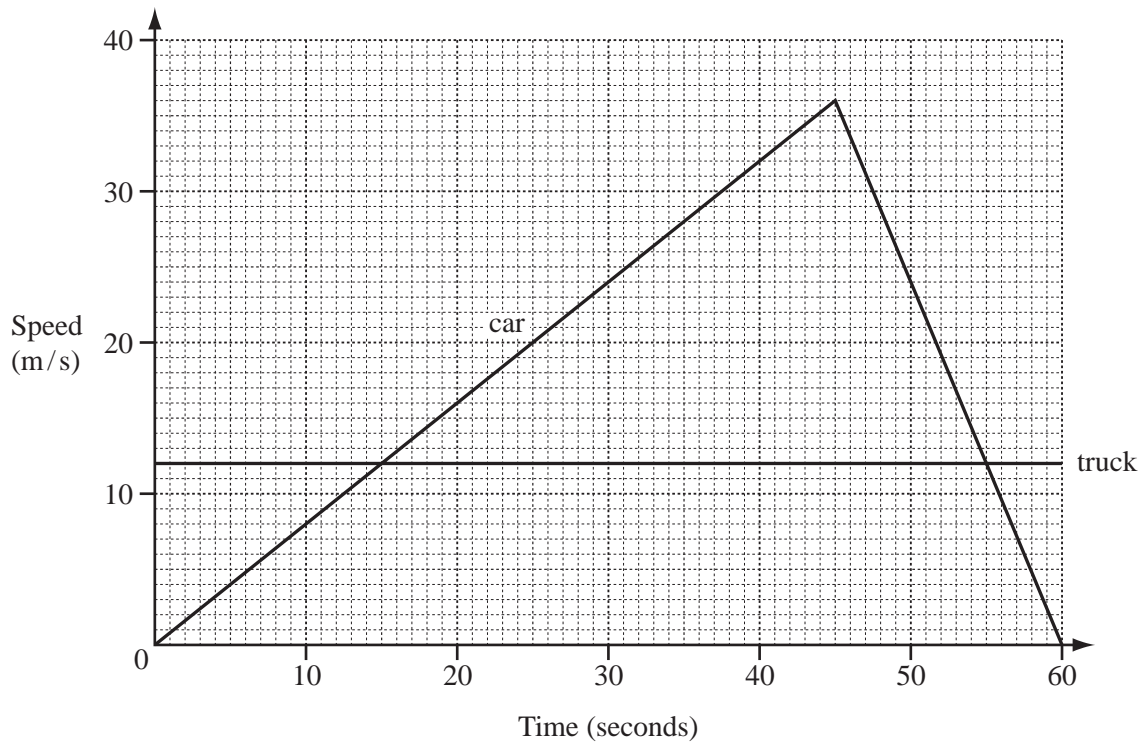
Answer(b) h [1]

(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/s² [2]

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

Answer(b) m [3]

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]