

Tuesday 5 November 2019 – Morning

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You may use:

- a scientific or graphical calculator
- geometrical instruments
- tracing paper



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

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Candidate number

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First name(s)

Last name

INSTRUCTIONS

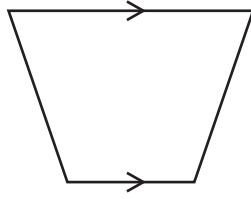
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required, but you must clearly show your candidate number and question number(s).

INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [].
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **16** pages.

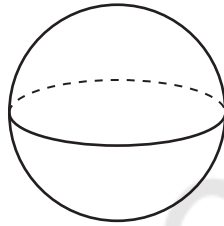
Answer **all** the questions.

- 1 (a) Write down the mathematical name of this quadrilateral.



(a) **Trapezium** [1]

- (b) Write down the mathematical name of this solid.



(b) **Sphere** [1]

- 2 (a) Complete this list to show all the factors of 30.

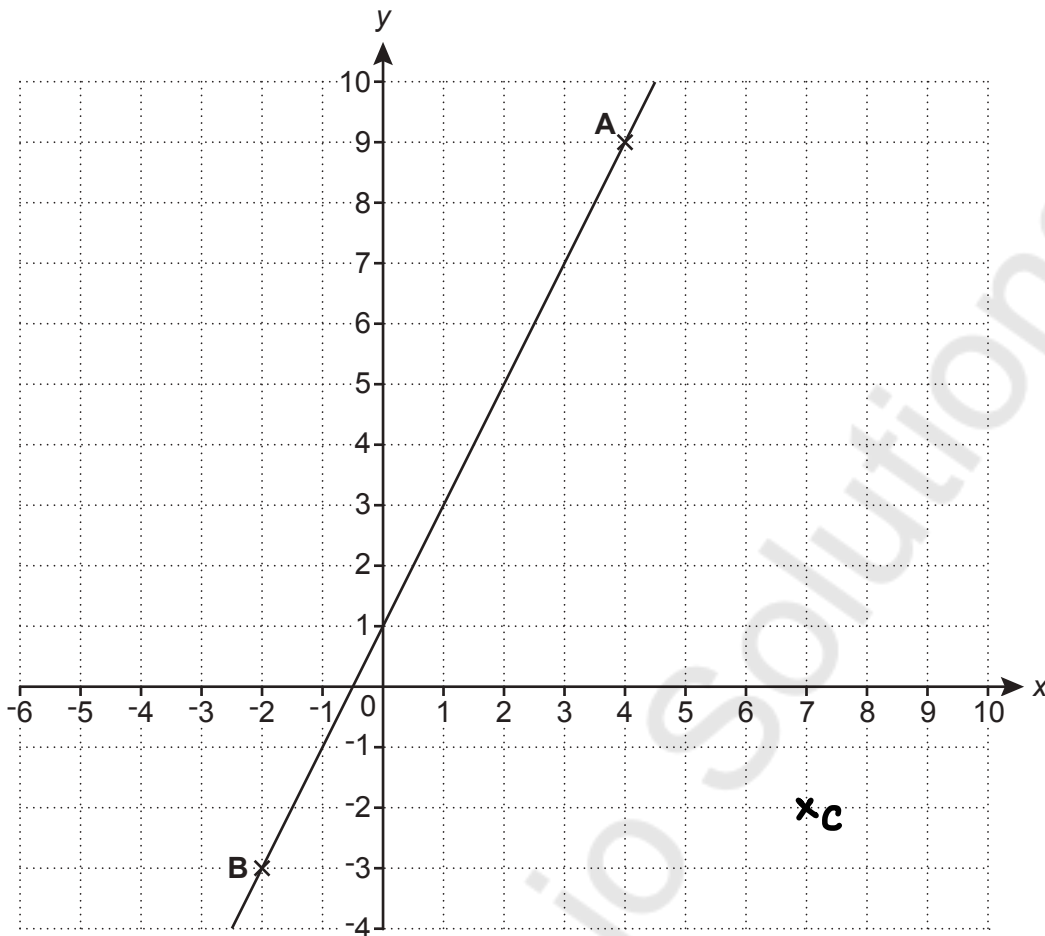
1 2 **3** **5** **6** 10 **15** 30 [2]

- (b) Write down the highest common factor (HCF) of 25 and 30.

25
1 **25**
5

(b) **5** [1]

- 3 Line AB is shown on this coordinate grid.



- (a) Write down the coordinates of

(i) point A,

(a)(i) (..... **4**, **9**) [1]

(ii) point B.

(ii) (..... **-2**, **-3**) [1]

- (b) Plot point C on the grid at (7, -2). [1]

- (c) The equation of line AB is $y = 2x + 1$.
A line parallel to AB goes through the point (0, 4).

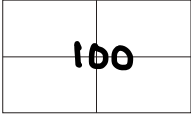
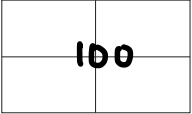

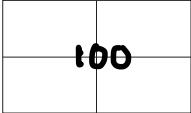

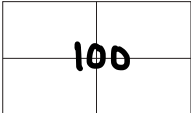
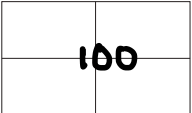
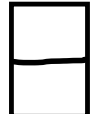
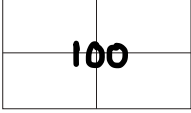
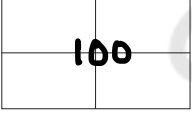

Write down the equation of the parallel line.

$$m = 2 \quad c = 4$$

$$y = mx + c$$

(c) **$y = 2x + 4$** [2]

- 4 A theme park asked 900 people to choose their favourite activity from a list of five. The pictogram shows the results for four of the activities.

Thrill rides				= 250
Family rides			= 125	
Entertainment			= 200	
Children's rides				
Water rides				275

Key:  represents 100 people

- (a) (i) How many people chose entertainment?

(a)(i) **200** [1]

- (ii) How many **more** people chose water rides than family rides?

$$275 - 125 = 150$$

(ii) **150** [2]

- (iii) All 900 people chose one of the five activities.

Complete the pictogram for children's rides.

[3]

$$900 - 250 - 125 - 200 - 275 = 50$$

- (b) Will plays a game at the theme park.
There are 20 cards numbered from 1 to 20.
Will takes a card at random.
He wins if the card he chooses shows a prime number.

Work out the probability that Will wins.
Give your answer as a fraction in its simplest form.

Primes : 2, 3, 5, 7, 11, 13, 17, 19

$$\frac{8}{20} \div 4 = \frac{2}{5}$$

(b) $\frac{2}{5}$ [4]

- (c) A family ticket for the theme park costs £68.
If the ticket is bought online it costs 15% less.

How much does it cost to buy a family ticket online?

$$100 - 15 = 85\% \rightarrow 0.85$$

$$0.85 \times 68 = 57.8$$

$$\pounds 57.80$$

(c) £.....**57.80**..... [3]

5 Simplify.

(a) $4a + 5a - 7a$

$$9a - 7a = 2a$$

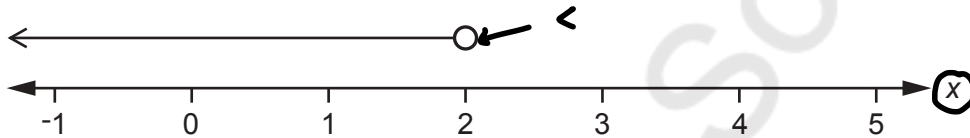
(a) $2a$ [1]

(b) $3g - 2f + 8g + 5f$

$$11g + 3f$$

(b) $11g + 3f$ [2]

6 Write down the inequality shown on this number line.



..... $x < 2$ [2]

7 Factorise fully.

(a) $6 + 9y$

$$3(2 + 3y)$$

(a) $3(2 + 3y)$ [1]

(b) $2x^2 + 6x$

$$\text{HCF of } 2 \text{ \& } 6 = 2$$

$$\text{HCF of } x^2 \text{ \& } x = x$$

$$2x(x + 3)$$

(b) $2x(x + 3)$ [2]

8 Plaza United are playing a football match away from home.

- (a) 379 supporters are going to the match by coach.
Each coach seats 45 people.

What is the smallest number of coaches that will be needed?

$$379 \div 45 = 8.42$$

$$\approx 9$$

(a) 9 [2]

- (b) In their last 50 matches, Plaza United have drawn 10 matches, lost 5 and won the rest.

Sam claims

The probability that Plaza United will win this match is 0.7.

- (i) Show calculations to support Sam's claim. [2]

$$\begin{aligned} \text{Won} &= 50 - 10 - 5 \\ &= 35 \end{aligned}$$

$$\frac{35}{50} = \frac{7}{10} = 0.7$$

- (ii) Give one reason why Sam's claim may not be reliable.

..... Past opponents may be a different standard.....

..... [1]

- 9 Mr and Mrs Jones buy cinema tickets for themselves and their three children. The cost of an adult ticket is £6 more than a child ticket. The total cost of the **five** tickets is £45.

Work out the cost of an adult ticket.

$$\text{Child} = x$$

$$\text{Adult} = x + 6$$

$$x + 6 + x + 6 + x + x + x = 45$$

$$5x + 12 = 45$$

$$- 12 \quad - 12$$

$$5x = 33$$

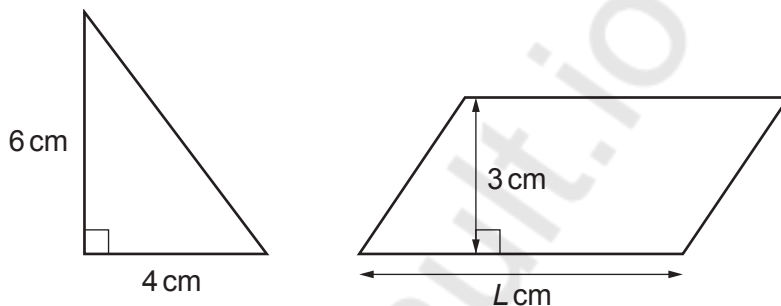
$$\div 5 \quad \div 5$$

$$x = 6.6$$

An adult ticket costs £ **12.60** [5]

$$\text{Adult} = 6.6 + 6 = 12.6$$

- 10 The area of the parallelogram is four times the area of the triangle.



Calculate the length, L , of the parallelogram.

$$\begin{aligned} \text{Area triangle} &= \frac{1}{2}bh \\ &= \frac{1}{2} \times 4 \times 6 \\ &= 12 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area parallelogram} &= 4 \times 12 \\ &= 48 \text{ cm}^2 = b \times h \\ &= 48 = b \times 3 \end{aligned}$$

$$b = \frac{48}{3} \dots\dots\dots 16 \dots \text{ cm [5]}$$

$$= 16$$

- 11 Harry has a job.
On Friday, he is paid £8.50 per hour.
On Saturday, he is paid $1\frac{1}{2}$ times that rate.

He works for 4 hours on Friday.

He works from 8am until 1pm on Saturday. **- 5 hours**

How much does Harry earn in total for these two days?

Friday

$$4 \times 8.50 = \text{£}34$$

Saturday

$$1.5 \times 8.50 = 12.75$$

$$5 \times 12.75 = 63.75$$

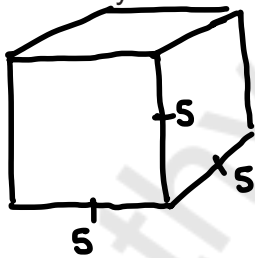
Total

$$\text{£}34 + \text{£}63.75 = \text{£}97.75$$

£ 97.75 [6]

- 12 The volume of a cube is 125cm^3 .

Calculate the total surface area of the cube.
Give the units of your answer.



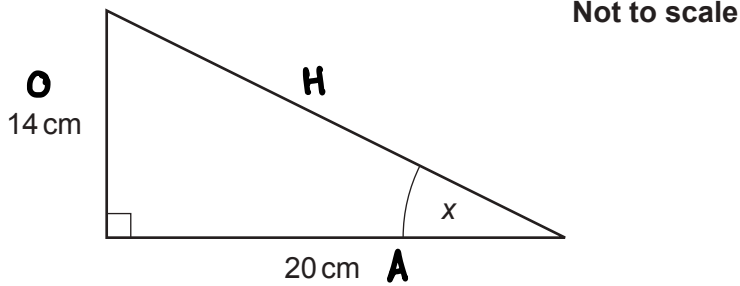
$$\sqrt[3]{125} = 5$$

$$\text{One face} = 5 \times 5 = 25\text{cm}^2$$

$$6 \text{ faces} = 25 \times 6 = 150\text{cm}^2$$

..... 150 cm² [5]

- 13 Here is a right-angled triangle.



Show that angle x is 35° , correct to the nearest degree.

[3]

$$S^{\circ} H \quad C^A H \quad T^{\circ} A^{\vee}$$

$$\tan(x) = \frac{O}{A}$$

$$\tan(x) = \frac{14}{20}$$

$$x = \tan^{-1}\left(\frac{14}{20}\right)$$

$$= 34.9920202$$

$$\approx 35^\circ$$

- 14 Dean drives a distance of 760 km in 9 hours.
Robert drives a distance of 559 km in 6 hours 30 minutes.

D
S T

Who has the highest average speed?
Show how you decide.

Dean

$$760 \div 9 = 84.4 \text{ km/h}$$

Robert

$$559 \div 6.5 = 86 \text{ km/h}$$

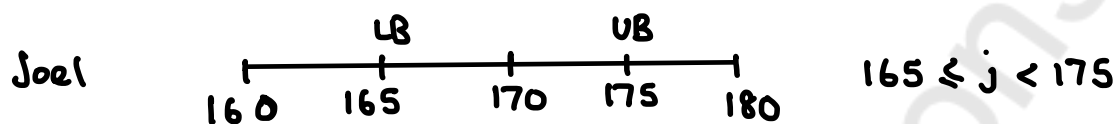
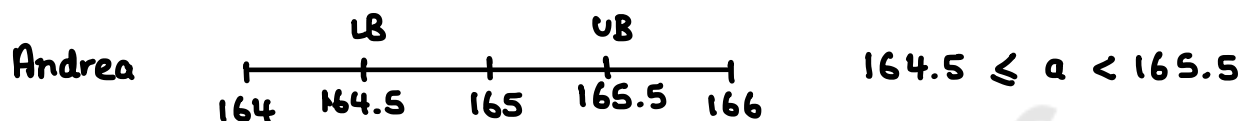
..... Robert because $86 > 84.4$

[4]

- 15 Andrea is 165 cm tall, correct to the nearest cm.
Joel is 170 cm tall, correct to the nearest 10 cm.

Show that Andrea could be taller than Joel.

[3]



If Andrea 165.4 cm and Joel is 165 cm

- 16 Carol makes birthday cards.
Each card takes the same amount of time to make.

She makes 3 cards in 48 minutes.
She has an order for 80 cards.

Can she complete this order in 3 days if she works 8 hours each day?
Show how you decide.

$$\begin{array}{r}
 3 \text{ cards} = 48 \text{ mins} \\
 \div 3 \qquad \qquad \qquad \div 3 \\
 1 \text{ card} = 16 \text{ mins} \\
 \times 80 \qquad \qquad \qquad \times 80 \\
 80 \text{ cards} = 1280 \text{ mins} \\
 \qquad \qquad \qquad \downarrow \div 60 \\
 \qquad \qquad \qquad 21.3 \text{ hours}
 \end{array}$$

$$3 \times 8 \text{ h} = 24 \text{ hours}$$

Yes because $21.3 < 24$

[5]

17 The table below shows the area, in square kilometres (km^2), of some countries.

Country	Area (km^2)
Australia	7.69×10^6
Latvia	6.46×10^4
Luxembourg	2.59×10^3
Russia	1.71×10^7
Singapore	7.24×10^2
Sweden	4.50×10^5

(a) Write the area of Sweden as an ordinary number.

4 50 000

(a) 450,000 km^2 [1]

(b) Which of the above countries has the smallest area?

(b) Singapore [1]

(c) Alexis says

$$7.69 \times 10^6$$

The area of Australia is approximately three times larger than the area of Luxembourg.

Is she correct?

Show how you decide.

$$2.59 \times 10^3$$

$$7.69 \times 10^6 \div 2.59 \times 10^3 = 2969.11$$

Alexis is ~~incorrect~~ because Australia is around 3000 times larger than Luxembourg [2]

(d) Work out the total area of Russia and Australia.

Give your answer in standard form, correct to 2 significant figures.

$$1.71 \times 10^7 + 7.69 \times 10^6 = 24790000$$

$$\approx 25000000$$

$$= 2.5 \times 10^7$$

(d) 2.5×10^7 km^2 [4]

- 18 Bob makes dry concrete by mixing cement, sand and stone in the ratio 1 : 2 : 3 by weight. He buys the cement, sand and stone in bags as shown in this table.

	Weight of bag (kg)	Cost per bag (£)
Cement	25	5.50
Sand	20	2.00
Stone	15	3.90

He packs the dry concrete into 30 kg bags.

Bob buys just enough cement, sand and stone to make 50 bags of dry concrete.

- (a) Show that Bob buys 500 kg of sand.

[3]

$$\begin{aligned} \text{Total kg} &= 30 \times 50 \\ &= 1500 \end{aligned}$$

$$c : s : st$$

$$1 + 2 + 3 = 6$$

$$1500 \div 6 = 250$$

$$\begin{aligned} \text{Sand} &= 2 \times 250 \\ &= 500 \text{ kg.} \end{aligned}$$

- (b) Bob sells the 50 bags of dry concrete for a total of £396.

Calculate Bob's percentage profit.

$$\begin{aligned} \text{Cement : } & 1 \times 250 = 250 \text{ kg} \\ & 250 \div 25 = 10 \text{ bags} \\ & 10 \times \text{£}5.50 = \text{£}55 \end{aligned}$$

$$\begin{aligned} \text{Sand : } & 500 \text{ kg} \\ & 500 \div 20 = 25 \text{ bags} \\ & 25 \times \text{£}2 = \text{£}50 \end{aligned}$$

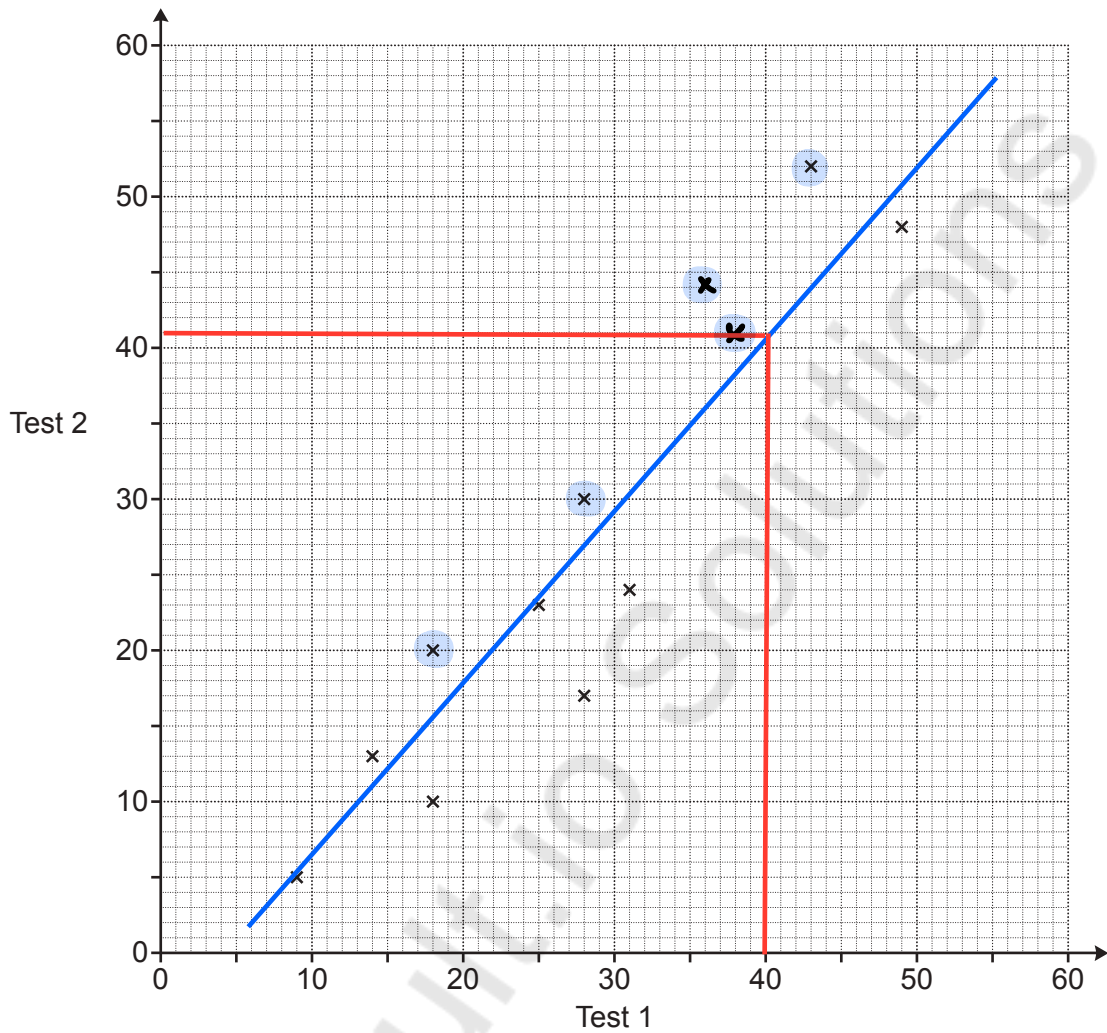
$$\begin{aligned} \text{Stone : } & 3 \times 250 = 750 \text{ kg} \\ & 750 \div 15 = 50 \text{ bags} \\ & 50 \times 3.90 = \text{£}195 \end{aligned} \quad (b) \dots\dots\dots$$

$$\begin{aligned} \text{Total} &= 55 + 50 + 195 \\ &= 300 \end{aligned}$$

$$\begin{aligned} \% \text{ profit} &= \frac{396 - 300}{300} \times 100 \\ &= 32 \end{aligned}$$

32 % [5]

- 19 12 students take two tests.
 Each test is out of 60.
 The scatter diagram shows the results for 10 of the students.



- (a) The table shows the results for the other 2 students.

Test 1	36	38
Test 2	44	41

Plot these results on the scatter diagram.

[1]

- (b) Describe the type of correlation shown in the scatter diagram.

(b) Positive [1]

- (c) (i) Draw a line of best fit on the scatter diagram. [1]
- (ii) Another student was absent for Test 2.
The student scored 40 marks on Test 1.

Use your line of best fit to estimate a result for this student on Test 2.

(c)(ii) **41** [1]

- (d) Work out the percentage of **the 12 students** whose result on Test 1 is **lower** than their result on Test 2.

$$\frac{5}{12} \times 100 = 41.\dot{6}$$

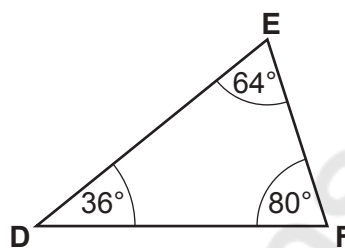
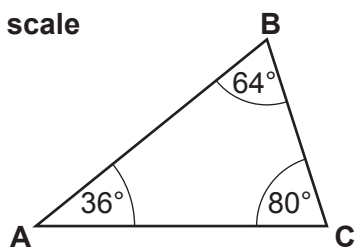
$$\approx 41.7\%$$

(d) **41.7%** % [4]

Turn over for Question 20

- 20 (a) Are these two triangles definitely congruent?
Give a reason.

Not to scale

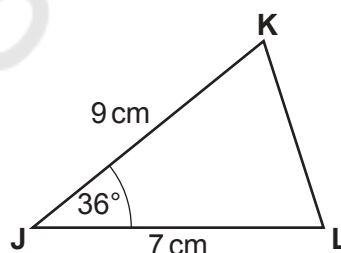
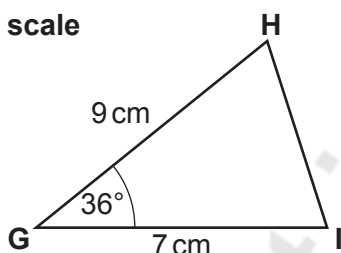


..... **No** because **lengths** are **unknown**.....

 [1]

- (b) Prove that these two triangles are congruent.

Not to scale



..... **Angle IGH = Angle LJK = 36°**
 **GH = JK = 9cm**
 **GI = JL = 7cm**

 **∴ SAS - congruent.** [3]

END OF QUESTION PAPER

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