Cambridge Assessment International Education

# Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

**MATHEMATICS** **0580/11**

Paper 1 (Core) **May/June 2021**

**1 hour**

You must answer on the question paper.

You will need: Geometrical instruments

**INSTRUCTIONS**

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For $\pi$, use either your calculator value or 3.142.

**INFORMATION**

- The total mark for this paper is 56.
- The number of marks for each question or part question is shown in brackets [ ].

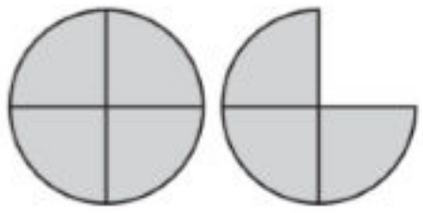
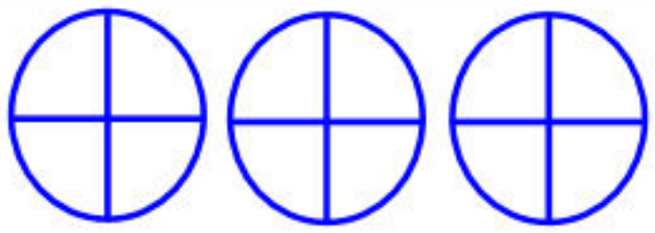
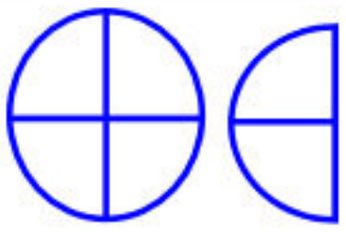
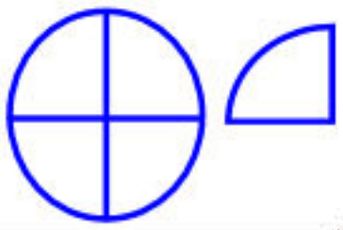


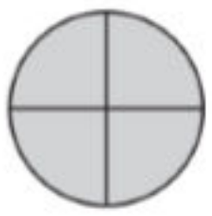
This document has **12** pages. Any blank pages are indicated.

**1** Zachary asks the 30 students in his class which is their favourite sport.
The table shows the results.

| Netball | Football | Hockey | Tennis |
|---|---|---|---|
| 7 | 12 | 6 | 5 |

Complete the pictogram.

| | |
|---|---|
| Netball |  |
| Football |  |
| Hockey |  |
| Tennis |  |

Key:  represents 4 people

[2]

**2** **(a)** Find the value of $\sqrt{225}$.

15 [1]

**(b)** Write down the reciprocal of $\frac{2}{3}$.

$\frac{3}{2}$ [1]

**(c)** Work out three-quarters of one-third.

$\frac{3}{4} \times \frac{1}{3} = \frac{1}{4}$

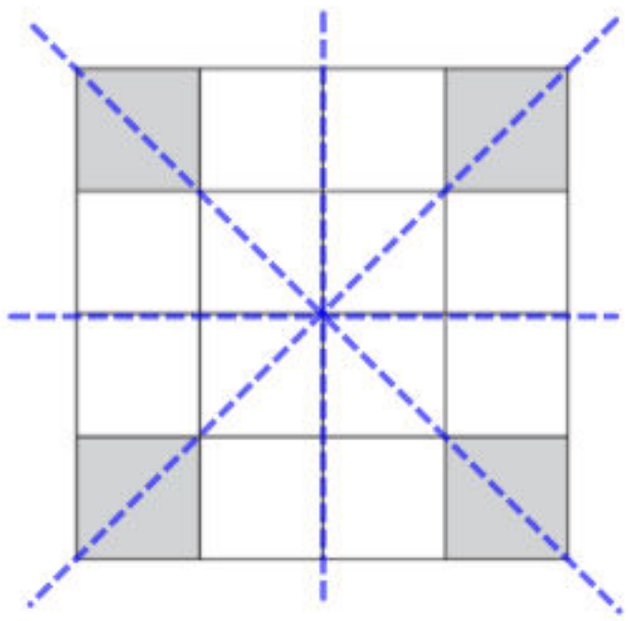
$\frac{1}{4}$ [1]

**(d)** Work out $-7-(6-8)$.

$-5$ [1]

3

3



**(a)** Write down the order of rotational symmetry of this diagram.

4 ..... [1]

**(b)** On the diagram, draw all the lines of symmetry. [2]

**4** The stem-and-leaf diagram shows the number of hours that each of 16 students studied last week.

| | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 5 | 6 | 8 | |
| 2 | 0 | 1 | 1 | 7 | 9 |
| 3 | 2 | 3 | 4 | 5 | |
| 4 | 4 | 5 | 7 | | |

Key: 1|2 represents 12 hours

* Median position = $\frac{1}{2}(16+1)$ th
= 8.5 th

Find

**(a)** the median,

* Median = $\frac{(27+29)h}{2}$ = 28 h

28 ..... h [1]

**(b)** the mode,

21 ..... h [1]

**(c)** the range.

* Range = Highest − Lowest
= 47 − 12
= 35

35 ..... h [1]

**5** The volume of a cuboid is $24\,cm^3$.
The base of the cuboid is 3 cm by 2 cm.

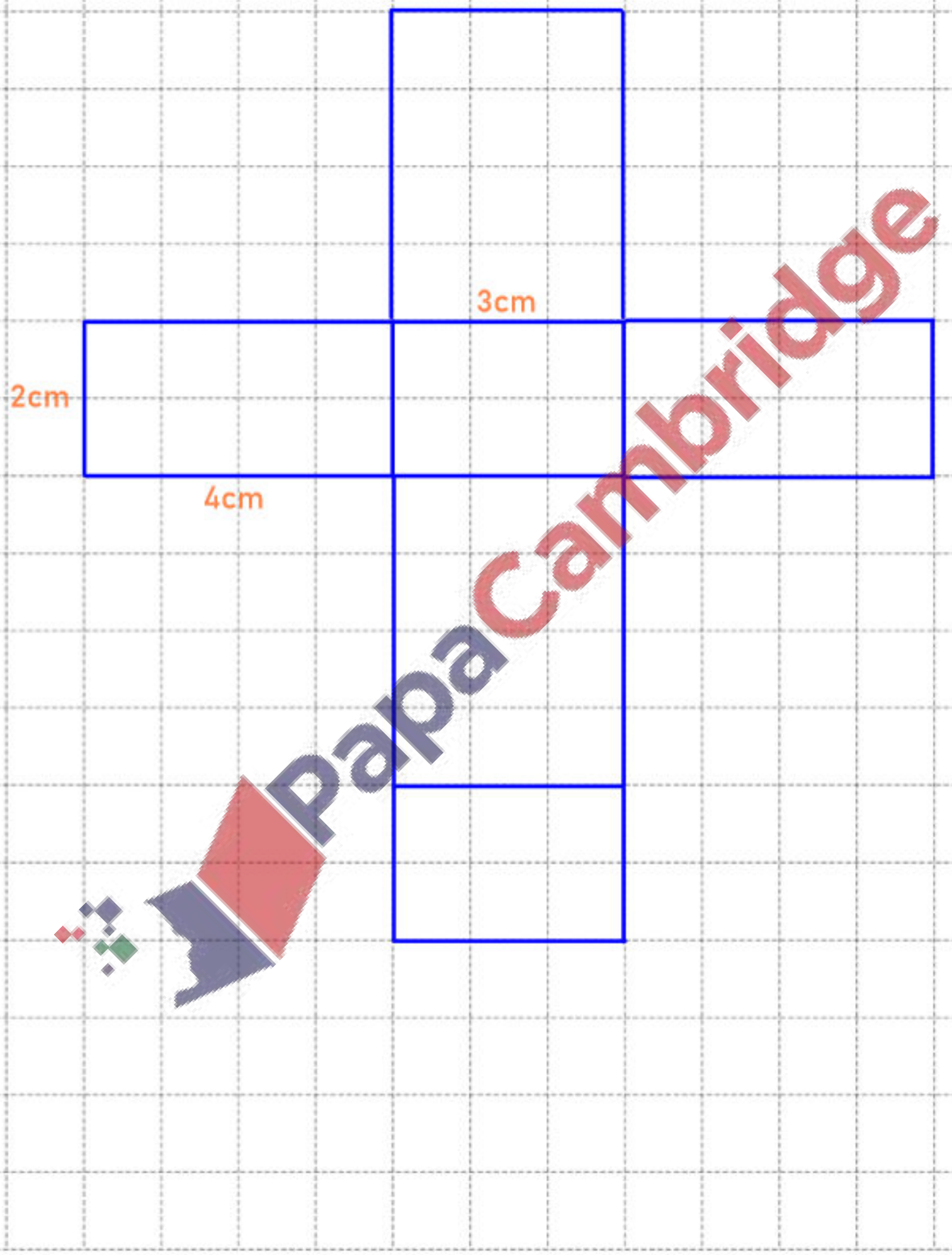
Draw a net of the cuboid on the $1\,cm^2$ grid.

$* V = l \times w \times h$

$\Rightarrow h = \frac{V}{l \times w}$

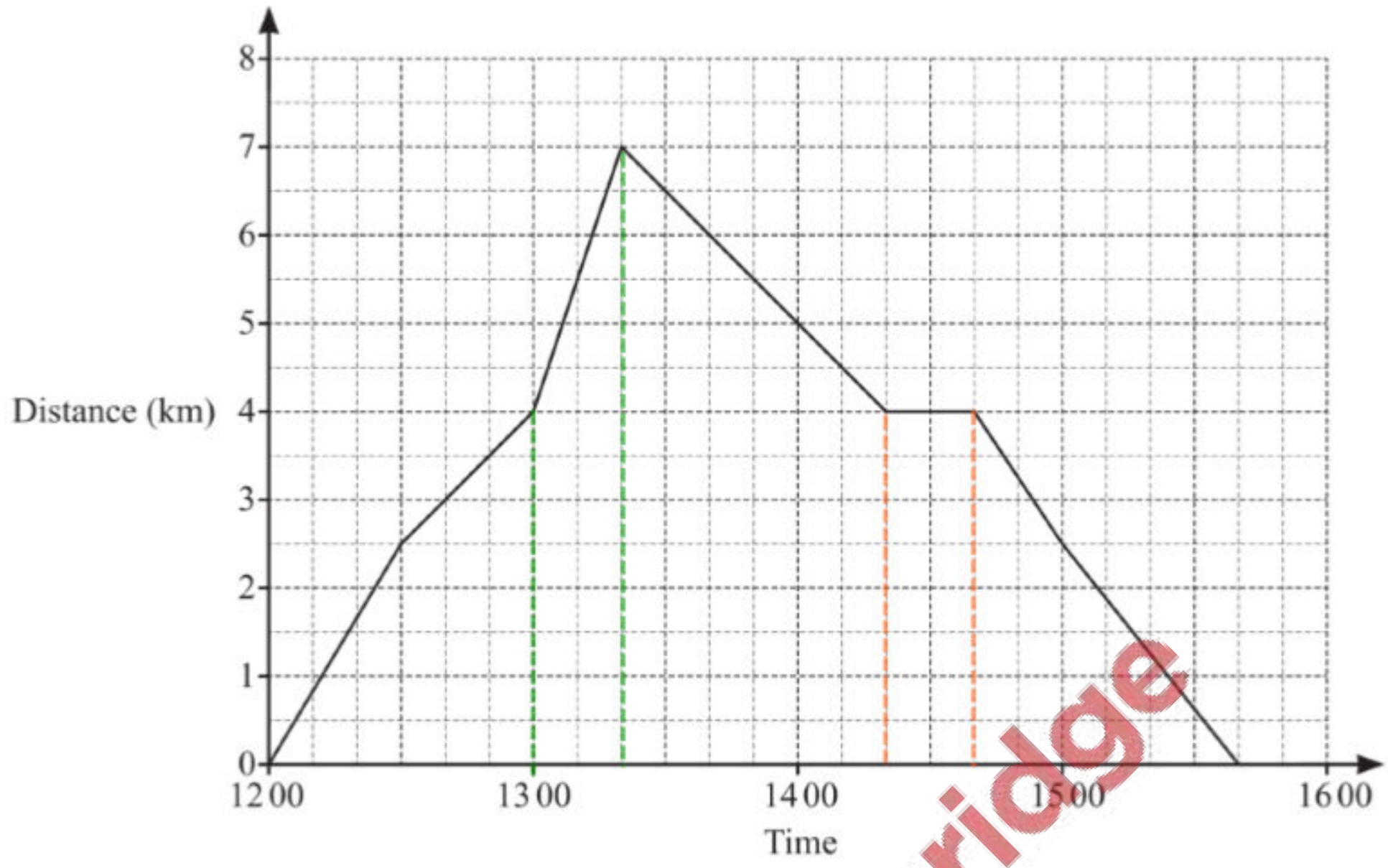
$\Rightarrow h = \left(\frac{24}{3 \times 2}\right) cm = 4\,cm$

3cm x 2cm x 4cm




[4]

6




The travel graph shows a student's journey.

**(a)** Explain what is happening between 14 20 and 14 40.

The student stopped. [1]

**(b)** Complete the statement.

The student is travelling fastest between the times 13 00 and 13 20

because the slope is the steepest. [2]

7 The probability that a train is late is 0.15 .

Write down the probability that the train is not late.

★ P = 1 − 0·15

⇒ P = 0·85 //

0·85 [1]

**8** Nazaneen changes \$6500 into 5798 euros at a bank.

Work out the exchange rate the bank uses.

\$6500 → 5798 euros ⇒ $x = \frac{\$1}{\$6500} \times 5798$ euros

\$1 → $x$

\$1 = ..... 0·892 ..... euros [1]

⇒ $x = 0·892$ euros //

**9** Work out.

**(a)** $\begin{pmatrix} 6 \\ -5 \end{pmatrix} + \begin{pmatrix} 8 \\ -1 \end{pmatrix} = \begin{pmatrix} 6+8 \\ -5+(-1) \end{pmatrix}$

$= \begin{pmatrix} 14 \\ -6 \end{pmatrix}$ //

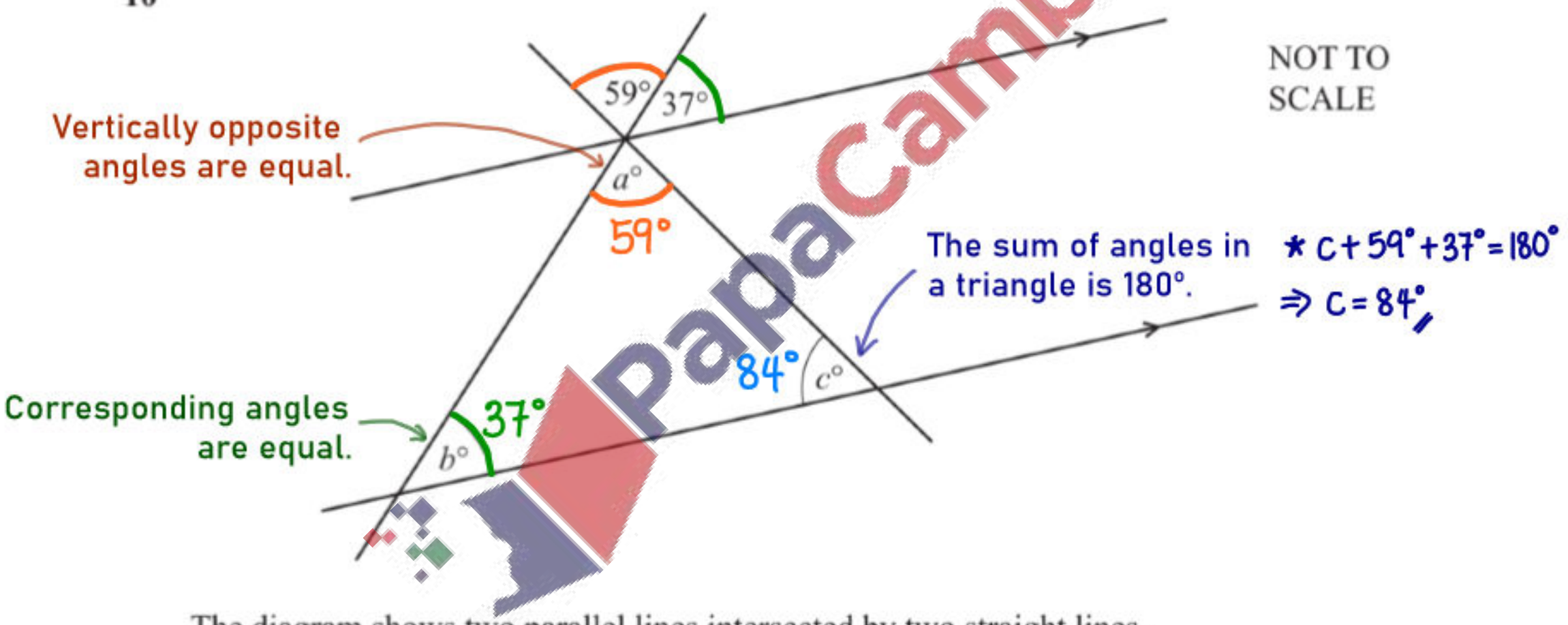
$\begin{pmatrix} 14 \\ -6 \end{pmatrix}$ [1]

**(b)** $3\begin{pmatrix} -4 \\ 7 \end{pmatrix} = \begin{pmatrix} 3\times-4 \\ 3\times7 \end{pmatrix}$

$= \begin{pmatrix} -12 \\ 21 \end{pmatrix}$ //

$\begin{pmatrix} -12 \\ 21 \end{pmatrix}$ [1]

**10**




* $c + 59° + 37° = 180°$

⇒ $c = 84°$ //

The diagram shows two parallel lines intersected by two straight lines.

Find the values of $a$, $b$ and $c$.

$a$ = ..... 59 .....

$b$ = ..... 37 .....

$c$ = ..... 84 ..... [3]

**11** **(a)** Write down the mathematical name for a polygon with 5 sides.

Pentagon [1]

**(b)** Work out the interior angle of a regular 18-sided polygon.

★ Interior angle $= \frac{180°(n-2)}{n}$

$= \frac{180°(18-2)}{18} = 160°$ //

160° [2]

**12** The $n$th term of a sequence is $6n-4$.

**(a)** Write down the first 3 terms in this sequence.

★ $6(1)-4 = 2$ //
★ $6(2)-4 = 8$ //
★ $6(3)-4 = 14$ //

2, 8, 14 [1]

**(b)** The $k$th term of this sequence is 422.

Work out the value of $k$.

★ $422 = 6k-4$
⇒ $6k = 426$
⇒ $k = 71$ //

$k =$ 71 [2]

**13** The radius of a circle is 42 cm.

Work out the circumference of the circle.
Give your answer in terms of $\pi$.

★ $C = 2\pi r$
⇒ $C = 2\pi(42\text{cm})$
⇒ $C = 84\pi\text{ cm}$ //

84π cm [2]

**14** Change $680\,000\,\text{cm}^3$ into $\text{m}^3$.

$1\,\text{m}^3 \rightarrow 10^6\,\text{cm}^3$

$x \rightarrow 680\,000\,\text{cm}^3$

$\Rightarrow x = \frac{680\,000\,\text{cm}^3}{10^6\,\text{cm}^3} \times 1\,\text{m}^3$

$\Rightarrow x = 0.68\,\text{m}^3$ //

0.68 ..... $\text{m}^3$ [1]

**15** The length, $l$ metres, of a piece of rope is 5.67 m, correct to the nearest centimetre.

Complete this statement about the value of $l$.

* $1\,\text{cm} = 0.01\,\text{m}$

* $l = 5.67\,\text{m} \pm \frac{0.01\,\text{m}}{2}$

* $\text{LB}(l) = \left(5.67 - \frac{0.01}{2}\right)\text{m} = 5.665\,\text{m}$ //

* $\text{UB}(l) = \left(5.67 + \frac{0.01}{2}\right)\text{m} = 5.675\,\text{m}$ //

5.665 ..... $\leqslant l <$ ..... 5.675 [2]

**16** **Without using a calculator**, work out $1\frac{3}{8} - \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

$\Rightarrow \frac{11}{8} - \frac{5}{6}$

$\Rightarrow \frac{33 - 20}{24}$

$\Rightarrow \frac{13}{24}$ //

$\frac{13}{24}$ ..... [3]

**17** **(a)** Write $\frac{1}{2\times2\times2\times2\times2}$ as a power of 2.

$\frac{1}{2^5} = 2^{-5}$

..... $2^{-5}$ ..... [1]

**(b)** **(i)** $3^{18} \div 3^t = 3^6$

Find the value of $t$.

$\Rightarrow 3^{18-t} = 3^6$

Since the bases are equal,

$\Rightarrow 18 - t = 6$

$\Rightarrow t = 12$

$t =$ ..... 12 ..... [1]

**(ii)** Simplify.

$8w^{10} \times 6w^5$

$\Rightarrow (8\times6)\, w^{10+5}$

$\Rightarrow 48w^{15}$

..... $48w^{15}$ ..... [2]

**18** Annie invests \$8300 at a rate of 5.6% per year compound interest.

Calculate the value of her investment at the end of 6 years.

* $A = a\left(1+\frac{r}{100}\right)^t$

$\Rightarrow A = \$8300\left(1+\frac{5.6}{100}\right)^6$

$\Rightarrow A = \$11\,509.64$ (2 dp)

\$ ..... 11 509.64 ..... [2]

**19** Write down an irrational number, $n$, where $31 < n < 32$.

$n =$ ..... $\sqrt{1000}$ ..... [1]

**20** By rounding each number in the calculation correct to 1 significant figure, estimate the value of

$$\frac{38.7 \times 3.115}{20.3 - 4.1^2}.$$

You must show all your working.

$\Rightarrow \frac{40 \times 3}{20 - 4^2}$

$\Rightarrow \frac{120}{20 - 16}$

$\Rightarrow \frac{120}{4}$

$\Rightarrow 30$

30 ..... [2]

**21** Solve the simultaneous equations.
You must show all your working.

$2x + y = 3$ – (1)
$x - 5y = 40$ – (2)

(1) × 5 : $10x + 5y = 15$ – (3)

(2) + (3) : $11x = 55$

$\Rightarrow x = 5$

Put x in (1):

$\Rightarrow 2(5) + y = 3$
$\Rightarrow 10 + y = 3$
$\Rightarrow y = -7$

$x =$ 5 .....

$y =$ -7 ..... [3]

**22** There is a straight road between town $A$ and town $B$ of length 130 km.

Maxi travels from town $A$ to town $B$.
Pippa travels from town $B$ to town $A$.
Both travel at a constant speed of 40 km/h.
Maxi leaves 30 minutes before Pippa.

Work out how far from town $A$ they will be when they pass each other.


* $D_A(P) = 130 - 40t$ — (1)

* $D_A(M) = 40\left(t + \frac{1}{2}\right)$ — (2)

When they pass each other, $D_A(P) = D_A(M)$

$\Rightarrow 40\left(t + \frac{1}{2}\right) = 130 - 40t$

$\Rightarrow 40t + 20 = 130 - 40t$

$\Rightarrow 80t = 110$

$\Rightarrow t = 1.375$ hrs.

Put t in (2):

$\Rightarrow D = 40\left(1.375 + \frac{1}{2}\right)$ km

$\Rightarrow D = 75$km

75 ..... km [4]