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OCR
Oxford Cambridge and RSA

GCSE (9-1)

Examiners' report

MATHEMATICS

J560
For first teaching in 2015

J560/01 November 2019 series

Version 1

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates. The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report. A full copy of the question paper can be downloaded from OCR.

Paper 1 series overview

This calculator paper is the first of the three papers taken by Foundation candidates for the GCSE (9-1) Mathematics specification.

Overall the paper proved accessible to all candidates. Most questions were attempted by the majority of candidates.

A significant number of candidates showed working that indicated that they were not using a calculator, this frequently led to arithmetic errors and a consequent loss of marks.

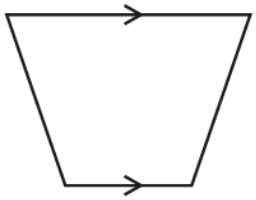
Many candidates did not check whether their answers to questions set in context were reasonable, for example payments for a few hours work varied from a few pounds to many thousands of pounds and suggested heights for people varied from as little as 12 cm to several metres.

Key points

- Candidates should use the most efficient methods to answer questions and not rely on trial and improvement.
- Candidates need to set their work out clearly and show the steps in their working.
- Numbers should be written clearly, for example 4, 7 and 9.

Question 1 (a)

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

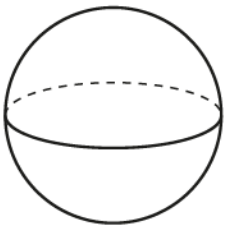


(a) ..... **[1]**

Many candidates were unable to give the correct answer, with rhombus and parallelogram being the most common wrong answers.

Question 1 (b)

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



(b) ..... **[1]**

Most candidates identified 'sphere', although many struggled with the spelling.

Question 2 (a)

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

1 2 .... 10 ..... 30 **[2]**

This was well answered with most candidates identifying all the factors correctly.

Question 2 (b)

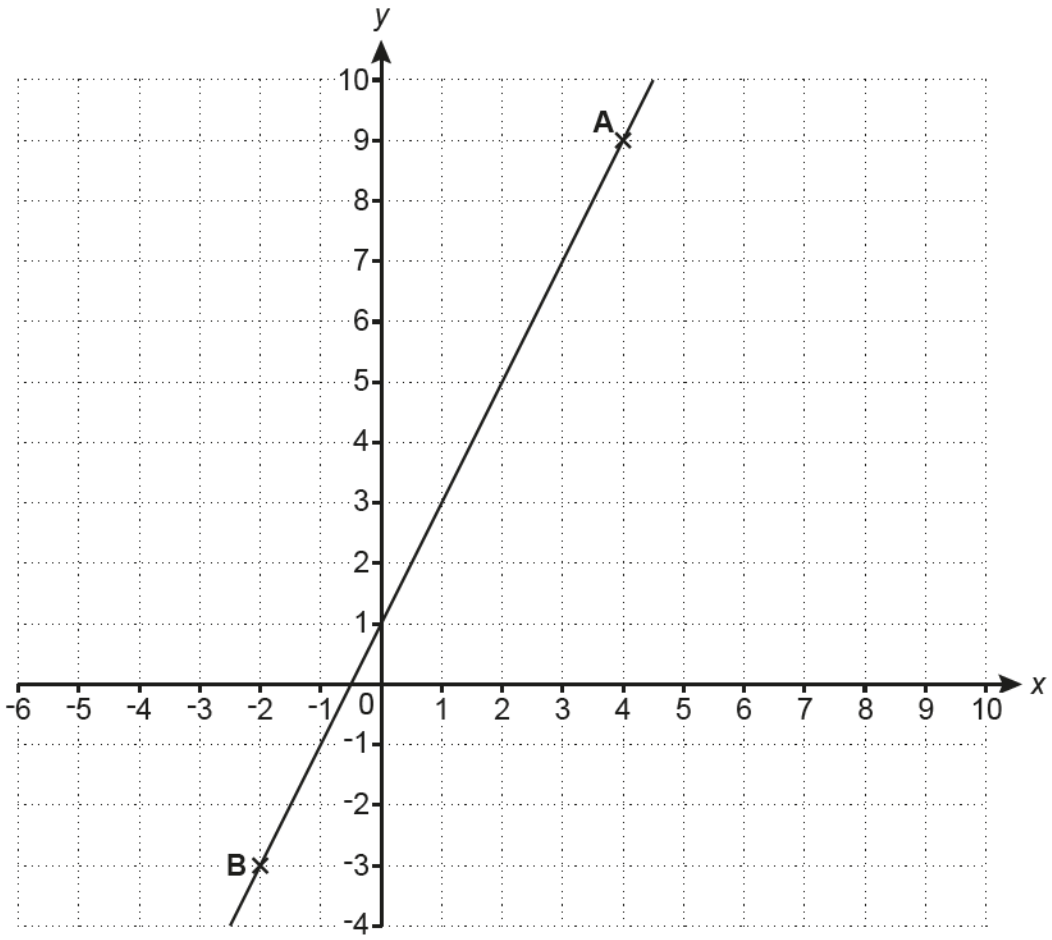
(b) Write down the highest common factor (HCF) of 25 and 30.

(b) ..... **[1]**

Many correct answers were seen to this part. The most common error was identifying the LCM.

Question 3 (a) (i), (a) (ii) and (b)

3 Line AB is shown on this coordinate grid.



(a) Write down the coordinates of

(i) point A,

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

(ii) point B.

(ii) (..... , ...) **[1]**

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

All candidates attempted this question and were able to demonstrate a good understanding of coordinates. Nearly all candidates got parts (a)(i), (a)(ii) and (b) right.

Question 3 (c)

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

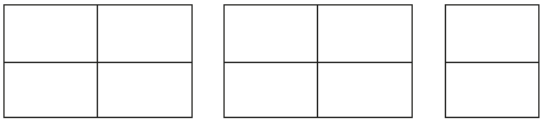
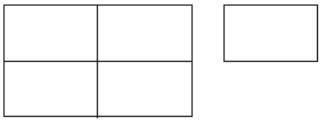
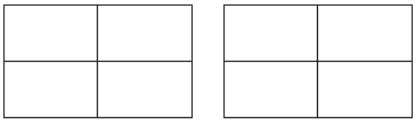
Write down the equation of the parallel line.

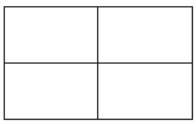
(c) ..... **[2]**

Parallel lines proved much more challenging for candidates. Only the more able candidates appreciated the link between the *x* coefficient and the gradient. A significant number showed little understanding and various digits were linked to the letters *x* and *y*. The original equation was offered as the answer on a number of occasions and answers were not always in equation form.

Question 4 (a) (i), (a) (ii) and (a) (iii)

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	
Family rides	
Entertainment	
Children's rides	
Water rides	

Key:  represents 100 people

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

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

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

(ii) ..... **[2]**

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

Complete the pictogram for children's rides. **[3]**

Nearly all candidates answered part (a) and most of them got the correct answers.

Question 4 (b)

(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.

(b) ..... **[4]**

The common mark on this question was 2 out of 4 from B1 and M1. A very common pair of errors was to include 1 in the list of primes and exclude 2.

Question 4 (c)

(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?

(c) £ ..... **[3]**

Many candidates scored full marks and several scored 1 mark. Far too many candidates used non-calculator methods, which often led to arithmetic errors.

Question 5 (a)

5 Simplify.

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

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

Part (a) was generally well answered.

Question 5 (b)

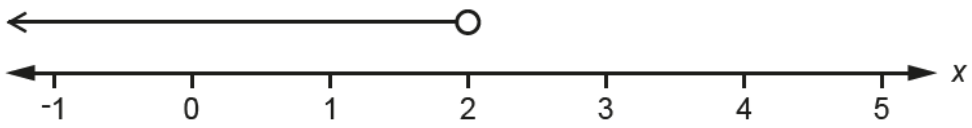
(b) $3g - 2f + 8g + 5f$

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

Many candidates scored both marks. Fewer were giving $11g + 3f = 14gf$. There is still a lack of understanding of signs, with some candidates giving $11g - 3f$ as the answer.

Question 6

6 Write down the inequality shown on this number line.



..... **[2]**

This was not generally well answered, and many candidates did not include x in their answer. Common errors included < 2 and $-1 < 2$. Of those who did give an inequality most gave the correct one, with only a small number reversing the sign or using ≤.

Question 7 (a)

7 Factorise fully.

(a) $6 + 9y$

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

This was well answered. The common error was 15*y*.

Question 7 (b)

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

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

Many correct answers were seen. Some candidates only used 2 or *x* as a factor rather than both, and these generally scored 1 mark.

Question 8 (a)

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?

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

The majority of candidates, having divided 379 by 45, realised that rounding down was not practical and gave a correct answer of 9 coaches. A minority obtained 8.4222… from a correct calculation before giving an answer of 8 coaches for 1 method mark. Despite this being a calculator paper some used inefficient methods of counting up or down resulting in arithmetic errors.

Question 8 (b) (i)

(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]**

The most common response included a reference to 35 wins which scored 1 mark, but several did not go on to show $\frac{35}{50}$ or 35 ÷ 50 in order to gain both marks.

Question 8 (b) (ii)

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

.....

..... **[1]**

Few candidates scored this mark as they had not realised the need to refer to past performance.

Question 9

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.

An adult ticket costs £ ..... **[5]**

Although several correct answers were seen with clearly set out working as shown in **Exemplar 1** below, many candidates did not use algebra. Many used trials with haphazard working all over the page. Candidates should be encouraged the use the most efficient method and to set working out clearly.

Exemplar 1

Adult ticket +6 for both is £12 more

Total £45.

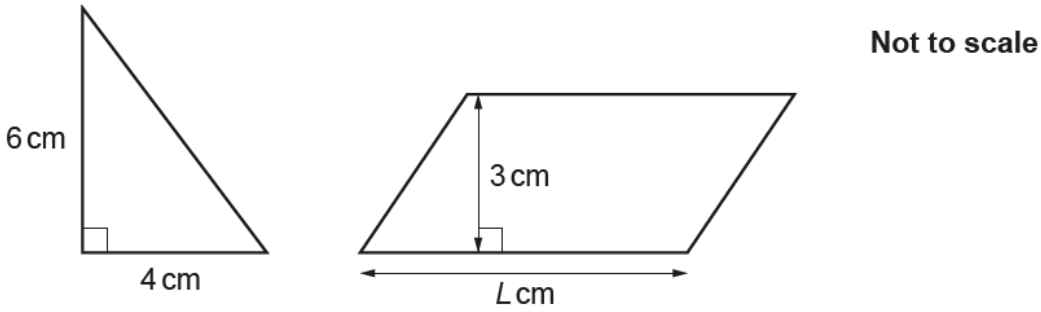
6.60 45-12 = ~~30~~ 33 33÷5 = 6.60 for child.

for an Adult it's 12.60

An adult ticket costs £ £12.60 **[5]**

Question 10

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



Not to scale

Calculate the length, L, of the parallelogram.

..... cm **[5]**

Some candidates were unable to find the area of the triangle and many stated it was 24, but they did then multiply by 4 and divide by 3, scoring some method marks. A small number attempted to use Pythagoras' theorem.

Question 11

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 8 am until 1 pm on Saturday.

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

£ ..... **[6]**

Many candidates set out their working in a logical way and were able to score full marks, as shown in **Exemplar 2** below. A common error was to calculate the number of hours as 6 rather than 5.

Exemplar 2

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. → 8·50 x 4 = £34
He works from 8 am until 1 pm on Saturday.
→ 5 hours → 12·75 x 5 = £63·75
How much does Harry earn in total for these two days?

$1\frac{1}{2}$ x 8·50

$\frac{3}{2}$ x 8·50 = 12·75

£34 + 63·75 = £97·75

£ £97·75 **[6]**

Question 12

12 The volume of a cube is $125\,cm^3$.

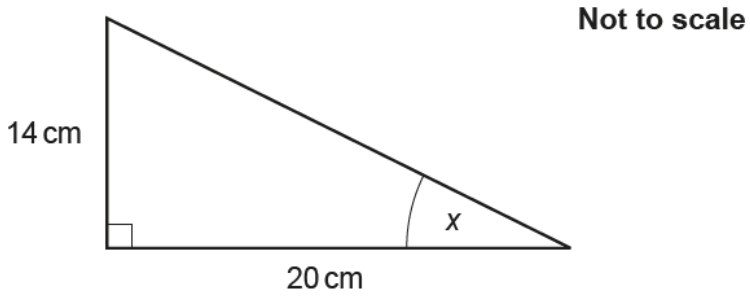
Calculate the total surface area of the cube.
Give the units of your answer.

..... **[5]**

Only a small number of candidates scored full marks on this question by realising that the first step was to find $\sqrt[3]{125}$ to obtain a length of 5 before using 5^2 to find the area of a face and multiplying by 6 to get the total surface area. Only a small number of candidates gave the correct units of cm^2.

Question 13

13 Here is a right-angled triangle.



Show that angle x is 35°, correct to the nearest degree. **[3]**

Very few candidates understood what this question required. Some wrote SOHCAHTOA but could not apply the principles of trigonometry to the question. Candidates need to realise that when the question states 'Show that' they cannot start with the value given, in this case 35°.

Question 14

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

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

..... because .....

..... **[4]**

Several candidates were able to answer this question efficiently, dividing the distance by the time. Some incorrectly used 6.3 rather than 6.5 for time, others converted the time to minutes. Candidates should be encouraged to use the most efficient method.

Question 15

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]**

This question was attempted by most candidates but was not well answered. Many candidates did not understand the notation.

Question 16

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.

Many candidates were able to show logical and well set out working scoring all 5 marks, as shown in **Exemplar 3** below. Very few candidates who attempted this question scored 0, as shown in **Exemplar 4** below where the candidate scored M1 for calculating the time taken to make one card. There were several different methods which could be used.

Exemplar 3

To make 1 card $48 \div 3 = 16$

$8 \times 60 = 480$ mins per day

$480 \div 10 = 48$ mins $= 3$ cards

$3 \times 10 = 480$ mins

3 (cards) $\times$ 3 (days) $=$ 90 (cards) so she makes 30 per day

Yes because she could ~~should~~ make 90 in 3 days as it is possible [5]

Exemplar 4

48 ÷ 3 = 16 16 mins a card

no because She takes to long to finish 1 card [5]

Question 17 (a)

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.

(a) ..... km^2 **[1]**

Many correct answers were seen. Some candidates had difficulty converting from standard form, offering answers with the correct digits but incorrect place values.

Question 17 (b)

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

(b) ..... **[1]**

This part was generally correct.

Question 17 (c)

(c) Alexis says

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

Is she correct?
Show how you decide.

Alexis is ..... because .....

..... **[2]**

The most common method was to multiply the area of Luxembourg by 3 and compare this to Australia. The most common errors were in converting from standard form. Some also made arithmetic errors, despite this being a calculator paper.

Question 17 (d)

(d) Work out the total area of Russia and Australia.
Give your answer in standard form, correct to 2 significant figures.

(d) ..... km^2 **[4]**

Despite this being a calculator paper, many candidates changed the values to ordinary form and did a non-calculator addition. A small number multiplied rather than adding. Several did not give their answer to 2 significant figures.

Question 18 (a)

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]**

Many candidates did not attempt either part of this question. Of those who did, very few scored any marks on this part as they showed little understanding of how to respond to a 'Show that' question. Some candidates scored 1 mark for making an attempt, for example $30 \times 50 = 1500$.

Question 18 (b)

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

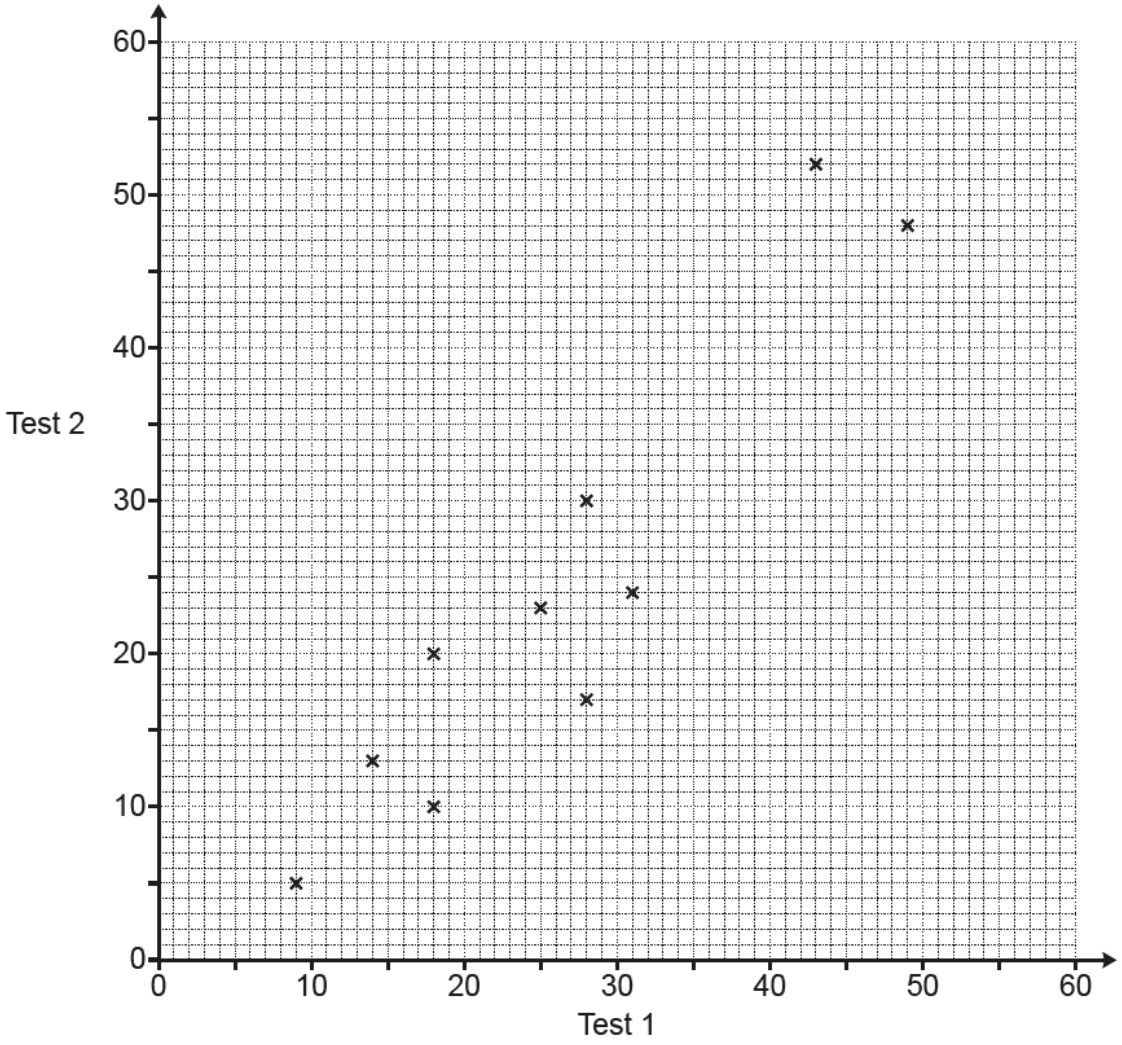
Calculate Bob's percentage profit.

(b) ..... % **[5]**

Of those candidates who attempted this question a small number were able to formulate a method to work out the cost, but it was rare to award 5 marks.

Question 19 (a)

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]**

This part was generally correct.

Question 19 (b)

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

(b) ..... **[1]**

This part was also generally correct.

Question 19 (c) (i)

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

This was generally well answered. A small number of candidates incorrectly joined all the points together.

Question 19 (c) (ii)

(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) ..... **[1]**

This was the best answered part of Question 19. Many candidates scored this mark.

Question 19 (d)

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

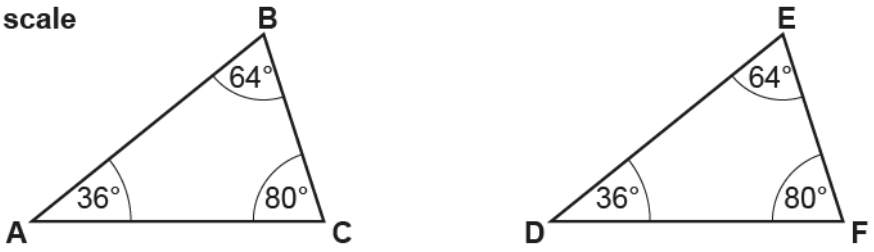
(d) ..... % **[4]**

Many candidates were able to give a fraction over 12 but fewer were able to convert this to a percentage.

Question 20 (a)

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

Not to scale



..... because .....

.....

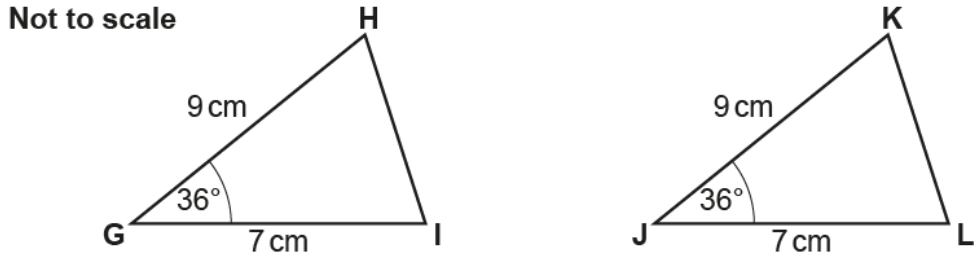
.....

..... **[1]**

This question proved to be very challenging. A large number of candidates omitted it altogether and left the answer space completely blank. The most common response was to say 'yes' and offer an explanation that referred to angles or included an attempt at trigonometry Those who did say 'no' often did not realise that the lengths could differ. The few candidates who did realise that the lengths could differ usually offered a clear explanation and scored the mark.

Question 20 (b)

(b) Prove that these two triangles are congruent.



.....

.....

.....

.....

..... **[3]**

This part was not well answered. Only a few candidates showed any understanding of how to approach a geometric proof. Many referred to 'the angles' or 'the sides' but did not identify these. Those who did try to identify sides frequently used words such as 'adjacent' or hypotenuse' rather than letter notation. Many focused on attempts to find the unknown side and angles, sometimes by measuring or assuming the triangle was isosceles, sometimes by attempting to apply Pythagoras' theorem or trigonometric ratios. The very tiny minority who identified that angle G = angle J, GH = JK and GI =JL often did not state SAS so scored 2 out of the possible 3 marks.

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