Cambridge Assessment International Education

# Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

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

Paper 1 (Core) **May/June 2020**

**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. Blank pages are indicated.

**1** Write down the value of the 7 in the number 570 296.

70 000 [1]

**2** The table shows the temperature, in °C, at midday on the first day of each month during one year in a city.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 11 | 15 | 19 | 23.5 | 27.5 | 29 | 28 | 25 | 19.5 | 14.5 | 10 |

Calculate the mean of these temperatures.

$\star$ Mean $= \frac{(9+11+15+19+23.5+27.5+29+28+25+19.5+14.5+10)°C}{12}$

$\Rightarrow$ Mean $= 19.25°C$ //

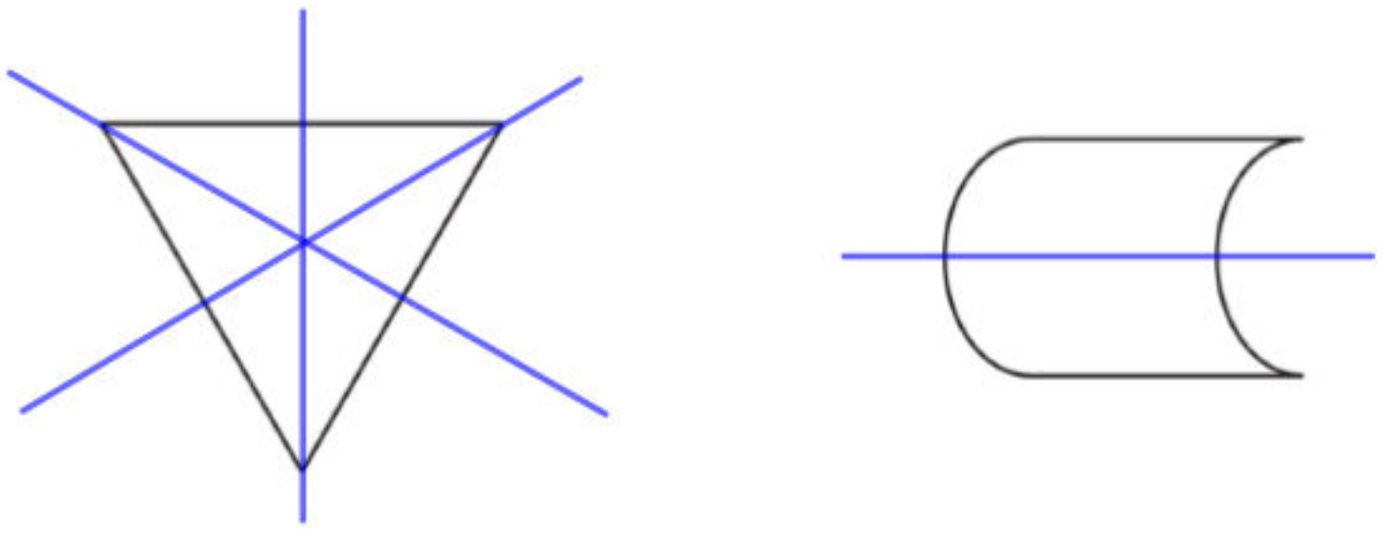
19.25 °C [2]

**3** Write these numbers in order, starting with the smallest.

$\frac{13}{201}$ 6.47%  5.6%  0.065 6.5%  $\frac{5}{89}$ 5.62%

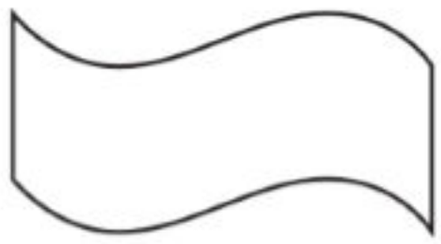
5.6% (smallest) < $\frac{5}{89}$ < $\frac{13}{201}$ < 0.065 [2]

**4** **(a)**



On each shape draw all the lines of symmetry. [3]

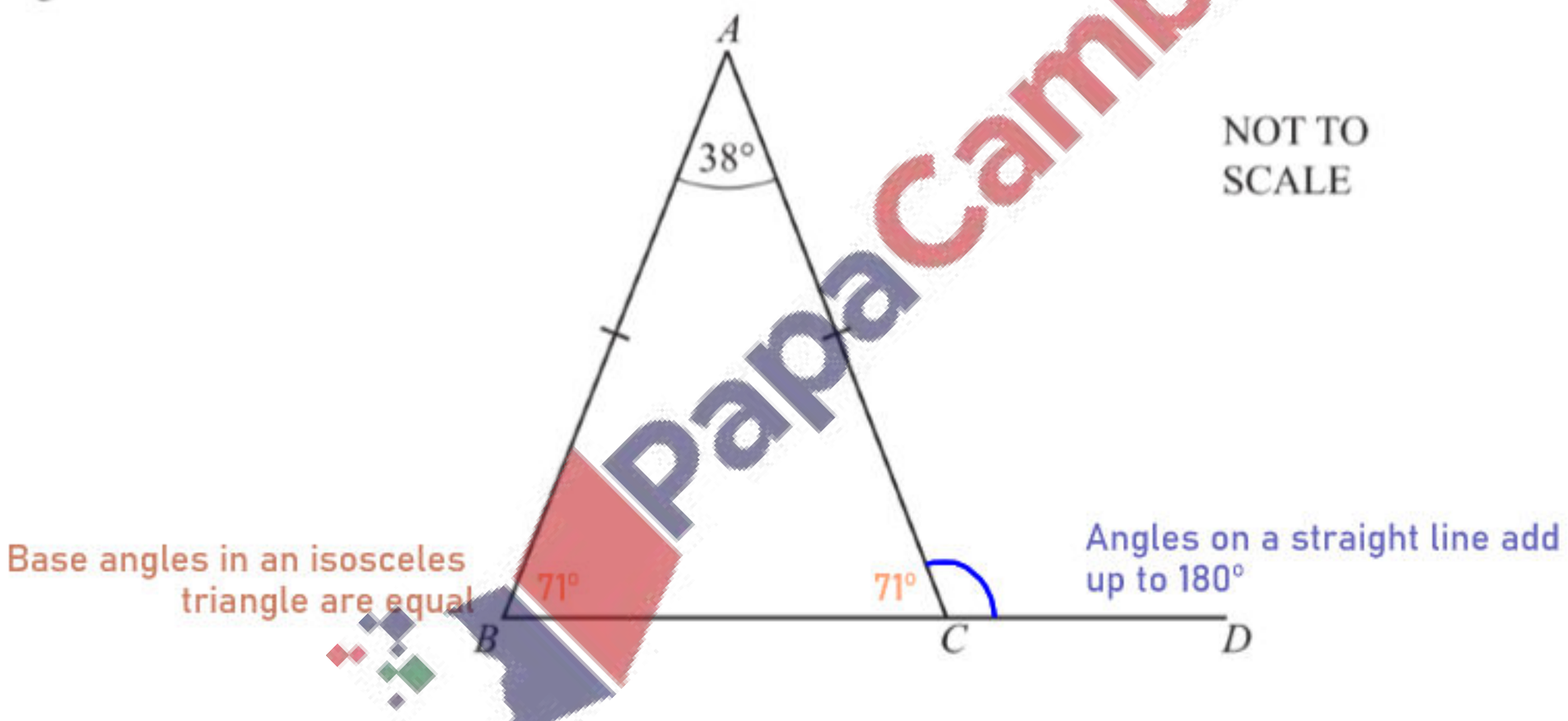
**(b)**



Write down the order of rotational symmetry of this shape.

2 [1]

**5**




In the triangle $ABC$, $AB = AC$ and angle $BAC = 38°$.
$BCD$ is a straight line.

Work out angle $ACD$.

$\star$ $A\hat{C}D + 71° = 180°$

$\Rightarrow A\hat{C}D = 109°$

Angle $ACD$ = 109° [3]

**6** **(a)** Diego flies from Madrid to Buenos Aires.
His flight leaves at 20 55 and arrives at 03 50 local time.
The local time in Buenos Aires is 5 hours behind the local time in Madrid.

Departure
Local time (Madrid) → 20 55
Arrival
Local time (Madrid) → 08 50

Work out, in hours and minutes, the time the flight takes.

hrs. mins.

$$\begin{array}{r} {}^{23}\cancel{24}\ \cancel{00}^{60} \\ -\ 20\ 55 \\ \hline 3\ 5 \end{array} \qquad \begin{array}{r} 08\ 50 \\ +\ 3\ 5 \\ \hline 11\ 55 \end{array}$$

hrs. mins.

11 h 55 min [2]

**(b)** Diego changes 200 euros into Argentine Peso.
The exchange rate is 1 euro = 24.8 pesos.

Work out how many pesos he receives.

$*A_{pesos} = 200 \times 24.8\ pesos$

$= 4960\ pesos$

4960 pesos [1]

**(c)** The distance between Madrid and Buenos Aires is 10 050 km.
Diego's return flight takes 12 hours 30 minutes.

Calculate the average speed, in km/h, for the return flight.

$* v = \frac{d}{t} \Rightarrow v = \frac{10\,050\ km}{12\frac{30}{60}\ h}$

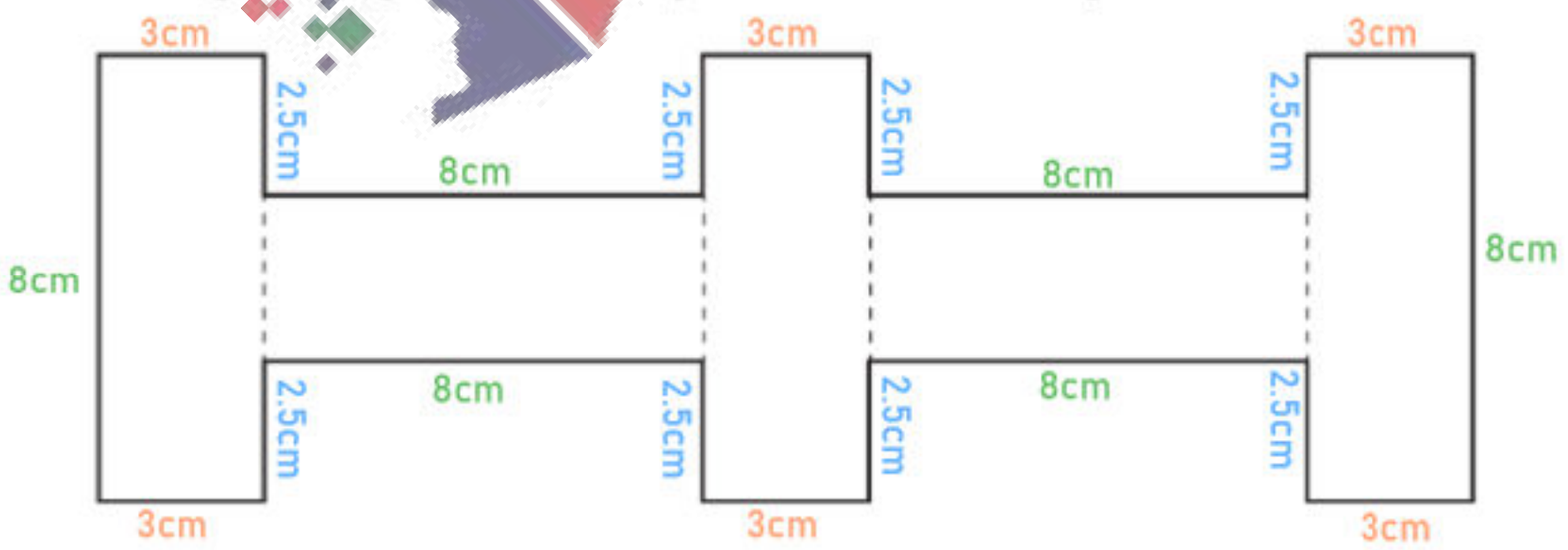
$\Rightarrow v = 804\ km/h$

804 km/h [1]

**7** Rectangle $A$ measures 3 cm by 8 cm.


NOT TO SCALE

Five rectangles congruent to $A$ are joined to make a shape.




NOT TO SCALE

Work out the perimeter of this shape.

$* P = (6 \times 8\,cm) + (6 \times 3\,cm) + (8 \times 2.5\,cm)$

$\Rightarrow P = 86\,cm$

86 cm [2]

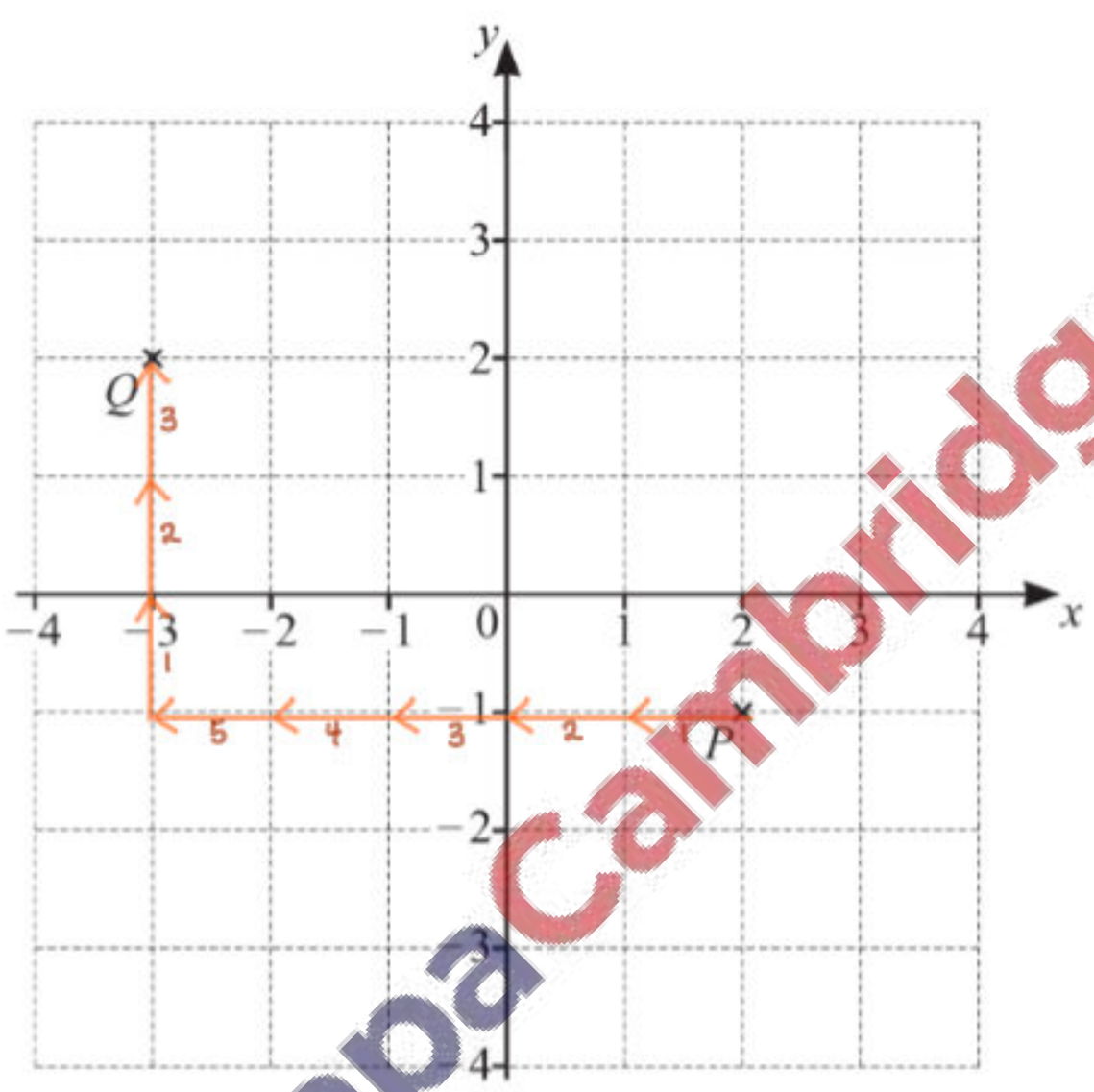
**8** Find the highest **odd** number that is a factor of 60 and a factor of 90.

Factors of 60: 1, 2, 3, 4, 5, 6, 10, 12, (15), 20, 30, 60

Factors of 90: 1, 2, 3, 5, 6, 9, 10, (15), 18, 30, 45, 90

15 [1]

**9**




**(a)** Write $\overrightarrow{PQ}$ as a column vector.

$\begin{pmatrix} -5 \\ 3 \end{pmatrix}$ [1]

**(b)** Write $3\overrightarrow{PQ}$ as a single vector.

$* \ 3\begin{pmatrix} -5 \\ 3 \end{pmatrix} = \begin{pmatrix} 3\times -5 \\ 3\times 3 \end{pmatrix} = \begin{pmatrix} -15 \\ 9 \end{pmatrix}_{//}$

$\begin{pmatrix} -15 \\ 9 \end{pmatrix}$ [1]

**10** Work out the size of one interior angle of a regular 9-sided polygon.

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

$\Rightarrow \text{Interior angle} = \frac{180°(9-2)}{9} = 140°_{//}$

140° [2]

**11** A cone has radius 4.5 cm and height 10.4 cm.

Calculate, in terms of π, the volume of the cone.
[The volume, $V$, of a cone with radius $r$ and height $h$ is $V = \frac{1}{3}\pi r^2 h$.]

$\star\ V = \frac{1}{3}\pi(4.5\text{cm})^2(10.4\text{cm})$

$\Rightarrow V = 70.2\pi\ \text{cm}^3$

70.2π ..... $\text{cm}^3$ [2]

**12** **(a)** The $n$th term of a sequence is $60 - 8n$.

Find the largest number in this sequence.

The largest number is when n=1

$\star\ 60 - 8(1) = 52$

52 ..... [1]

**(b)** Here are the first five terms of a different sequence.

12 $\xrightarrow{+7}$ 19 $\xrightarrow{+7}$ 26 $\xrightarrow{+7}$ 33 $\xrightarrow{+7}$ 40

Find an expression for the $n$th term of this sequence.

$\star\ a_n = a_1 + (n-1)d$

$\Rightarrow a_n = 12 + (n-1) \times 7$

$\Rightarrow a_n = 12 + 7n - 7$

$\Rightarrow a_n = 7n + 5$

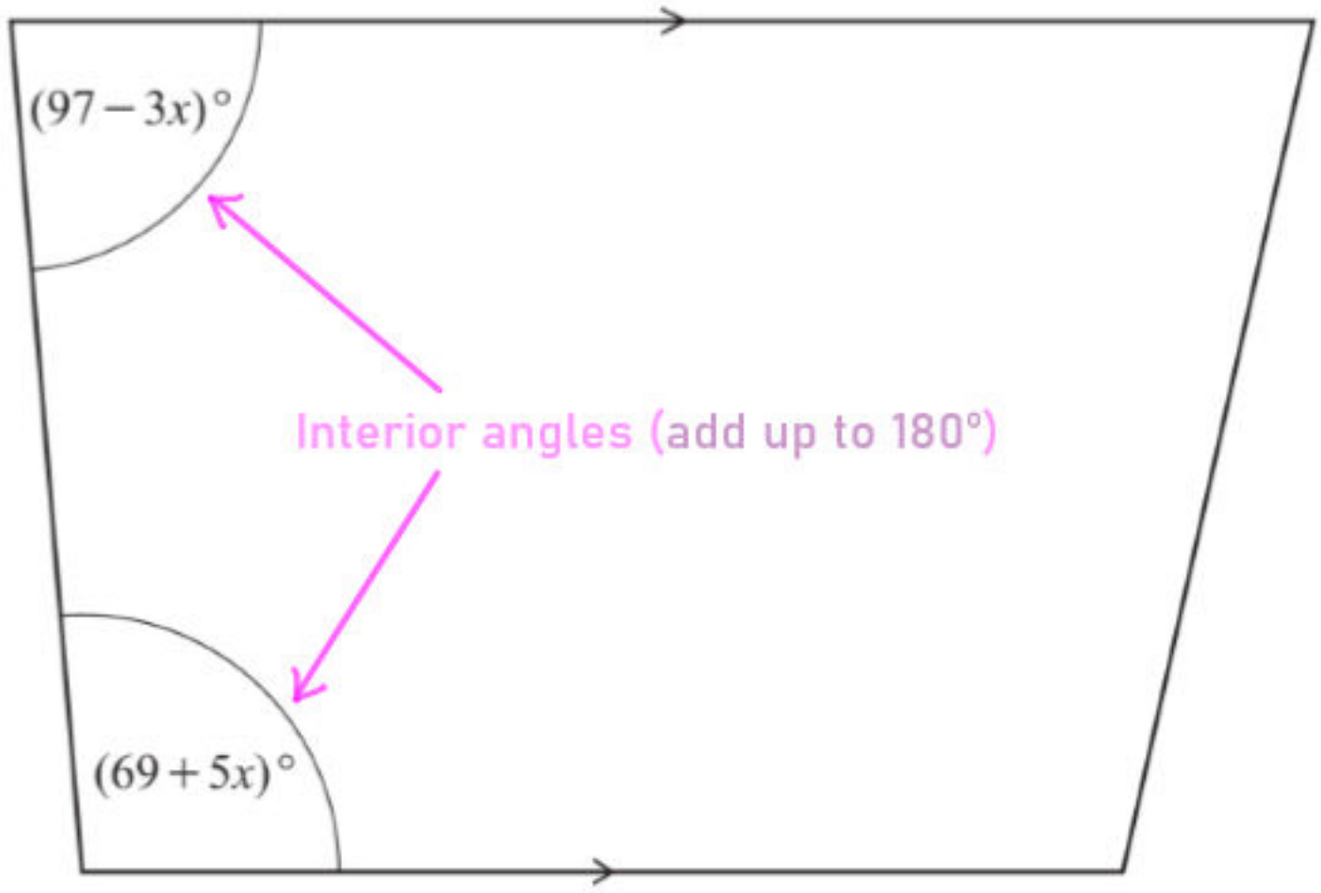
7n+5 ..... [2]

**13** Factorise completely.

$21a^2 + 28ab$

7a(3a+4b) ..... [2]

**14** The diagram shows a trapezium.




Work out the value of $x$.

$\star\ 97-3x+69+5x=180$

$\Rightarrow 166+2x=180$

$\Rightarrow 2x=14$

$\Rightarrow x=7$

$x =$ 7 [3]

**15** Simplify.

$4p^5q^3 \times p^2q^{-4}$

$\Rightarrow 4p^{5+2}q^{3+(-4)}$

$\Rightarrow 4p^7q^{-1}$

$4p^7q^{-1}$ [2]

**16** **(a)** Write the number 0.0605 in standard form.

$0.0605 \rightarrow 6.05 \times 10^{-2}$

$6.05 \times 10^{-2}$ [1]

**(b)** Calculate $(1.63\times10^{12})\times(2.47\times10^{-1})$. Give your answer in standard form.

$= 1.63 \times 2.47 \times 10^{12+(-1)}$

$= 4.0261 \times 10^{11}$

$4.0261 \times 10^{11}$ [1]

**17** Expand and simplify.

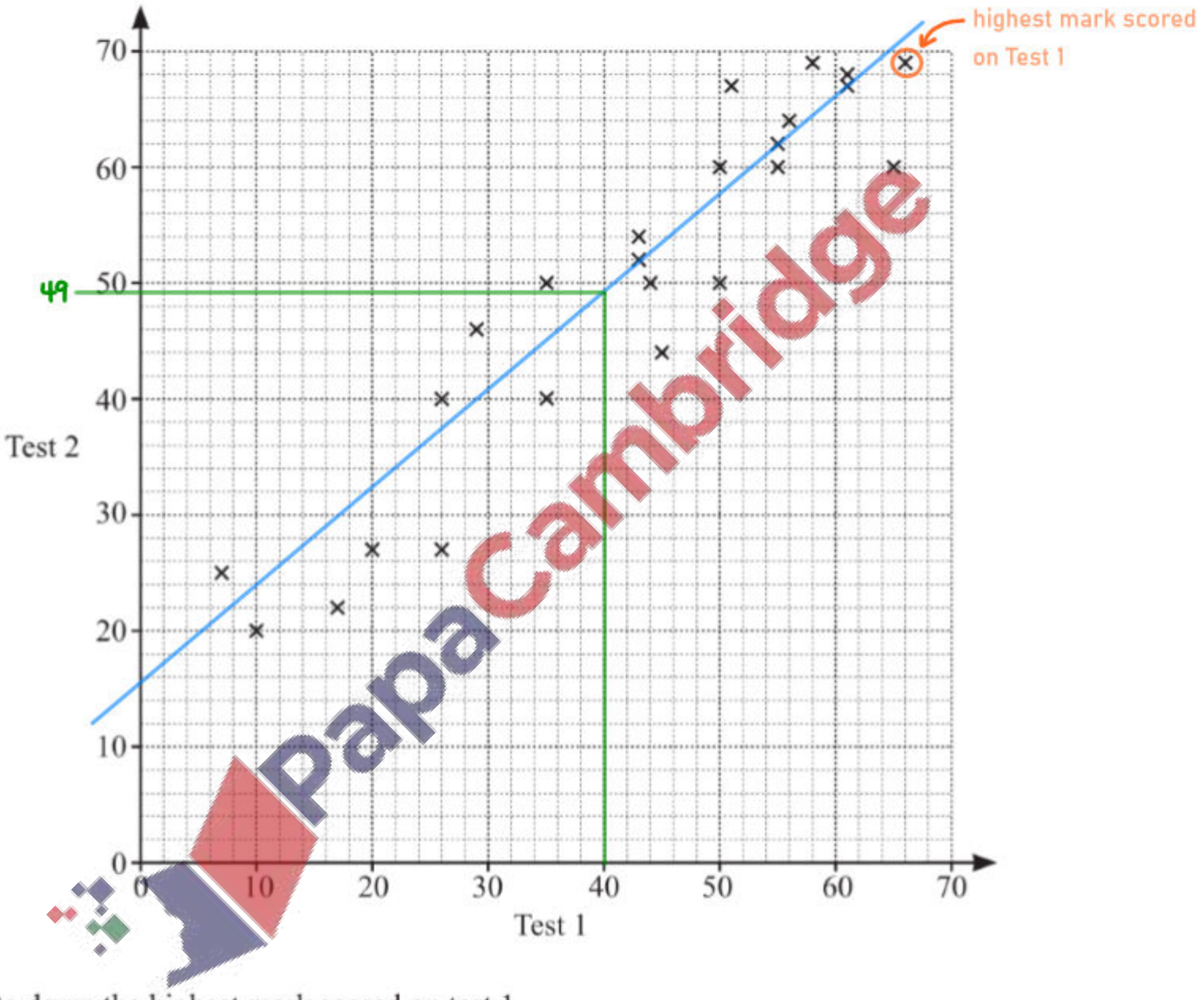
$(x-5)(x-7)$

$\Rightarrow x^2-7x-5x+35$

$\Rightarrow x^2-12x+35$ //

$x^2-12x+35$ ..... [2]

**18** Mrs Salaman gives her class two mathematics tests.
The scatter diagram shows information about the marks each student scored.






**(a)** Write down the highest mark scored on test 1.

66 ..... [1]

**(b)** Write down the type of correlation shown in the scatter diagram.

positive ..... [1]

**(c)** Draw a line of best fit on the scatter diagram. [1]

**(d)** Hamish scored a mark of 40 on test 1.
He was absent for test 2.

Use your line of best fit to find an estimate for his mark on test 2.

49 ..... [1]

**19** The length, $l$ cm, of a sheet of paper is 29.7 cm, correct to the nearest millimetre. 1mm = 0.1cm

Complete this statement about the value of $l$.

* $l = 29.7\text{cm} \pm \frac{0.1\text{cm}}{2}$

* $LB(l) = \left(29.7 - \frac{0.1}{2}\right)\text{cm} = 29.65\text{cm}$

* $UB(l) = \left(29.7 + \frac{0.1}{2}\right)\text{cm} = 29.75\text{cm}$

29.65 $\leqslant l <$ 29.75 [2]

**20** **Without using a calculator**, work out $\left(2\frac{1}{3} - \frac{7}{8}\right) \times \frac{6}{25}$.

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

$\Rightarrow \left(\frac{7}{3} - \frac{7}{8}\right) \times \frac{6}{25}$

$\Rightarrow \left(\frac{56 - 21}{24}\right) \times \frac{6}{25}$

$\Rightarrow \frac{\overset{7}{\cancel{35}}}{\underset{4}{\cancel{24}}} \times \frac{\overset{1}{\cancel{6}}}{\underset{5}{\cancel{25}}}$

$\Rightarrow \frac{7}{20}$

$\frac{7}{20}$ [4]

**21** Lucia invests $5000 at a rate of 4.5% per year compound interest.

Calculate the value of her investment at the end of 7 years.

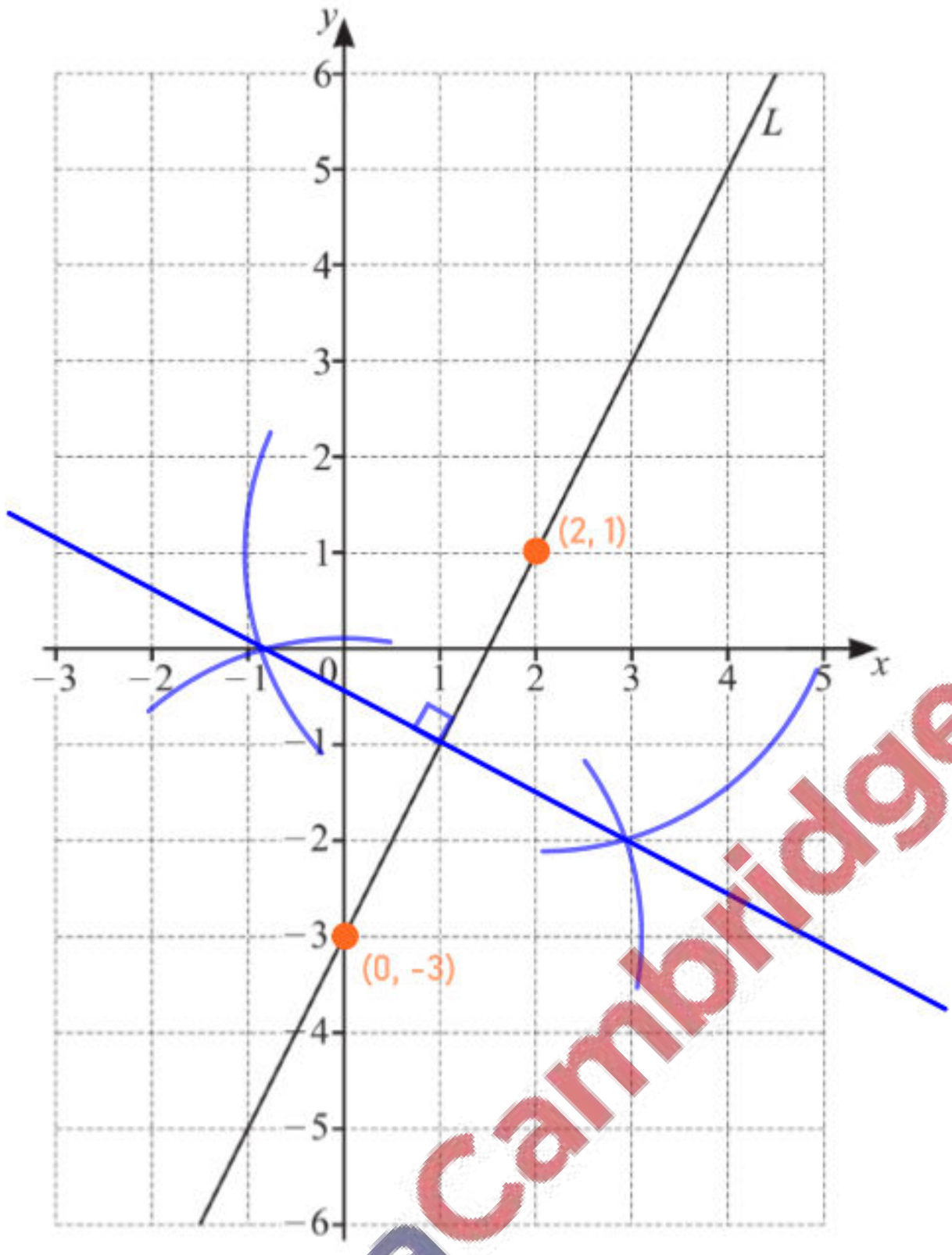
* $A = a\left(1 + \frac{r}{100}\right)^t$

$\Rightarrow A = \$5000\left(1 + \frac{4.5}{100}\right)^7$

$\Rightarrow A = \$6804.31\ (2\text{dp})$

$ 6804.31 [2]

**22**

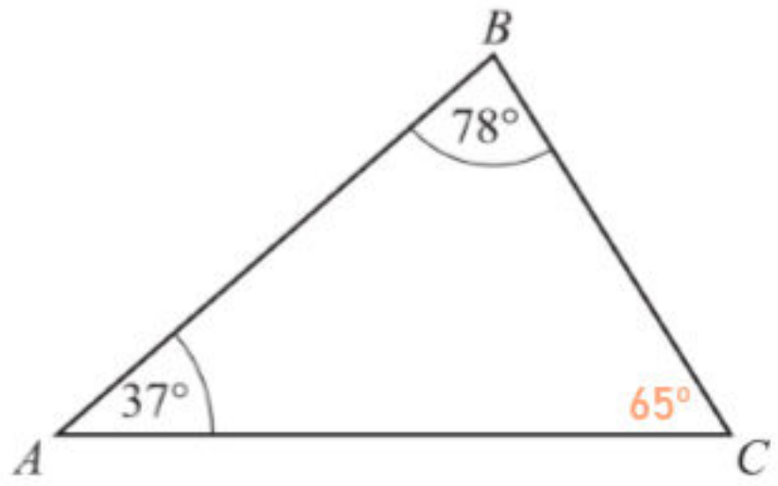


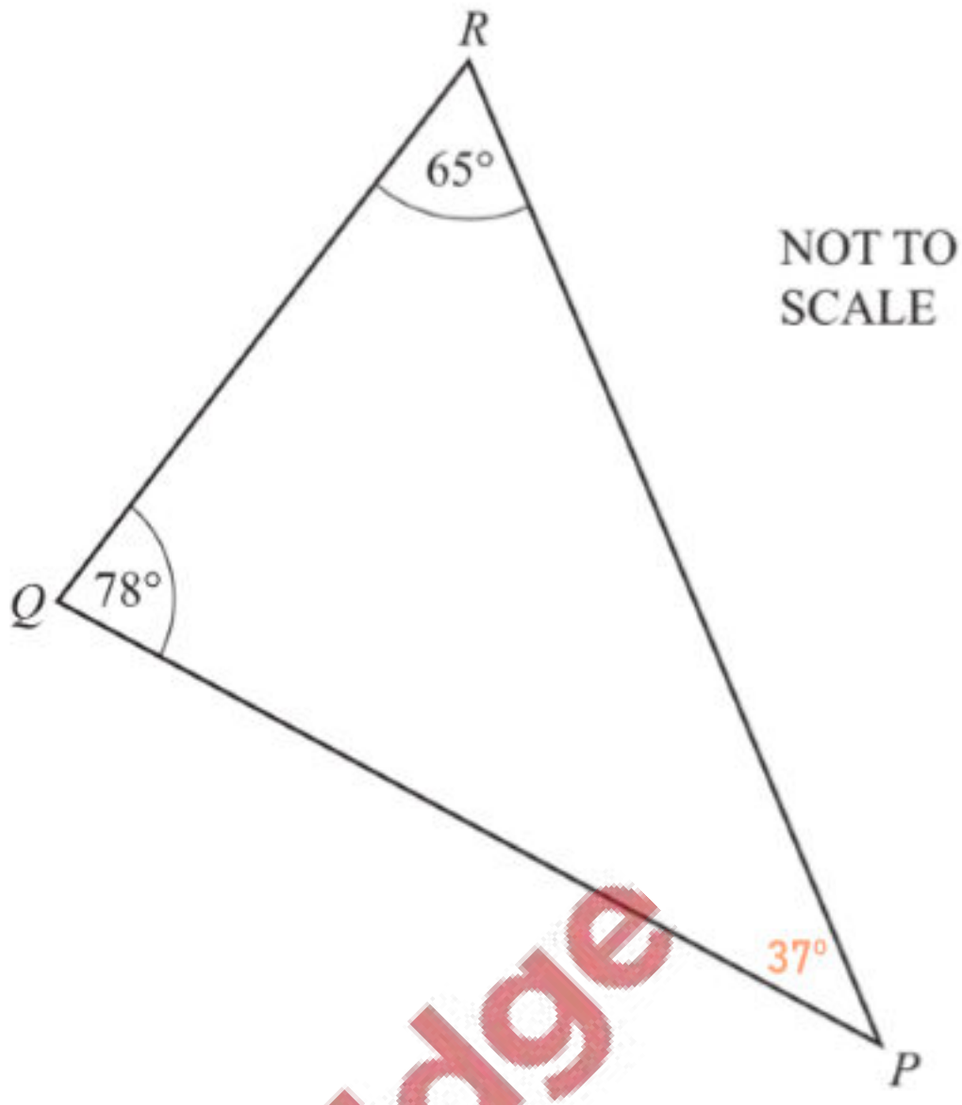

**(a)** Find the equation of line $L$ in the form $y = mx + c$.

$y =$ ..... [2]

**(b)** On the grid, draw a line that is perpendicular to line $L$. [1]

**23**




NOT TO SCALE

Explain why triangle *ABC* is similar to triangle *PQR*.

All the angles in both triangles are equal. Based on the AAA criteria, they are similar. [2]