AQA
Realising potential

GCSE Maths: Answers and commentaries

Foundation Tier – Paper 2

A closer look at the live questions from summer 2022

v1.0

Contents

Help prepare your GCSE students with confidence

Every year in GCSE Maths exams, students often misread, misunderstand or misinterpret questions and don't always do what the question is asking them to do.

This booklet has been designed by our curriculum experts for you to use with your students to explore real responses. Inside you'll find best practice approaches, example responses, examiner commentaries and tips on how to access more marks.

Foundation Tier – Paper 2

Question 6

6 A machine to clean carpets can be hired.

Machine hire
£25 per day

Cleaning fluid	
1-litre bottle	£10
2-litre bottle	£18

Rana wants to

hire the machine for 1 day

and

buy 5 litres of cleaning fluid.

Work out the **smallest** total amount she could pay.

[3 marks]

Answer £ _____

Question 6, response 1

6 A machine to clean carpets can be hired.

Machine hire
£25 per day

Cleaning fluid	
1-litre bottle	£10
2-litre bottle	£18

Rana wants to

hire the machine for 1 day

and

buy 5 litres of cleaning fluid.

Work out the **smallest** total amount she could pay.

[3 marks]

£25 + 18 + 18 + 10 = 71

£25 + 10 + 10 + 10 + 18 = 73

£25 + 10 + 10 + 10 + 10 + 10 = 75

Answer £ 71

Commentary

A thorough response like this gave the student three attempts to score the method marks. They earned 2 marks for any correct cost, even if they didn't select the £71. This student has also clearly shown their method, so were covered in case of any arithmetic errors.

3 marks

Question 6, response 2

6 A machine to clean carpets can be hired.

Machine hire
£25 per day

Cleaning fluid	
1-litre bottle	£10
2-litre bottle	£18

Rana wants to

hire the machine for 1 day

and

buy 5 litres of cleaning fluid.

Work out the **smallest** total amount she could pay.

[3 marks]

25 25

1L £10 , 5L = 50

£75 18 18 9 4 5 = £70

Answer £ 70

Commentary

A few students worked out the cost of 2.5 of the 2-litre bottles, but didn't realise that bottles can only be bought as whole units. For this approach they received a special case mark.

However, this student has also worked out one of the other correct costs, £75, so can be awarded both method marks.

2 marks

Question 6, response 3

6 A machine to clean carpets can be hired.

Machine hire
£25 per day

Cleaning fluid	
1-litre bottle	£10
2-litre bottle	£18

Rana wants to

hire the machine for 1 day

and

buy 5 litres of cleaning fluid

Work out the **smallest** total amount she could pay.

[3 marks]

1 day = £25 per day
x2 litre bottles = £18 £18 = 36
1 - litre bottle = £10

36 +10 = £46

Answer £ 46

Commentary

Although this question was generally answered very well, a few students forgot to add the price of the machine hire and only worked out the cost of the cleaning fluid. This only scored the first mark.

1 mark

Question 6, response 4

6 A machine to clean carpets can be hired.

Machine hire
£25 per day

Cleaning fluid	
1-litre bottle	£10
2-litre bottle	£18

Rana wants to

hire the machine for 1 day

and

buy 5 litres of cleaning fluid.

Work out the **smallest** total amount she could pay.

[3 marks]

25 × 1 = 25 £25

18 − 10 = 8 £42

1 litre = £10 £67

2 litres = £18

3 litres = £26

4 litres = £34

5 litres = £42

Answer £ 67

Commentary

This student has shown a misconception. They think that 2 litres costs £8 more than 1 litre and have added £8 for each extra litre.

0 marks

Question 7

7 Quadrilateral *ABCD* has

- angle *ABC* = 90°
- *BC* = 4 cm
- *CD* is parallel to *BA*
- *CD* = 6 cm

Draw *ABCD* on the centimetre grid.

AB has been drawn for you.

[3 marks]

Question 7, response 1

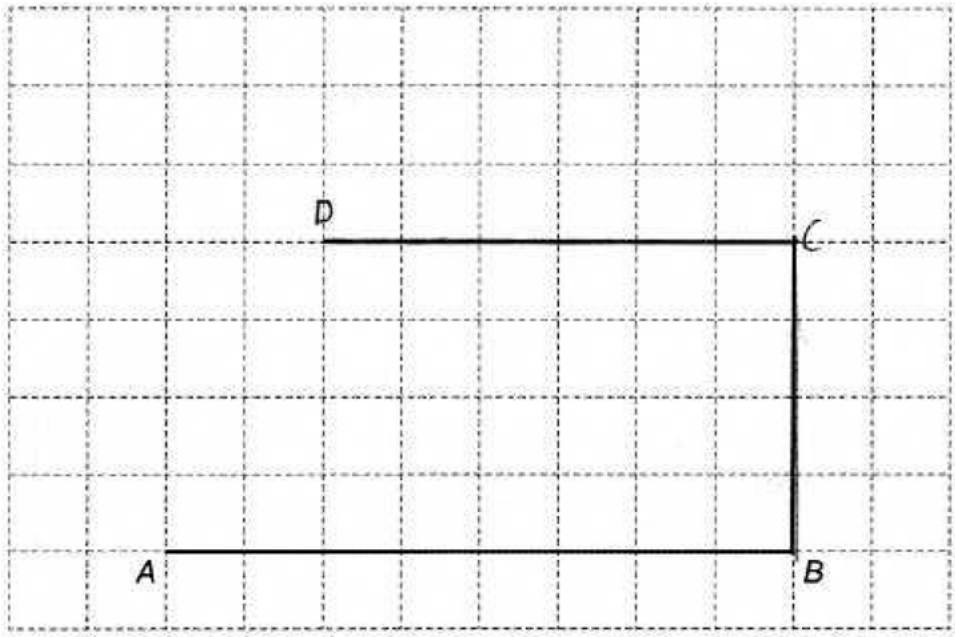
7 Quadrilateral *ABCD* has

- angle *ABC* = 90°
- *BC* = 4 cm
- *CD* is parallel to *BA*
- *CD* = 6 cm

Draw *ABCD* on the centimetre grid.

AB has been drawn for you.

[3 marks]



Commentary

Some students didn't complete the shape, even though they were told it was a quadrilateral in the question. This student was so close to a fully correct solution, all they needed to do was to join *A* to *D* for the final mark.

2 marks

Question 7, response 2

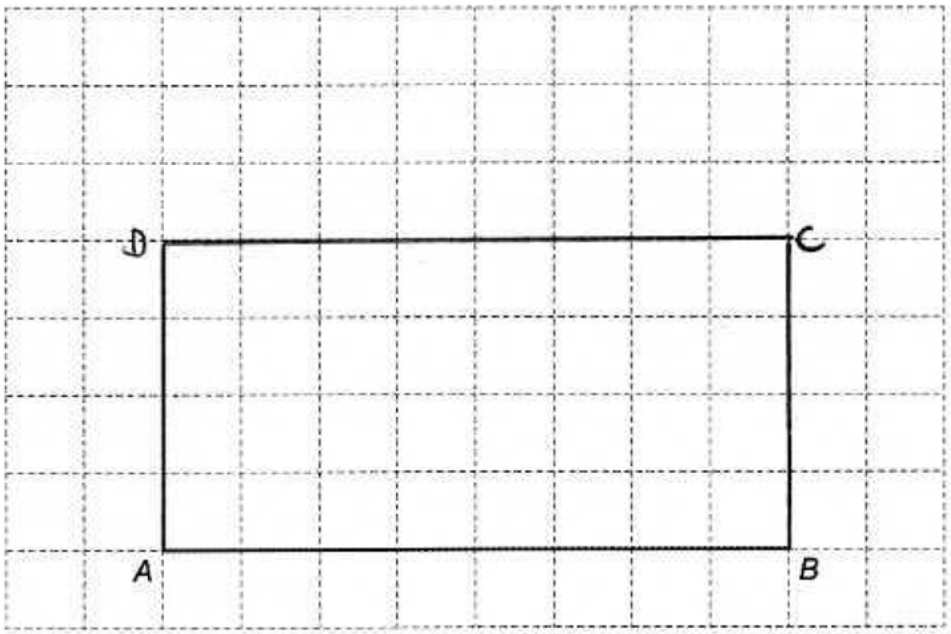
7 Quadrilateral *ABCD* has

- angle *ABC* = 90°
- *BC* = 4 cm
- *CD* is parallel to *BA*
- *CD* = 6 cm

Draw *ABCD* on the centimetre grid.

AB has been drawn for you.

[3 marks]



Commentary

Many students showed some understanding at this early stage of the paper even if they could not complete the solution. Most students had quadrilaterals demonstrating a right angle at *B*, or a line parallel to *AB*, or both, as in this case.

2 marks

Question 8

8 The masses of some puppies were recorded.

The smallest mass was 7 kilograms 200 grams.

The range of the masses was 650 grams.

What was the **largest** mass?

Give your answer in kilograms and grams.

[2 marks]

Answer _____ kilograms _____ grams

Question 8, response 1

8 The masses of some puppies were recorded.

The smallest mass was 7 kilograms 200 grams.

The range of the masses was 650 grams.

What was the **largest** mass?

Give your answer in kilograms and grams.

[2 marks]

Smallest - 7kg 200 grams

Largest - 7kg 850 grams

Answer 7.85 kilograms 7,850 grams

Commentary

This student has given an unusual interpretation of the instruction by giving their answer in kilograms and in grams. As it was so early in the paper and the student had shown good knowledge of both range and units, this was not penalised. Note that this student had the correct answer in the line above anyway.

2 marks

Question 8, response 2

8 The masses of some puppies were recorded.

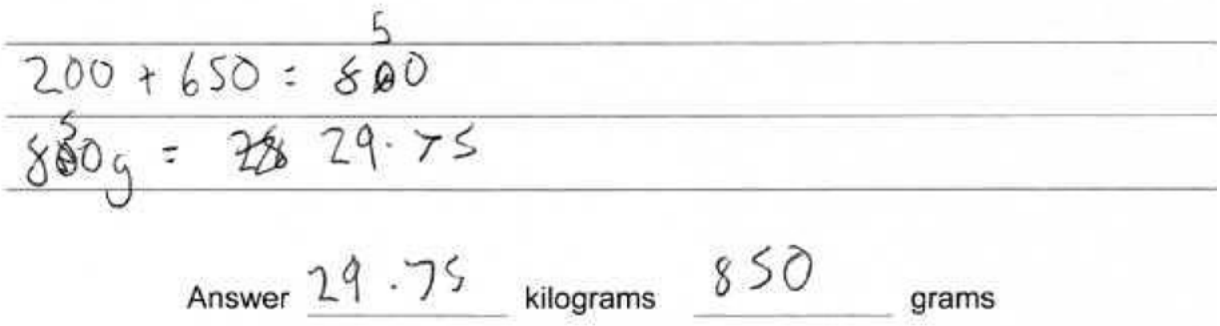
The smallest mass was 7 kilograms 200 grams.

The range of the masses was 650 grams.

What was the **largest** mass?

Give your answer in kilograms and grams.

[2 marks]



Answer 29.75 kilograms 850 grams

Commentary

We saw this response surprisingly often. The student has worked out 850 but then uses the idea that 850 is 4.25 times 200 to multiply 7 by 4.25.

1 mark

Question 8, response 3

8 The masses of some puppies were recorded.

The smallest mass was 7 kilograms 200 grams.

The range of the masses was 650 grams.

What was the **largest** mass?

Give your answer in kilograms and grams.

[2 marks]

7200
− 650
6550

7 kg = 7000 g
+ 200
7200

Answer 6 kilograms 550 grams

Commentary

This student has misunderstood how range works.

0 marks

Question 9(a)

9 (a) Ali revises each day for five days.

On each of the first **four** days he revises from 5 pm to 8 pm

On the fifth day he starts revising at 1 pm

He finishes when he has revised for a **total** of 18 hours for the five days.

What time does he finish on the fifth day?

[3 marks]

Answer _____

Question 9(a), response 1

9 (a) Ali revises each day for five days.

On each of the first **four** days he revises from 5 pm to 8 pm

On the fifth day he starts revising at 1 pm

He finishes when he has revised for a **total** of 18 hours for the five days.

What time does he finish on the fifth day?

[3 marks]

5pm - 8pm = 3hours

3 × 4 = 12 hours

18 - 12 = 6

1pm, 2pm, 3pm, 4pm, 5pm, 6pm

Answer 6pm

Commentary

This student has made the most common error that we saw. They used the correct method to work out that Ali revises for 6 hours on Friday but then gets confused trying to add 6 hours onto 1 pm.

2 marks

Question 9(a), response 2

9 (a) Ali revises each day for five days.

On each of the first **four** days he revises from 5 pm to 8 pm

On the fifth day he starts revising at 1 pm

He finishes when he has revised for a **total** of 18 hours for the five days.

What time does he finish on the fifth day?

[3 marks]

3 × 4 = 12

Answer 6pm

Commentary

This student has probably made the same error but doesn't show the subtraction of 18 – 12 or that they are trying to add 6 hours. It's unclear whether they think Friday is 5 or 6 hours because they haven't shown their working. They only gain the first mark.

1 mark

Question 9(a), response 3

9 (a) Ali revises each day for five days.

On each of the first **four** days he revises from 5 pm to 8 pm

On the fifth day he starts revising at 1 pm

He finishes when he has revised for a **total** of 18 hours for the five days.

What time does he finish on the fifth day?

[3 marks]

5pm - 8pm - 4hours x 4 : 16hours

1pm ~ 3pm -

Answer 3pm

Commentary

This student has incorrectly worked out the number of hours between 5 pm and 8 pm so has lost the first mark. They then correctly follow-through with 16 hours to give an answer of 3 pm. They don't show that 18 – 16 is 2 hours but the correct follow-through answer implies the middle mark.

2 marks

Question 9(b)

9 (b) Sofia is revising for Maths.

She tries to work out $3 \times (4 + 2)$

Here is her working.

$$3 \times (4 + 2) = 12 + 3$$
$$= 15$$

What mistake has she made?

[1 mark]

Question 9(b), response 1

9 (b) Sofia is revising for Maths.

She tries to work out $3 \times (4 + 2)$

Here is her working.

$$3 \times (4 + 2) = 12 + 3$$
$$= 15$$

What mistake has she made?

[1 mark]

She has not worked out the brackets first.

Commentary

This student has explained that Sofia used the incorrect order of operations. Responses that simply said she hadn't used BIDMAS wouldn't have been accepted, as students were expected to explain about the brackets.

1 mark

Question 9(b), response 2

9 (b) Sofia is revising for Maths.

She tries to work out $3 \times (4 + 2)$

Here is her working.

BIDMAS

$$3 \times (4 + 2) = 12 + 3$$
$$= 15$$

What mistake has she made?

[1 mark]

correct way she times 3 x 4 but your meant
3 x (4 + 2) to add the bracket then times
4 + 2 = 8 that answer by 3.
3 x 8 = 24

Commentary

Some students attempted to give a correct reason but then showed an incorrect calculation that negated their answer. Here the student seems to understand that you need to work out the brackets first, but their calculation error means that incorrect work is seen. This was a common arithmetic slip.

0 marks

Question 9(b), response 3

9 (b) Sofia is revising for Maths.

She tries to work out $3 \times (4 + 2)$

Here is her working.

$$3 \times (4 + 2) = 12 + 3$$
$$= 15$$

3x4 = 12 + 2 = 14

3x(4+2)

What mistake has she made?

[1 mark]

She's added on 3 instead of two.

3x(4 + 2) = 12 + 2 = 14

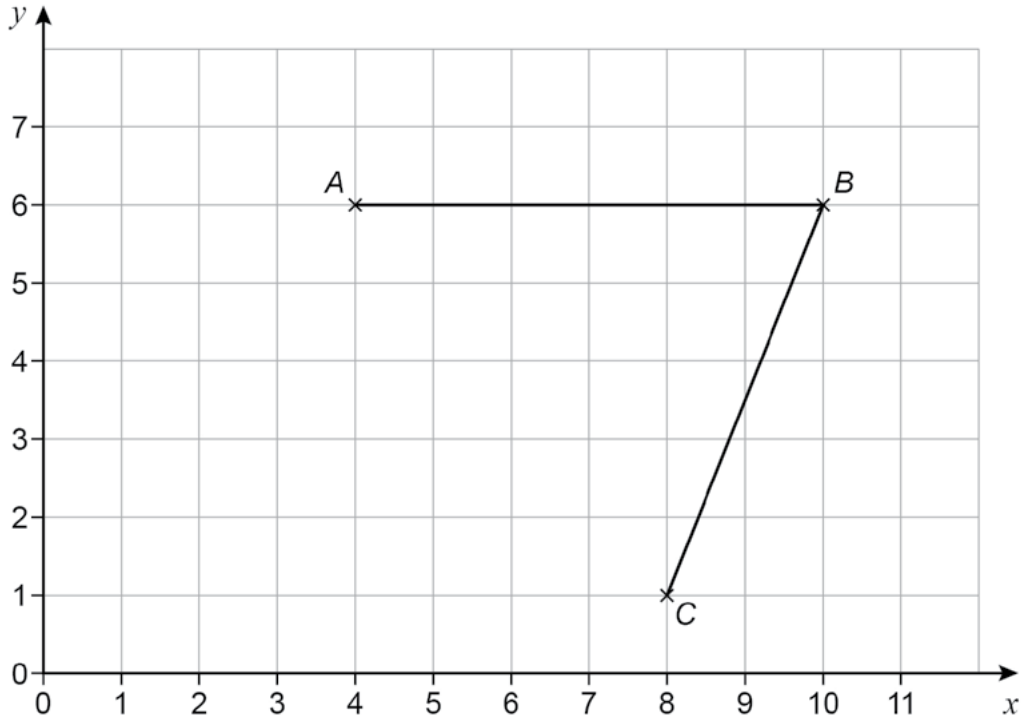
Commentary

Some students demonstrated that they didn't really know how to expand a bracket. This student shows that they don't know that both terms need to be multiplied by 3.

0 marks

Questions 10(a), 10(b) and 10(c)

10 Lines *AB* and *BC* are shown.



10 (a) Write down the coordinates of *C*.

[1 mark]

Answer (_____ , _____)

10 (b) Write down the coordinates of the midpoint of *AB*.

[1 mark]

Answer (_____ , _____)

10 (c) *D* is the point on the grid that makes *ABCD* a parallelogram.

Work out the coordinates of *D*.

[1 mark]

Answer (_____ , _____)

Question 10, response

10 (a) Write down the coordinates of *C*.

[1 mark]

Answer (1 , 8)

10 (b) Write down the coordinates of the midpoint of *AB*.

[1 mark]

Answer (6 , 7)

0 (c) *D* is the point on the grid that makes *ABCD* a parallelogram.

Work out the coordinates of *D*.

[1 mark]

Answer (1 , 2)

Commentary

The most common overall error was to swap all the coordinates and write them in the form (y, x). This was only penalised the first time it was seen in this question.

(a) 0 marks, (b) 1 mark, (c) 1 mark

Part **(a)** was usually very well-answered. In part **(b)** some gave the midpoint of *BC* while others gave (10, 6), presumably from the coordinates of *B*. In part **(c)** students usually had a y-coordinate of 1 but x was various values. Those who drew the parallelogram on the diagram usually did better.

Question 11(a)

11 Nihal has savings of £168

He uses $\frac{5}{7}$ of his savings to buy sports equipment.

11 (a) Assume that he will use $\frac{1}{3}$ of the **rest** of the money to buy a shirt.

How much of his savings, in £, will he have left?

[3 marks]

Answer £ _____

Question 11(a), response 1

11 Nihal has savings of £168

He uses $\frac{5}{7}$ of his savings to buy sports equipment.

11 (a) Assume that he will use $\frac{1}{3}$ of the **rest** of the money to buy a shirt.

How much of his savings, in £, will he have left?

[3 marks]

168 ÷ 7 = 24

24 x 5 = 120

168 - 120 = 48

48 ÷ 3 = 16

Answer £ £16

Commentary

This student has started really well and correctly works out as far as the cost of the shirt. They just need to work out how much Nihal has left by subtracting.

Students should be reminded to go back and read the question to check they have answered it.

2 marks

Question 11(a), response 2

11 Nihal has savings of £168

He uses $\frac{5}{7}$ of his savings to buy sports equipment.

11 (a) Assume that he will use $\frac{1}{3}$ of the **rest** of the money to buy a shirt.

How much of his savings, in £, will he have left?

[3 marks]

$\frac{5}{7} = 0.71 = 71\%$ $168 \div 100 = 1.68 \times 71 = 119.28$

$168 - 119.28 = 48.72$ ~~$\frac{1}{3} = 0.3 = 30\%$~~

$48.72 \div 10 = 4.872 \times 3 = 14.62$

Answer £ 14.62

Commentary

This student has used 71% as an approximation to 57. Many used approximate percentages. They were awarded the method marks if they had used an accuracy of at least 2 sf. This student goes on to use 30% for 13 which is only to 1 sf, therefore they couldn't receive that mark.

1 mark

Question 11(a), response 3

11 Nihal has savings of £168

He uses $\frac{5}{7}$ of his savings to buy sports equipment.

11 (a) Assume that he will use $\frac{1}{3}$ of the **rest** of the money to buy a shirt.

How much of his savings, in £, will he have left?

[3 marks]

168 ÷ 7 = 24 x 5 = 120

120 ÷ 3 = 40 x 1 = 40

Answer £ 40

Commentary

This was a common misunderstanding, not realising that they needed to subtract the 120 from 168 before dividing by 3.

1 mark

Questions 12(a), 12(b) and 12(c)

12 Sue is working with 2-digit numbers.

She multiplies the digits together to get an answer.

> For 63, she multiplies 6 by 3
> so 63 gives an answer of 18

12 (a) Write down a different 2-digit number that gives an answer of 18

[1 mark]

Answer _____

12 (b) Write down a 2-digit number that gives an answer of 0

[1 mark]

Answer _____

12 (c) Write down a 2-digit number that gives an answer **greater** than 70

[1 mark]

Answer _____

Question 12(a)

Although this part was well-answered, some students showed the answer as a product of the two digits or with the two digits separately. 18 was a common wrong answer.

Question 12(b)

Many students showed the calculation with the two digits or the two digits separately. Some thought that digits 52, for example with answer 10, met the requirement. Occasionally three digits were used, eg the answer 10 × 0 was seen.

Question 12(c)

Common incorrect responses were 10 by 8, 90, 11 × 7 and numbers greater than 70, eg 71 or 72. However many gave correct answers.

Question 13

13 Steve and Molly each buy 480 tea bags.

Small packs	**Large packs**
80 tea bags for £1.90	160 tea bags for £3.25

Steve buys only small packs.

Molly buys only large packs.

In total, how much **more** than Molly does Steve pay?

[4 marks]

Answer £ _____

Question 13, response 1

13 Steve and Molly each buy 480 tea bags.

Small packs	**Large packs**
80 tea bags for £1.90	160 tea bags for £3.25

Steve buys only small packs.

Molly buys only large packs.

In total, how much **more** than Molly does Steve pay?

[4 marks]

Steve = 80 x 6 = 480

Molly = 160 x 3 = 480

1.90 x 6 = £11.04 = 11.04

3.25 x 3 = £9.75 = 09.75

£11.04 - £9.75 = £1.29

Answer £ 1.29

Commentary

Most students used this method and the vast majority gave a fully correct solution. This student shows a common misread from the calculator of 11.4 as 11.04. Fortunately the student has shown their working, so only loses the final mark for accuracy.

3 marks

Question 13, response 2

13 Steve and Molly each buy 480 tea bags.

Small packs	**Large packs**
80 tea bags for £1.90	160 tea bags for £3.25

Steve buys only small packs.

Molly buys only large packs.

In total, how much **more** than Molly does Steve pay?

[4 marks]

£1·90 + £1·90 = £3·80

£3·80 − £3·25 = £0·55

Answer £ 0·55

Commentary

Occasionally students worked out the difference for 80 tea bags or 160 tea bags as in this response. This didn't answer the question set, which asked for the difference in price for 480 tea bags. This student could have finished off their solution by realising it needed scaling up and working out three times their answer.

2 marks

Question 13, response 3

13 Steve and Molly each buy 480 tea bags.

Small packs	**Large packs**
80 tea bags for £1.90	160 tea bags for £3.25

Steve buys only small packs.

Molly buys only large packs.

In total, how much **more** than Molly does Steve pay?

[4 marks]

£3.25
- £1.90

Answer £ 1·32

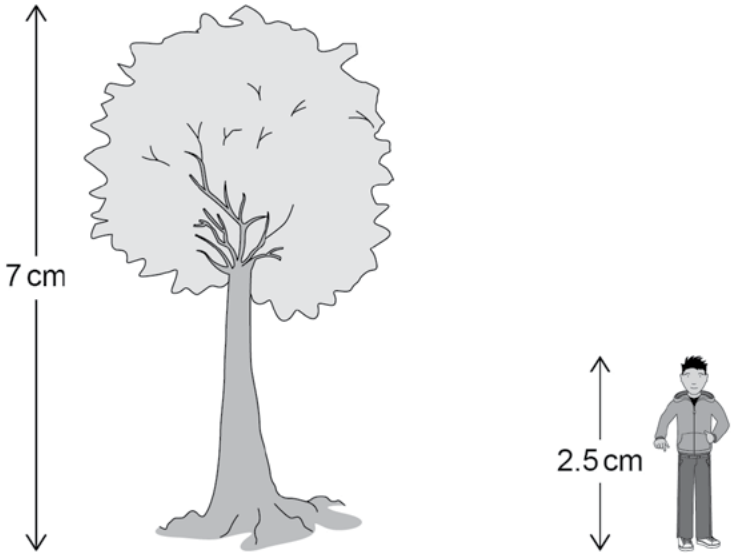
Commentary

Although this question was generally answered really well, some students only did this calculation.

0 marks

Question 15

15 The scale drawing shows a tree and a student.



The actual height of the tree is 4.2 metres.

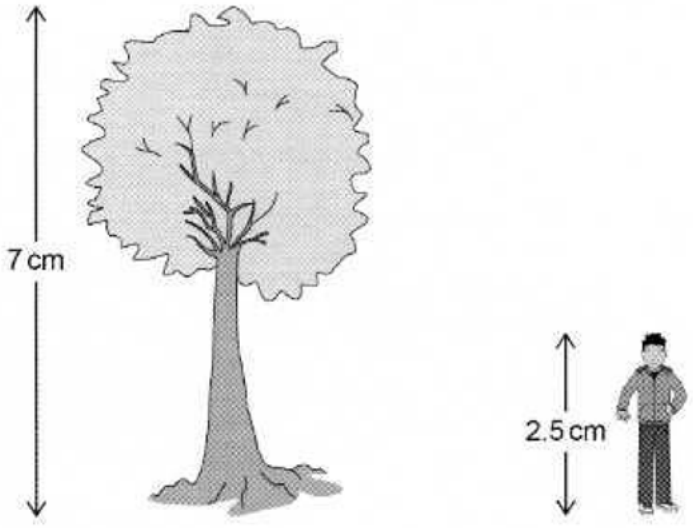
Work out the actual height of the student.

[3 marks]

Answer _____ m

Question 15, response 1

15 The scale drawing shows a tree and a student.



The actual height of the tree is 4.2 metres.

Work out the actual height of the student.

[3 marks]

4.2M = 420cm 420 ÷ 7 = 60

2.5 × 60 = 150

150cm = 1.5M

Answer 1.5M m

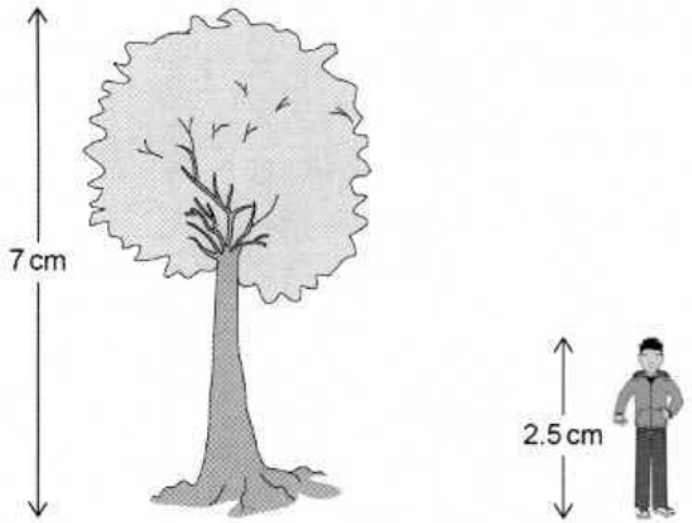
Commentary

Some students chose to switch to centimetres. This seemed to be a sensible approach because it may have made the calculations easier.

3 marks

Question 15, response 2

15 The scale drawing shows a tree and a student.



The actual height of the tree is 4.2 metres.

Work out the actual height of the student.

[3 marks]

420cm

7cm = 4·2m

420cm ÷ 7cm = 60

1cm = 0·6m

2 x 0·6 = 1·2

0·5 cm = 0·3

1·2 + 0·3 = 1·8m

Answer 1·8 m

Commentary

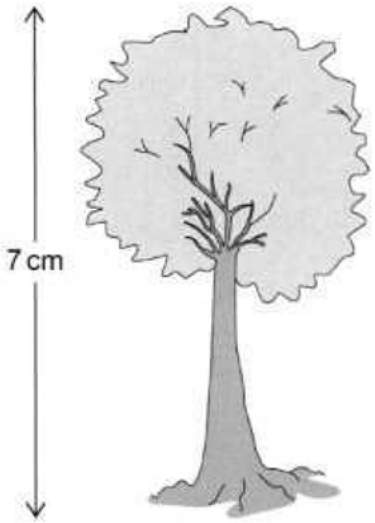
Many attempts to build up were incomplete or unclear and often gained a maximum of 1 mark.

This student attempted to build up to 2.5 cm. Fortunately they showed enough method that meant the arithmetic slip in the last line only cost them the final mark for accuracy.

2 marks

Question 15, response 3

15 The scale drawing shows a tree and a student.



The actual height of the tree is 4.2 metres.

Work out the actual height of the student.

[3 marks]

7 cm − 2·5cm = 4·5cm

4·2 metres

4·2 ÷ 3 = 1·4

Answer 1·4 m

Commentary

This student started with the standard incorrect approach of a subtraction. Then they seemed to work out that the tree was approximately 3 times the height of the student and used that approach. Had they shown the calculation of 7 ÷ 2.5 then they could have been given a mark.

0 marks

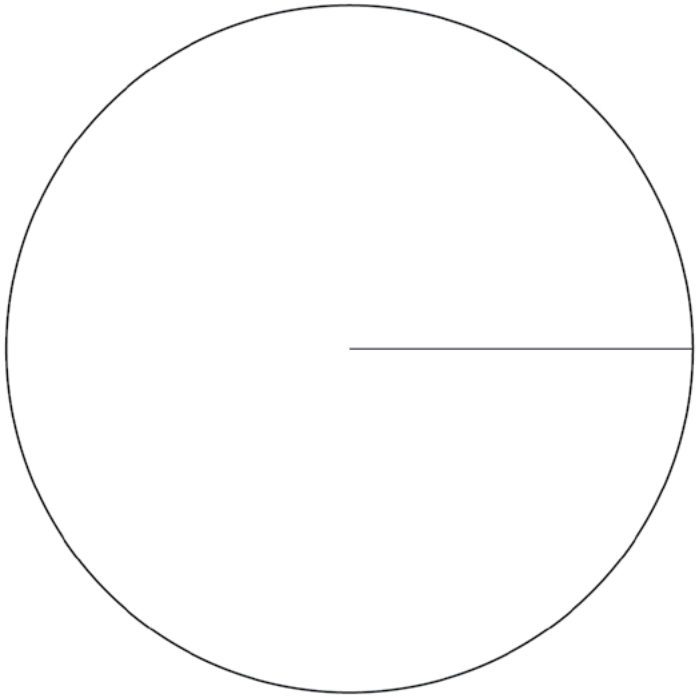
Question 16

16 60 people were asked if they would vote in an election.

- $\frac{1}{4}$ of the people said No
- 20 people said Yes
- The rest said Maybe

Draw and label a pie chart to show this information.

[3 marks]



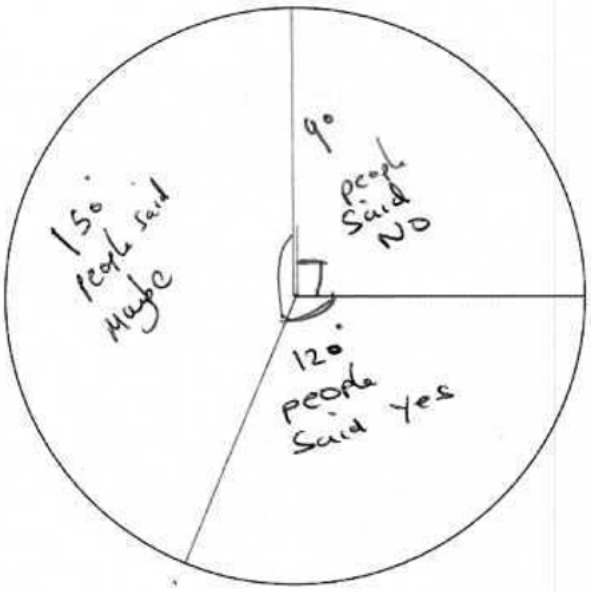
Question 16, response 1

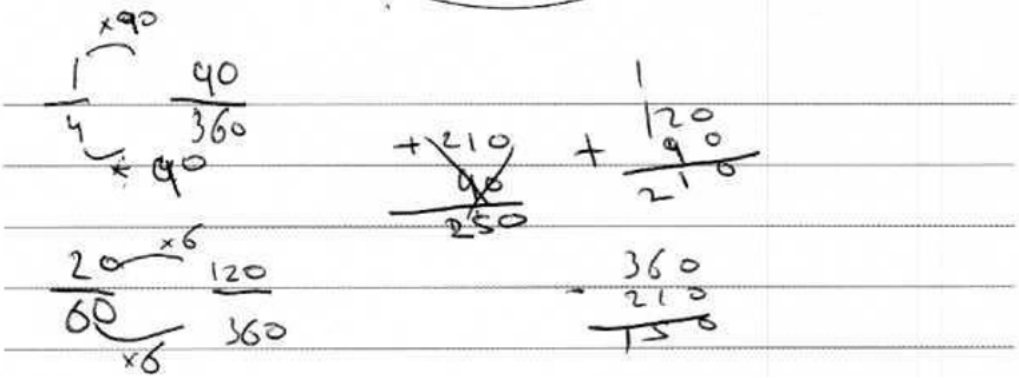
16 60 people were asked if they would vote in an election.

- $\frac{1}{4}$ of the people said No
- 20 people said Yes
- The rest said Maybe

Draw and label a pie chart to show this information.

[3 marks]





Commentary

This student's pie chart is inaccurate for two of the angles. However, showing the angle of 90° and the working or angle of 120° meant they could still score 2 out of 3. This also applied to students who had forgotten to bring a protractor. However very few students showed any method.

2 marks

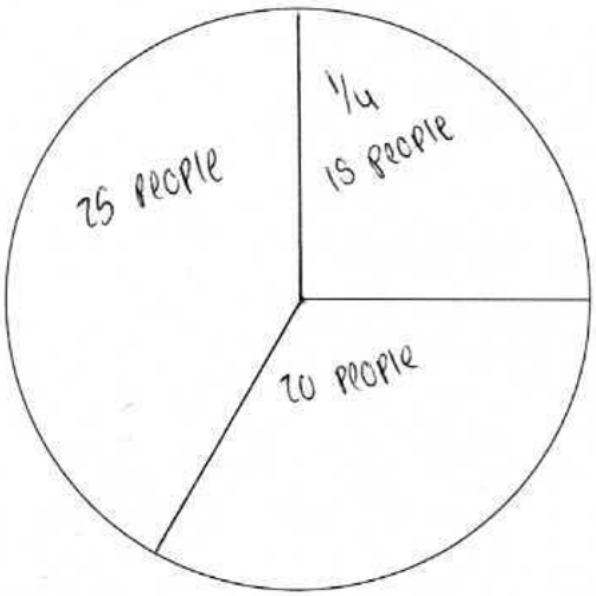
Question 16, response 2

16 60 people were asked if they would vote in an election.

- $\frac{1}{4}$ of the people said No
- 20 people said Yes
- The rest said Maybe

Draw and label a pie chart to show this information.

[3 marks]



60 people
1/4 = 15 people said no
60 - 20 - 15 = 25

Commentary

This student has drawn a fully correct pie chart but not given any useful labels. However, most students did give the correct labels.

2 marks

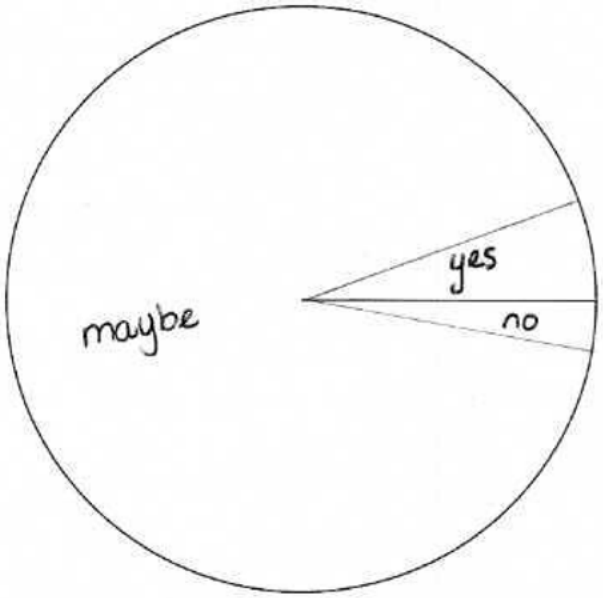
Question 16, response 3

16 60 people were asked if they would vote in an election.

- $\frac{1}{4}$ of the people said No
- 20 people said Yes
- The rest said Maybe

Draw and label a pie chart to show this information.

[3 marks]



Commentary

This was a common wrong approach. This student has drawn angles of 10° and 20° but we also saw 15° and 20°.

0 marks

Questions 17(b) and 17(c)

17 (a) x is at least 7

Circle the correct inequality.

[1 mark]

$x < 7$ $\quad$ $x \leqslant 7$ $\quad$ $x > 7$ $\quad$ $x \geqslant 7$

17 (b) Multiply out $5c(2d + 1)$

[2 marks]

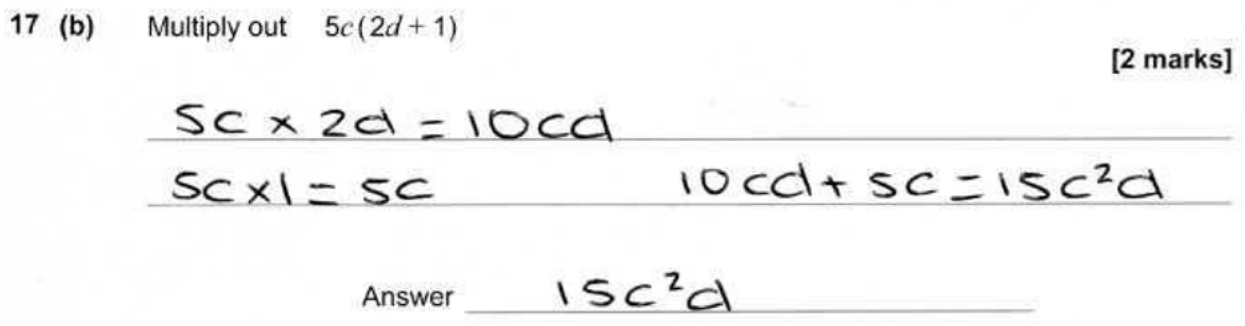
Answer _____

17 (c) Factorise $21x + 28$

[1 mark]

Answer _____

Question 17(b), response 1

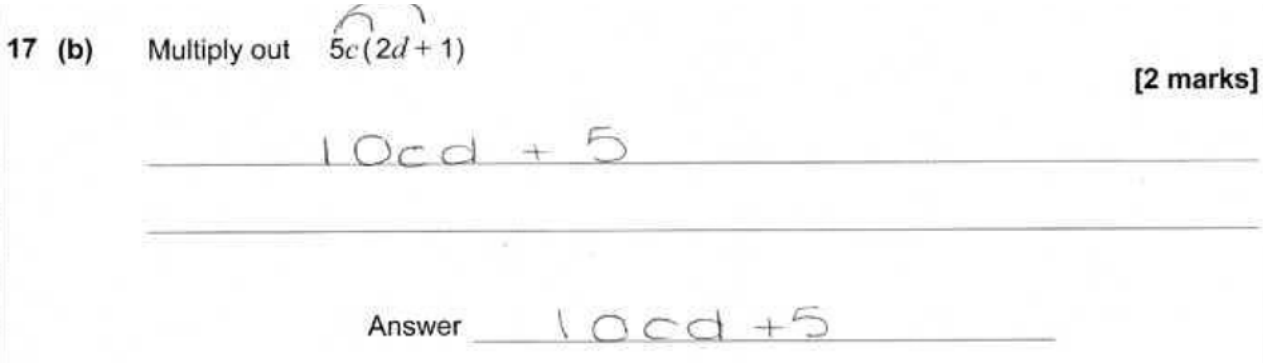


Commentary

This student has the correct answer but then attempts to further simplify.

1 mark

Question 17(b), response 2

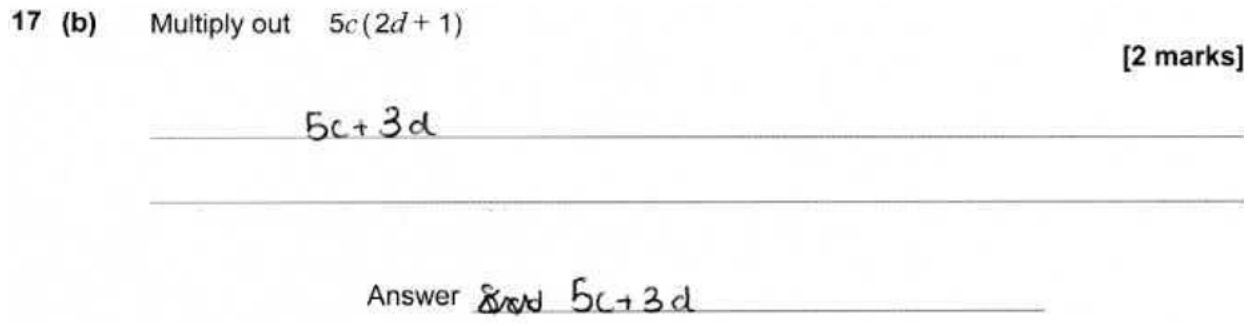


Commentary

Some students had the first term correct but made a mistake with the second, like this one. $10cd + 1$ and $10cd + 6c$ was also fairly frequently seen.

1 mark

Question 17(b), response 3

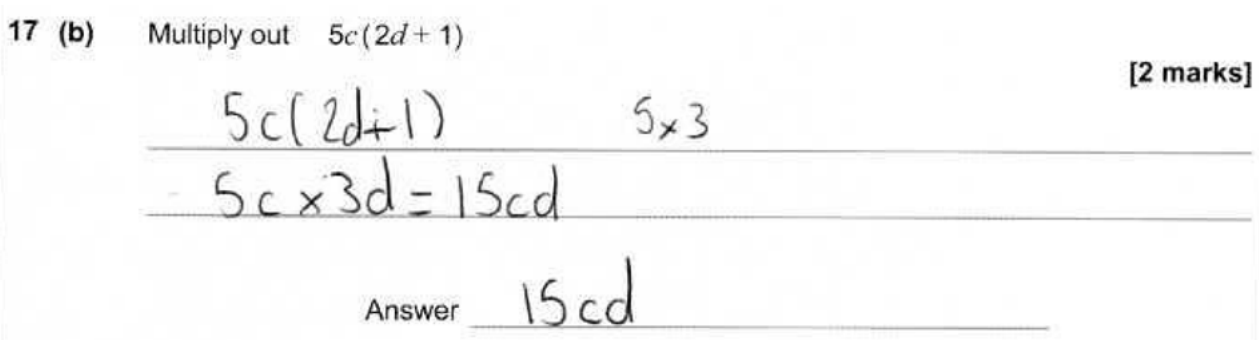


Commentary

Another common misconception was that $2d + 1$ is equal to $3d$. Some students then added $5c$.

0 marks

Question 17(b), response 4



Commentary

... and others multiplied by $5c$.

0 marks

Question 17(c)

Commentary

Common incorrect answers were $49x$ and $7x(3 + 4)$. Some students only gave one of the factors because they divided through by 7 to get $3x + 4$.

Questions 18(a) and 18(b)

18 (a) The people at a party are either adults or children.

adults : children = 9 : 11

What percentage are adults?

[2 marks]

Answer _____ %

18 (b) The people at a different party are from Spain, France or Germany.

68% are from Spain

number from France = number from Germany

Work out number from Spain : number from France

Give your answer in the form n : 1

[3 marks]

Answer _____ : 1

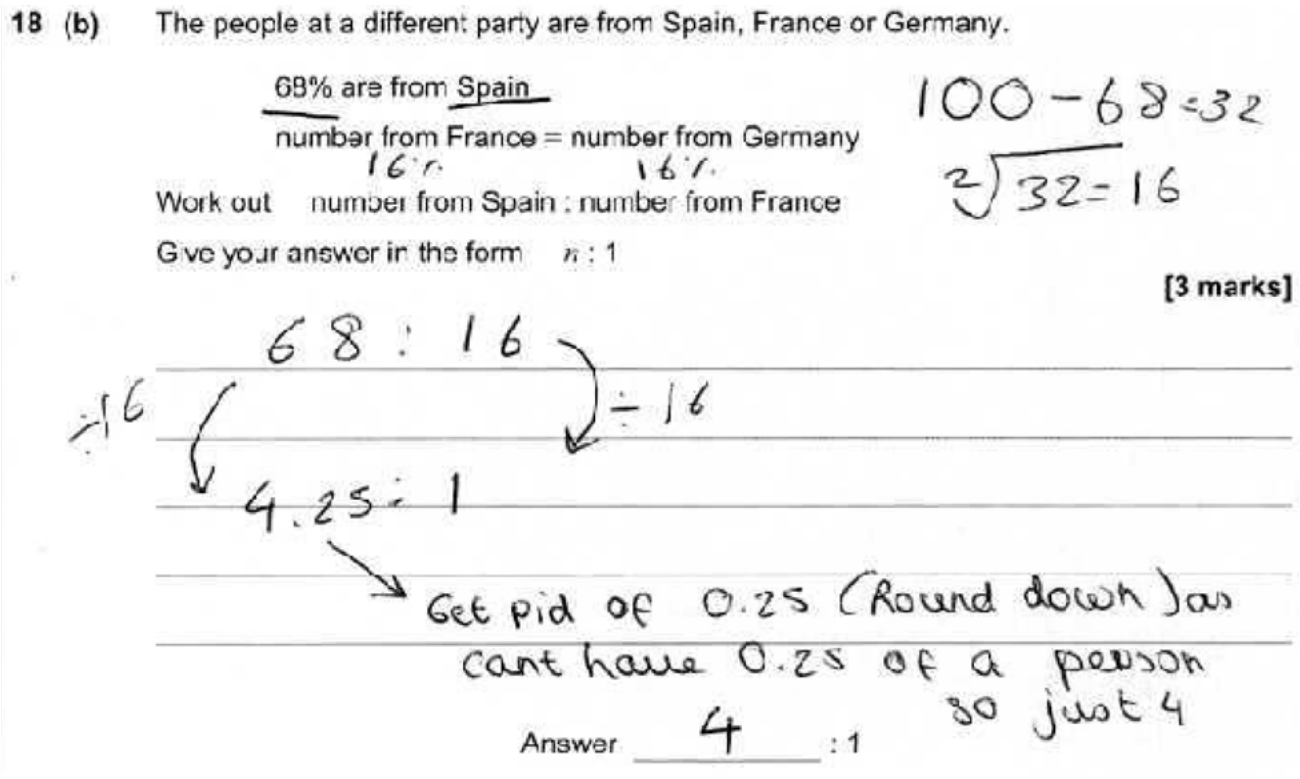
Question 18(a)

Commentary

Common wrong methods included working out 911 as a percentage or working out the percentage of children. Some arithmetic errors were seen with 9 × 5 = 40 being the most frequent. 40 was quite a common wrong answer, perhaps because of the incorrect multiplication, but also as an estimate of 9 being less than half of 20.

Occasionally the answer was left as 0.45 rather than changing to a percentage.

Question 18(b), response 1



Commentary

Many students did manage to work out 16% correctly and some were able to write this as a ratio. However, the simplification sometimes highlighted misconceptions.

Some students, such as this one, did not realise the importance of the exact value 4.25 in the ratio n : 1, thinking that n represented a whole number of people so it couldn't be a decimal. This misconception meant the last mark wasn't scored.

2 marks

Question 18(b), response 2

18 (b) The people at a different party are from Spain, France or Germany.

68% are from Spain

number from France = number from Germany

Work out number from Spain : number from France

Give your answer in the form $n : 1$

[3 marks]

100% − 68% = 32

68 : 32

Answer 2.125 : 1

Commentary

The student hasn't realised that 32% is for both France and Germany so they need to halve it. However, they have written a ratio so their answer given in the correct form can be followed through for the final B1ft.

This was a common incorrect response.

1 mark

Questions 20(a) and 20(b)

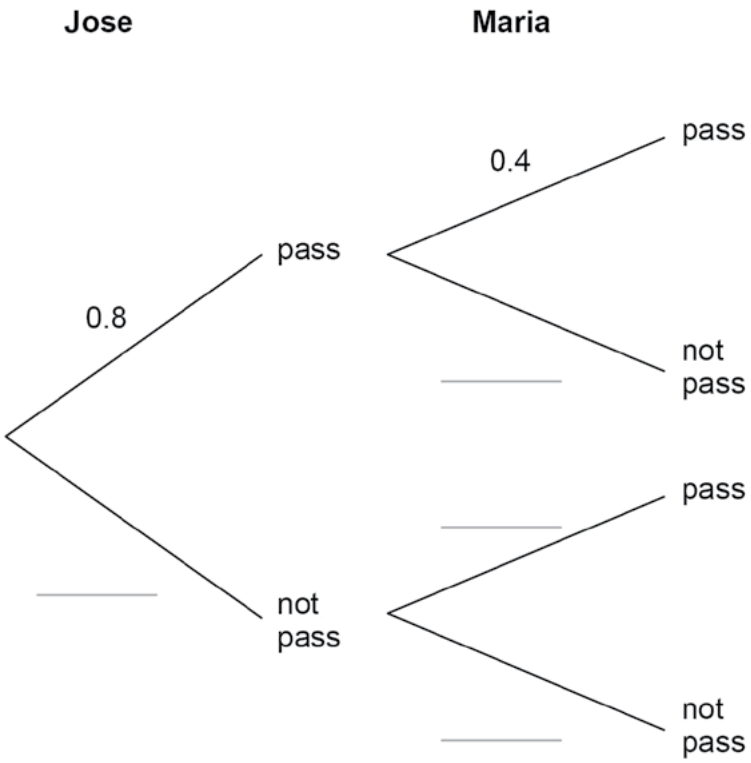
20 Jose and Maria each take a test.

The probability that Jose passes is 0.8

The probability that Maria passes is 0.4

20 (a) Complete the tree diagram.

[2 marks]



20 (b) Work out the probability that they **both** pass.

[1 mark]

Answer _____

Question 20(a)

Commentary

Many students correctly worked out that the probability of Jose not passing was 0.2. The most common errors for Maria were to put 0.1 and 0.1 on the bottom two branches (to add up to the 0.2 that they had filled in) or to swap the probabilities on the bottom two branches to give the tree diagram some symmetry on the right-hand side.

Question 20(b)

Commentary

Many students added the given probabilities or just quoted one of them.

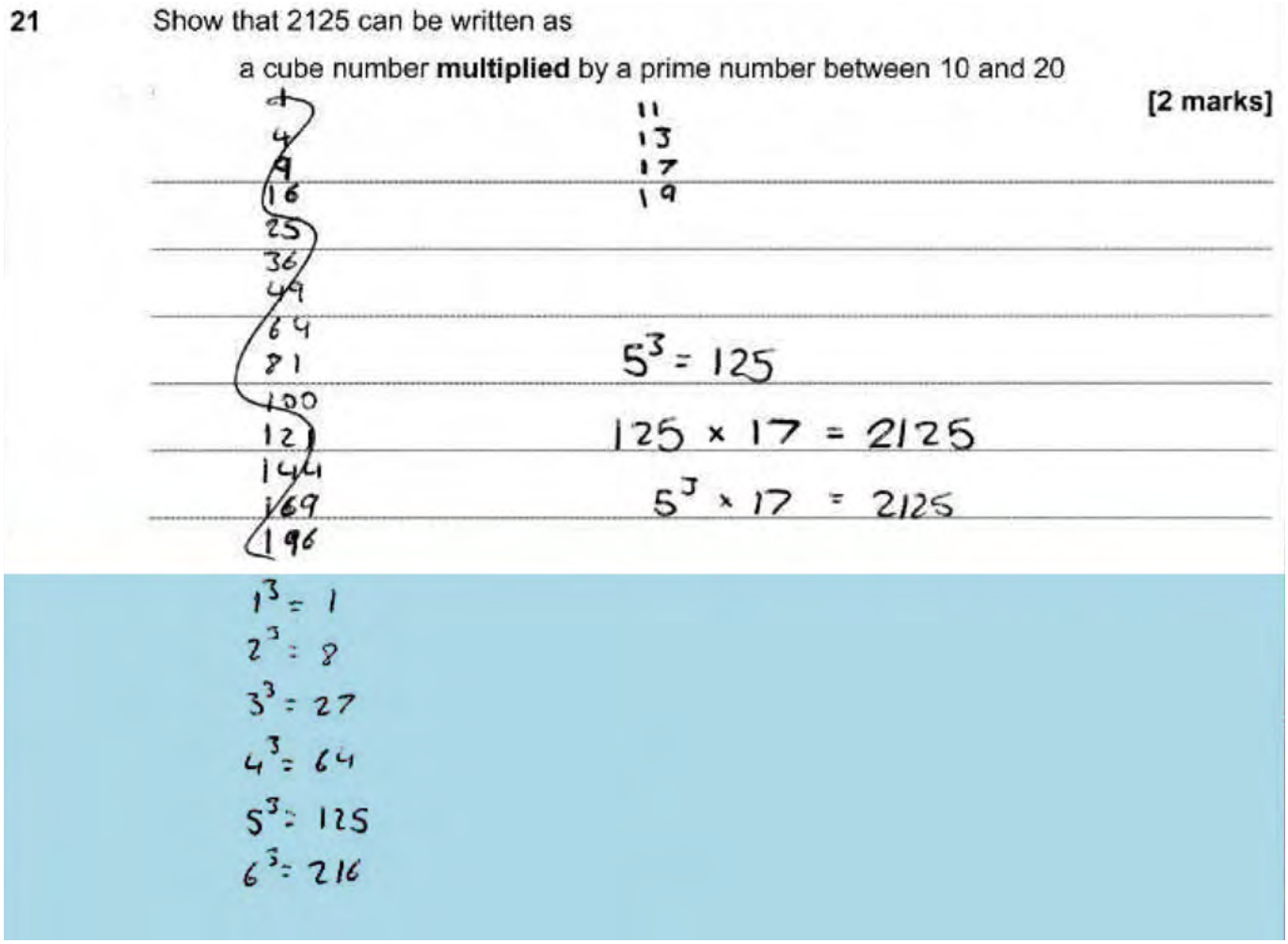
Question 21

21 Show that 2125 can be written as

a cube number **multiplied** by a prime number between 10 and 20

[2 marks]

Question 21, response 1



21 Show that 2125 can be written as

a cube number **multiplied** by a prime number between 10 and 20

[2 marks]

1
4
9
16
25
36
49
64
81
100
121
144
169
196

11
13
17
19

$5^3 = 125$

$125 \times 17 = 2125$

$5^3 \times 17 = 2125$

$1^3 = 1$
$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$
$6^3 = 216$

Commentary

A fully correct response. The student has listed cubes and the relevant primes and then clearly shown which pair works. Considering this was a question that was common with Higher tier, a pleasingly high number of students did find the correct solution.

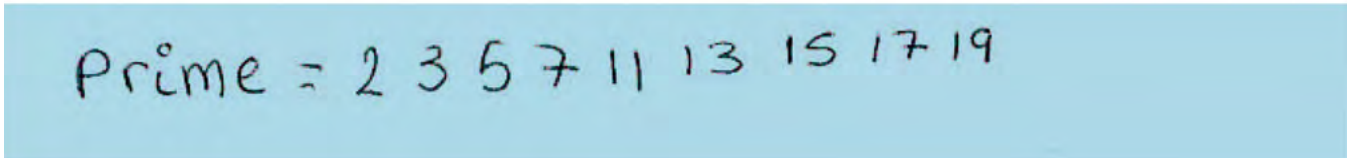
2 marks

Question 21, response 2

21 Show that 2125 can be written as

a cube number **multiplied** by a prime number between 10 and 20

[2 marks]

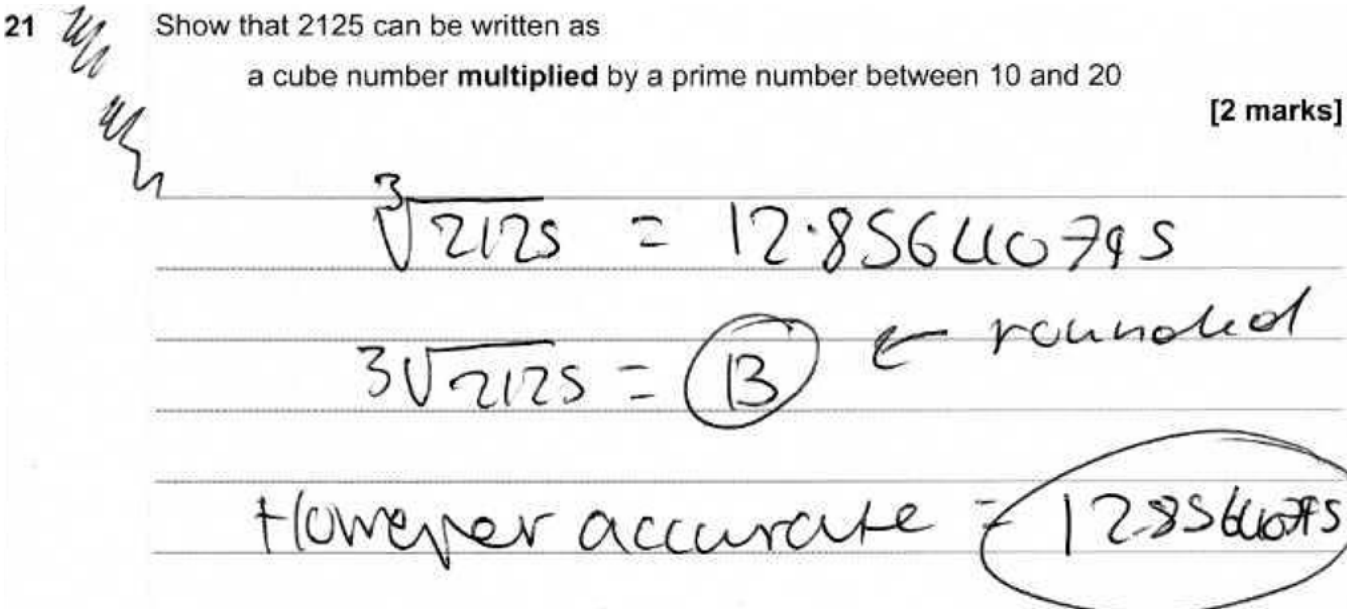


Commentary

Many students gained one mark for listing the relevant primes. Unfortunately, this one has made the relatively common error of also including 15.

0 marks

Question 21, response 3



Commentary

Some of the weaker responses just worked out the cube or the cube root of 2125, as this student has done.

0 marks

Question 22

22 A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

Answer _____

Question 22, response 1

22 A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

72+83+88+97=340÷4=85

90-85=5

Answer 5

Commentary

Many students gained one mark for working out the average of the four given days, as this one has, or for dividing 340 by 5. Both of these calculations were a valid start to alternative methods and we did see students completing both methods correctly. However, the vast majority who took one of these routes, usually made no further progress, like this student.

1 mark

Question 22, response 2

22 A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

x 795
x → 100
x → 105
x = 110

Answer 110

Commentary

Some students tested different values for Friday's attendance. This student, however, has not shown the outcome of their trials so their approach is a risky one and will score all or nothing. Fortunately, this student did reach the correct answer.

3 marks

Question 22, response 3

22 A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

$72+83+88+97=340$

$340\div 4=85$

$72+83+88+97+110=450$

$450\div 5=90$

Answer 90

Commentary

This student starts by working out the average of the four given days but then goes to trials. They hit on the correct trial but the student makes the common error of giving the answer to the trial rather than picking out the embedded correct value.

Students should be reminded to check they are answering the question they have been asked.

2 marks

Question 23

23 Sam types a constant number of words per minute.

He takes 8 minutes to type a report of 416 words.

How long does it take him to type an essay of 1534 words?

Give your answer in minutes and seconds.

[3 marks]

Answer _____ minutes _____ seconds

Question 23, response 1

23 Sam types a constant number of words per minute.

He takes 8 minutes to type a report of 416 words.

How long does it take him to type an essay of 1534 words?

Give your answer in minutes and seconds.

[3 marks]

416 ÷ 8 = 52 words per minute

1534 ÷ 52 = 29.5

Answer 29 minutes 50 seconds

Commentary

This method was the most successful because students obtained an integer scale factor. They also seemed more able to judge that the second step needed to be a division rather than a multiplication.

Many students who did all the proportion work correctly, struggled with the conversion to minutes and seconds. 29 minutes 50 seconds was a very common incorrect answer. We also saw 29 minutes, 5 seconds. This student has clearly shown where the answer comes from so can be awarded the 2 method marks. A special case was made for those who just gave the answer without method because it was so common.

2 marks

Question 23, response 2

23 Sam types a constant number of words per minute.
He takes 8 minutes to type a report of 416 words.

How long does it take him to type an essay of 1534 words?
Give your answer in minutes and seconds.

[3 marks]

$15334 \div 416 = 3.6875$

$8 \times 3.6875 = 29.5$

Answer 29.5 minutes 1770 seconds

Commentary

This student has also used a correct alternative method for the proportion work. Some who used this method introduced premature approximation because, having obtained a decimal scale factor, they truncated or rounded their answer to the first calculation. However, this student used the full value.

This is an interesting interpretation of the way the question is phrased, giving the answer in minutes and in seconds. Although this interpretation was allowed in Q8, which was very early in the paper, the final mark was not awarded here. This question required an actual conversion. It would have been unfair if those who attempted it and got it wrong scored less well.

2 marks

Question 23, response 3

23 Sam types a constant number of words per minute.
He takes 8 minutes to type a report of 416 words.

How long does it take him to type an essay of 1534 words?
Give your answer in minutes and seconds.

[3 marks]

A $8 \times 60 = 480$ $\frac{416}{480} = 0.86$ words a sec

$0.86 \times 1534 \div 60 = 22.157$

Answer 22 minutes 16 seconds

Commentary

Many students decided to work in seconds which complicated things. It was common to see a correct first calculation but then students were unsure which calculation was needed next. This student has multiplied by 0.86, instead of dividing by it.

1 mark

Question 23, response 4

23 Sam types a constant number of words per minute.

He takes 8 minutes to type a report of 416 words.

How long does it take him to type an essay of 1534 words?

Give your answer in minutes and seconds.

[3 marks]

416 x 2 = 832 16 minutes

416 x 3 = 1248 24 minutes

416 ÷ 2 = 208 4 minutes

1248 + 208 = 1456

Answer _____ minutes _____ seconds

Commentary

Those who tried to build up to 1534 often got close (this one has 28 minutes, and many got 29 or 30 minutes) but then could not work out how to get the exact answer. Often this was an all or nothing approach.

0 marks

Questions 25(a) and 25(b)

25 Rosie makes phone calls to try to sell broadband.

Today, she made 120 calls.

The table shows the results.

Result of call	Frequency
Not answered	33
Answered but sale not made	81
Answered and sale made	6

25 (a) Write down the relative frequency that a call was **not answered**.

[1 mark]

Answer _____

25 (b) During the **rest of the week**, Rosie will make 500 calls.

Using the results in the table, how many sales does she expect to make during the **rest of the week**?

[2 marks]

_____

_____

_____

_____

Answer _____

Question 25(a)

Commentary

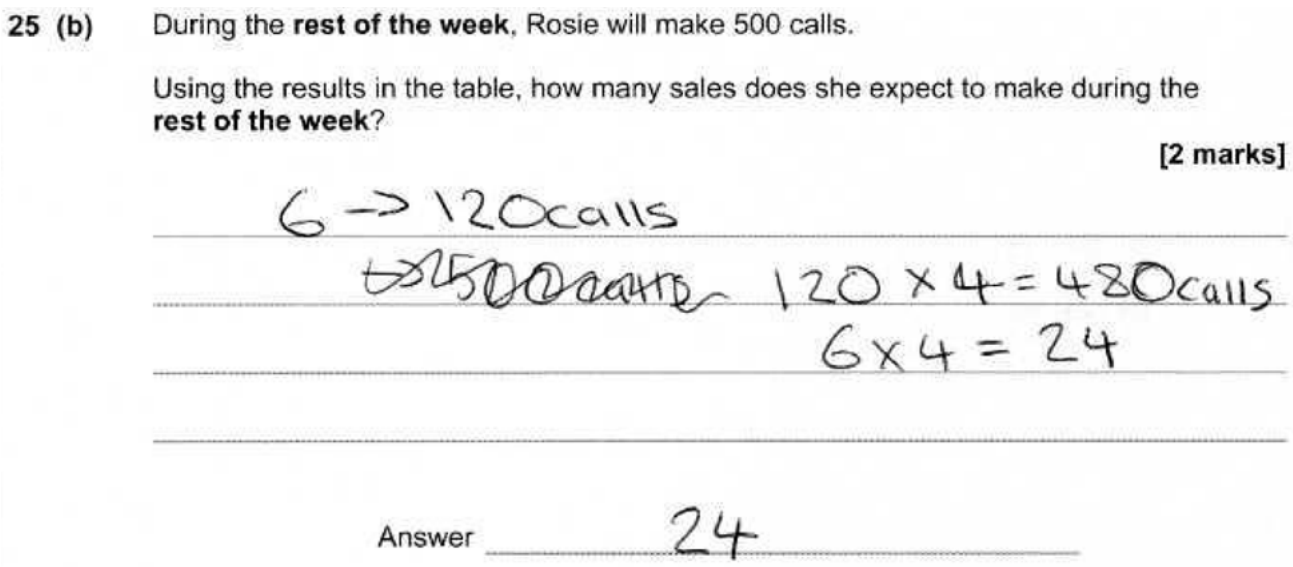
Those who gave the answer as a fraction were usually more successful, whereas those who tried to give it as a decimal or percentage sometimes did not give the full exact value or omitted the % symbol. The most common incorrect answers were the frequency, 33, or 3.63 (120 ÷ 33) or the values given as a ratio, eg 33 : 120 or 33 : 87.

Question 25(b), response 1

25 (b) During the **rest of the week**, Rosie will make 500 calls.

Using the results in the table, how many sales does she expect to make during the **rest of the week**?

[2 marks]



Commentary

Many students did a sort of build-up method but stopped at 24 as in this example. Some tried to adjust their answer to get from 480 calls to 500 calls but most didn't and left their answer as 24. This student may have thought it was 6 calls a day so the rest of the week was 4 more days and had missed the fact that they needed to scale up 6 out of 120.

Incomplete method.

0 marks

Question 25(b), response 2

25 (b) During the **rest of the week**, Rosie will make 500 calls.

Using the results in the table, how many sales does she expect to make during the **rest of the week**?

[2 marks]

500 ÷ 120 = 4.16

4.16 × 6 = 24.96

Answer 25

Commentary

This student does attempt a scaling method but has lost accuracy through premature approximation.

The student has rounded their answer in an attempt to correct it, but answers that came from further rounding lost the accuracy mark. Students should be using the full value on their calculator.

1 mark

Question 26

26 Harry and Ellie each bought a printer and a hard drive.

Here is some information about how much they paid.

	Printer	**Hard drive**
Harry	£80	£25
Ellie	10% less than Harry	20% more than Harry

Ellie says,

‘‘In total, I paid more than Harry because 20% is greater than 10%’’

Is she correct?

Tick a box.

Yes ☐ No ☐

Show calculations to support your answer.

[2 marks]

Question 26, response 1

26 Harry and Ellie each bought a printer and a hard drive.

Here is some information about how much they paid.

	Printer	Hard drive
Harry	£80	£25
Ellie	10% less than Harry	20% more than Harry

Ellie says,

"In total, I paid more than Harry because 20% is greater than 10%"

Is she correct?

Tick a box.

Yes ☐ No ☑

Show calculations to support your answer.

[2 marks]

10% of 80 = 8 20% of 25 = 5

10% = 2.5 x 2 = 5

8 - 5 = 3

Commentary

Most students did very well on this question that was common with the Higher tier.

This student gives a very neat solution. Once they reach 8 and 5, the decision can be made.

2 marks

Question 26, response 2

26 Harry and Ellie each bought a printer and a hard drive.

Here is some information about how much they paid.

	Printer	Hard drive
Harry	£80	£25
Ellie	10% less than Harry	20% more than Harry

£165

£72 £30 £102

Ellie says,

"In total, I paid more than Harry because 20% is greater than 10%"

Is she correct?

Tick a box.

Yes ☑ No ☐

Show calculations to support your answer.

[2 marks]

80 ÷ 10 = 8

80 - 8 = 72

25 ÷ 10 = 2.5

2.5 + 2 = 5

25 + 5 = 30

Commentary

Most students worked out the full cost for Harry and Ellie and compared them.

This student has done all the hard work, shown all the evidence but then ticked the wrong box.

1 mark

Question 26, response 3

26 Harry and Ellie each bought a printer and a hard drive.

Here is some information about how much they paid.

	Printer	Hard drive
Harry	£80	£25
Ellie	10% less than Harry	20% more than Harry

Ellie says,

"In total, I paid more than Harry because 20% is greater than 10%"

Is she correct?

Tick a box.

Yes ☐ No ☑

Show calculations to support your answer.

[2 marks]

Harry printer -> £80

Ellie printer -> 80 ÷ 10 = 8 80 - 8 = £72

Harry hard drive -> £25

Ellie hard drive -> 25 ÷ 10 = 2.50 × 2 = 5

25 - 5 = £20

Harry -> 80 + £25 = £105 Ellie -> £72 + 20 = £92

Ellie is incorrect because she payed £7 less than Harry.

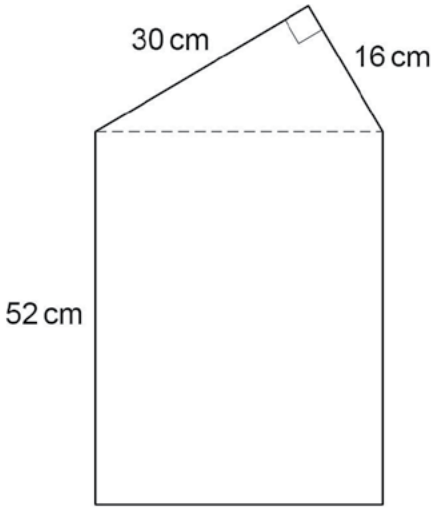
Commentary

This student has worked out 10% and 20% correctly. Then they take the 20% off the hard drive price, showing a processing error. However, they have shown two comparable values - £8 and £5.

1 mark

Question 27

27 A shape is made by joining a right-angled triangle to a rectangle.



Not drawn accurately

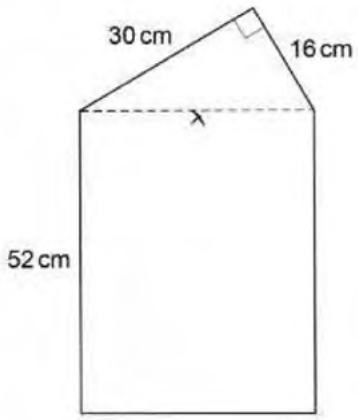
Work out the area of the shape.

[5 marks]

Answer _____ cm^2

Question 27, response 1

27 A shape is made by joining a right-angled triangle to a rectangle.



Not drawn accurately

Work out the area of the shape.

[5 marks]

- $30^2+16^2=x^2=1156$
  $\sqrt{1156}=34$
- $52\times34=1768\text{cm}^2$
- $30\times16=480$
  $480\div2=240\text{cm}^2$

$1768+240=2008\text{cm}^2$

Answer 2008 cm^2

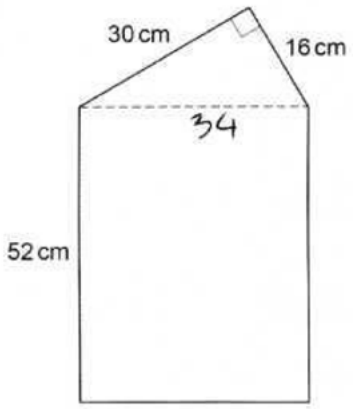
Commentary

This student has given a clearly set out, fully correct solution. This is great work at this stage of the paper. Some students wrote their values on the diagram as they went which helped them keep track.

5 marks

Question 27, response 2

27 A shape is made by joining a right-angled triangle to a rectangle.



Not drawn accurately

Work out the area of the shape.

[5 marks]

$30^2 = 900$

$16^2 = 256$

$256 + 900 = 1156$

$\sqrt{1156} = 34$

$52 \times 34 = 1768 + 272 = 2040$

~~30~~ $34 \times 16 = 544 \div 2 = 272$

Answer 2040 cm^2

Commentary

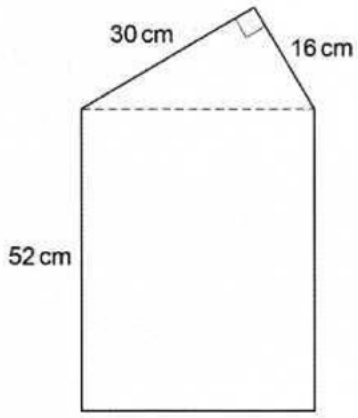
It was quite common for students to use the wrong sides to work out the area of the triangle, presumably because the triangle had been rotated so the base was less obvious.

However, this student has fully correct working for the hypotenuse and the area of the rectangle.

5 marks

Question 27, response 3

27 A shape is made by joining a right-angled triangle to a rectangle.



Not drawn accurately

Work out the area of the shape.

[5 marks]

$\frac{1}{2}$ ~~× base × height~~

$30^2 - 16^2 = 644$ $\sqrt{644} = 2\sqrt{161}$

$= 25.3$

$52 \times 25.3 = 1315.6$

$\frac{1}{2} \times 25.3 \times 16 = 202.4$

$1315.6 + 202.4 = 1518$

Answer 1518 ~~1315.6~~ cm²

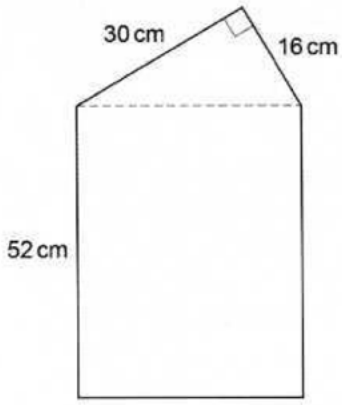
Commentary

This student has made an attempt at Pythagoras' theorem which gained the first mark even though they subtracted. They have then used their width to work out the area of the rectangle which gained the third mark (because they had the first). Unfortunately though, they have then used the wrong sides of the triangle to work out the area.

2 marks

Question 27, response 4

27 A shape is made by joining a right-angled triangle to a rectangle.



Not drawn accurately

Work out the area of the shape.

[5 marks]

30 × 16 = 480

480 ÷ 2 = 240 cm² = Triangle

52 × 30 = 1560 cm²

1560 + 240 = 1800

Answer 1800 cm²

Commentary

Sometimes the correct area of the triangle was the only part of the solution that scored. Students used many different values for the width of the rectangle, in this case the student has just used the 30 cm in the question.

1 mark

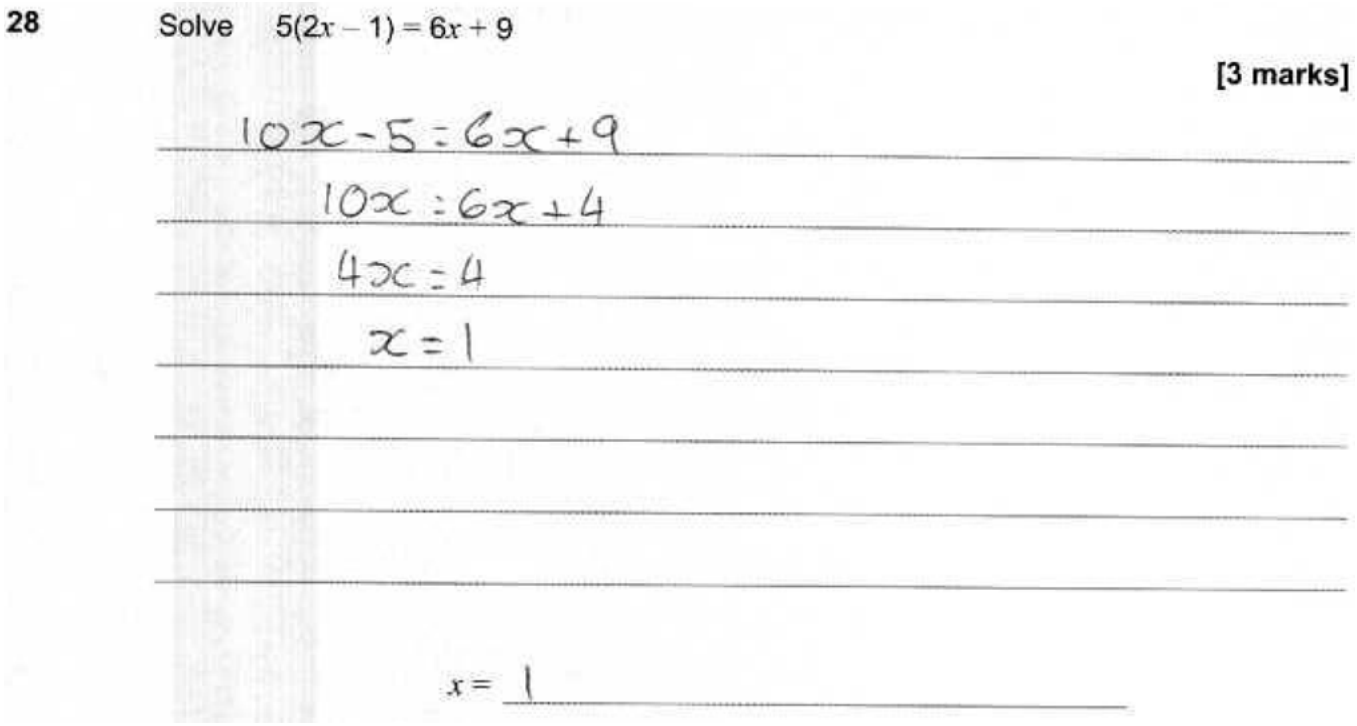
Question 28

28 Solve $5(2x - 1) = 6x + 9$

[3 marks]

$x =$ _____

Question 28, response 1

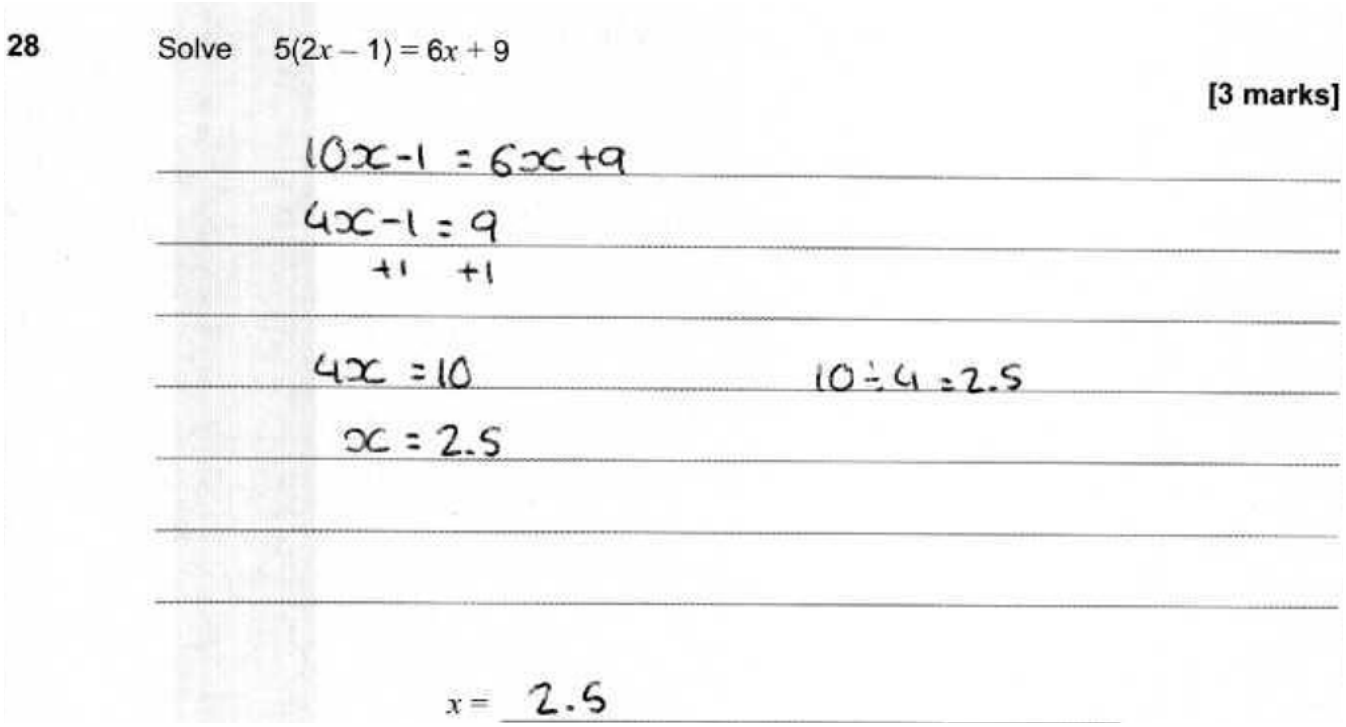


Commentary

This student has done the correct expansion but then has one mistake in the collection of terms. However, they did then follow through correctly so could gain the A1ft.

2 marks

Question 28, response 2



28 Solve $5(2x - 1) = 6x + 9$

[3 marks]

$10x - 1 = 6x + 9$

$4x - 1 = 9$

$+1 \quad +1$

$4x = 10$ $\quad 10 \div 4 = 2.5$

$x = 2.5$

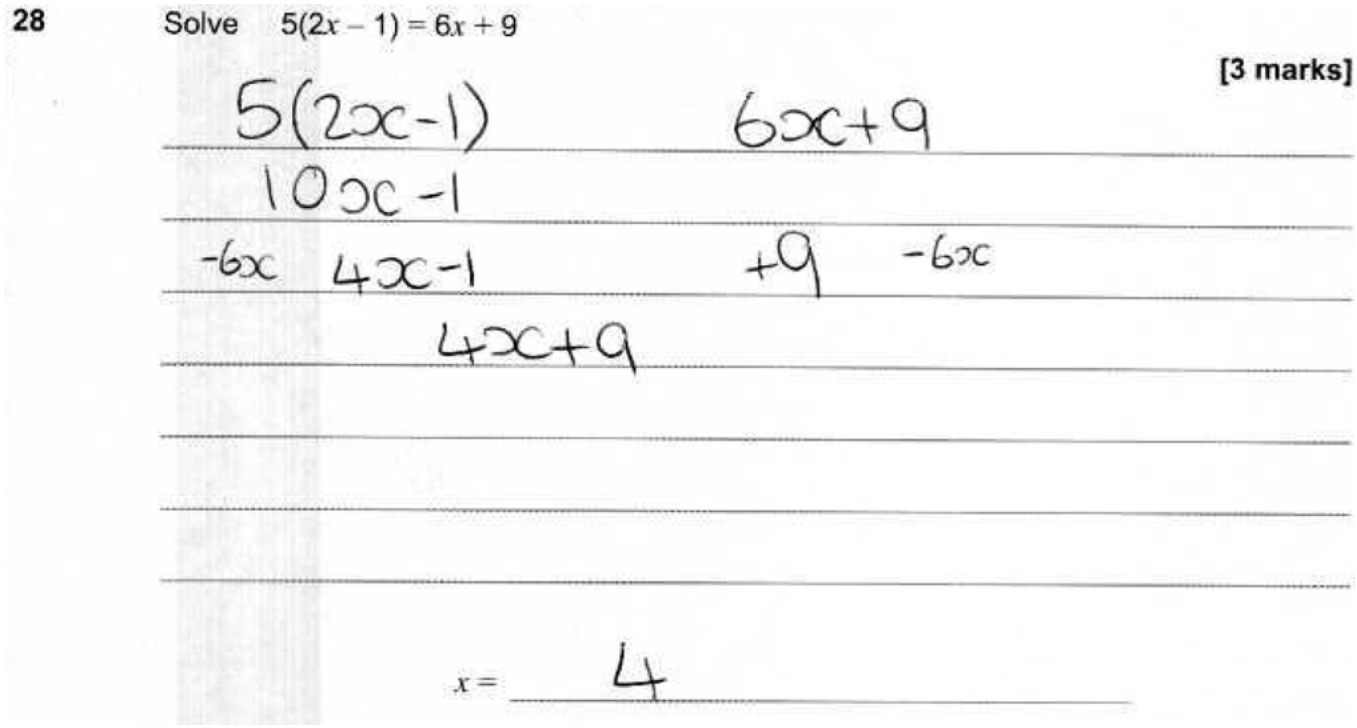
$x =$ 2.5

Commentary

This student has made one mistake in the expansion. However, they have correctly collected their terms and followed through to give their correct answer.

2 marks

Question 28, response 3



Commentary

This student has done the correct expansion but then has one mistake in the collection of terms. However, they did then follow through correctly so could gain the A1ft.

2 marks

Question 28, response 4

28 Solve $5(2x - 1) = 6x + 9$ [3 marks]

BIDMAS

$2x - 1 = 1x + 5 = 6x$

$6x + 9 = 15x$

$6x + 15x = 21x$

$x =$ ~~6~~ 21

Commentary

Many students made careless mistakes or showed misconceptions such as combining terms in x with constant terms, as this student has done.

0 marks

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