Pearson Edexcel

Pearson Edexcel
Level 1/Level 2 GCSE (9-1)
Mathematics (1MA1)

May/June 2022 Exemplar
1MA1-1F Paper 1 (Non-Calculator)
Foundation Tier

Senior Examiner's feedback on student responses

Contents

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About this booklet

This document has been produced to support mathematics teachers delivering the new GCSE (9-1) Mathematics specification.

This document looks at a selection of questions from the June 2022 GCSE (9 - 1) Mathematics Foundation tier examination. It shows real student responses to selected questions and how the examining team follow the mark schemes to demonstrate how the students would be awarded marks on these questions.

Our examining team have selected student responses to Foundation tier questions and common questions that are in both the Higher tier and Foundation tier from the June 2022 examination.

Following each question, you will find the mark scheme for that question, examiner comment, data on how the question performed and then a range of student responses with accompanying examiner comments on how the mark scheme has been applied and the marks awarded, and on common errors for this sort of question.

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General Examiner Feedback

It was pleasing to see many students clearly showing their working and using their communication skills when required. However, there were still many examples of students doing working out in their head. This was often incorrect and, because there was no supporting working to show where the answer had come from, this couldn't be rewarded.

The understanding of many of the concepts on this paper was sketchy for this cohort. Areas of the curriculum that need more attention are, fractions (Q12) calculating speed, distance, time (Q16), stem & leaf diagrams (Q21), standard form (Q26), angles in regular polygons (Q27) and quadratic graphs (Q28). A major concern is the standard of arithmetic shown throughout this paper. However, there were questions or part questions where students of varying ability were able to pick up marks.

Students often did not appear to check their answers for reasonableness – accepting an answer of £14000 or more for a monthly gas bill (for example in Q11) and a time of arrival at work of 2 pm having set off at 7.30am (in Q16).

The quality of handwriting from some students made their responses difficult to read.

Question 7

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 7 - Question

7 Simon buys some candles.
Each candle costs £2

Simon pays with a £20 note.
He gets £6 change.

Work out the number of candles Simon buys.

(Total for Question 7 is 3 marks)

Question 7 - Mark Scheme

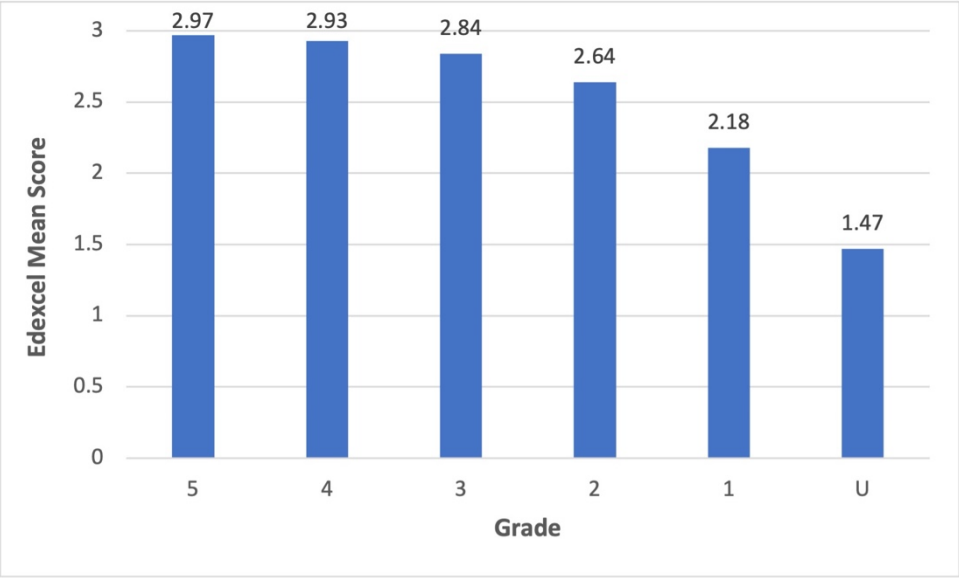
Question	Answer	Mark	Mark scheme	Additional guidance
7	7	P1	for 20 − 6 (= 14) **or** 20 ÷ 2 (=10) **and** 6 ÷ 2 (=3)	May be seen as a build-up method or by a method of repeated subtraction, listing multiples of 2
		P1	for "14" ÷ 2 (= 7) **or** "10" − "3" (= 7)	
		A1	cao	

Question 7 - Examiner Comments

Generally well answered, some with minimal working shown. Careless arithmetic was a major reason for some students not gaining full marks in this question. 20 – 6 = 24 or 20 – 6 = 12 were the most common errors made but by dividing correctly by 2 to get 12 or 6, 2 out of the 3 marks available were possible. A common approach was to list costs of candles in multiples of 2. However, it was not uncommon for some multiples to be omitted, thus affecting the final number of candles bought. Some weaker students got no further than working out the number of candles that could be bought for £20. To gain any credit £6 ÷ 2 also needed to be seen. Giving an answer of 14 on the answer line was also common following correct calculations, with 7 candles often being an embedded answer.

Question 7 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
2.70	3	90	2.70	2.97	2.93	2.84	2.64	2.18	1.47



Question 7 - Response A

7 Simon buys some candles.
Each candle costs £2

Simon pays with a £20 note.
He gets £6 change.

Work out the number of candles Simon buys.

Simone pays £20.00
each candle £2.00

20 - 6 = 14
14 ÷ 2 = 7

7

3 /3

P1 for 20 – 6 = 14

P1 for 14 ÷ 2 = 7

A1 for a correct answer.

Question 7 - Response B

7 Simon buys some candles.
Each candle costs £2

Simon pays with a £20 note.
He gets £6 change.

Work out the number of candles Simon buys.

2x6=12

2 x 7 = 14

£20
-£14 =£6

simon buys 14 candles

2 /3

Q7

P1 for 20 – 6 = 14 This is implied by "£20 - £14 = £6"

P1 for 14 ÷ 2 = 7 Again this is implied by "2 × 7 = 14"

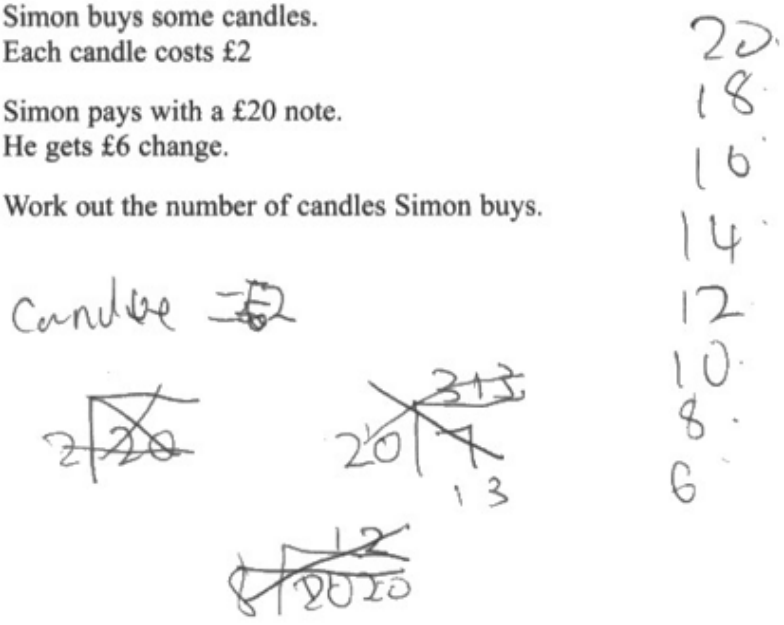
A0 since the correct answer of 7 is embedded in the working but contradicted by the answer on the answer line.

Question 7 - Response C

7 Simon buys some candles.
Each candle costs £2

Simon pays with a £20 note.
He gets £6 change.

Work out the number of candles Simon buys.



1 /3

Q7

A
B
C

P1 for repeated subtraction, ending at 6. This implies leaving a remainder of 6 (£6 change).

P0 since there is no process to count the steps in their repeated subtraction.

Note: if the student had drawn arcs from 20 to 18, 18 to 16, 16 to 14, etc this would have shown an intention to total the subtractions made and this process mark would have been awarded.

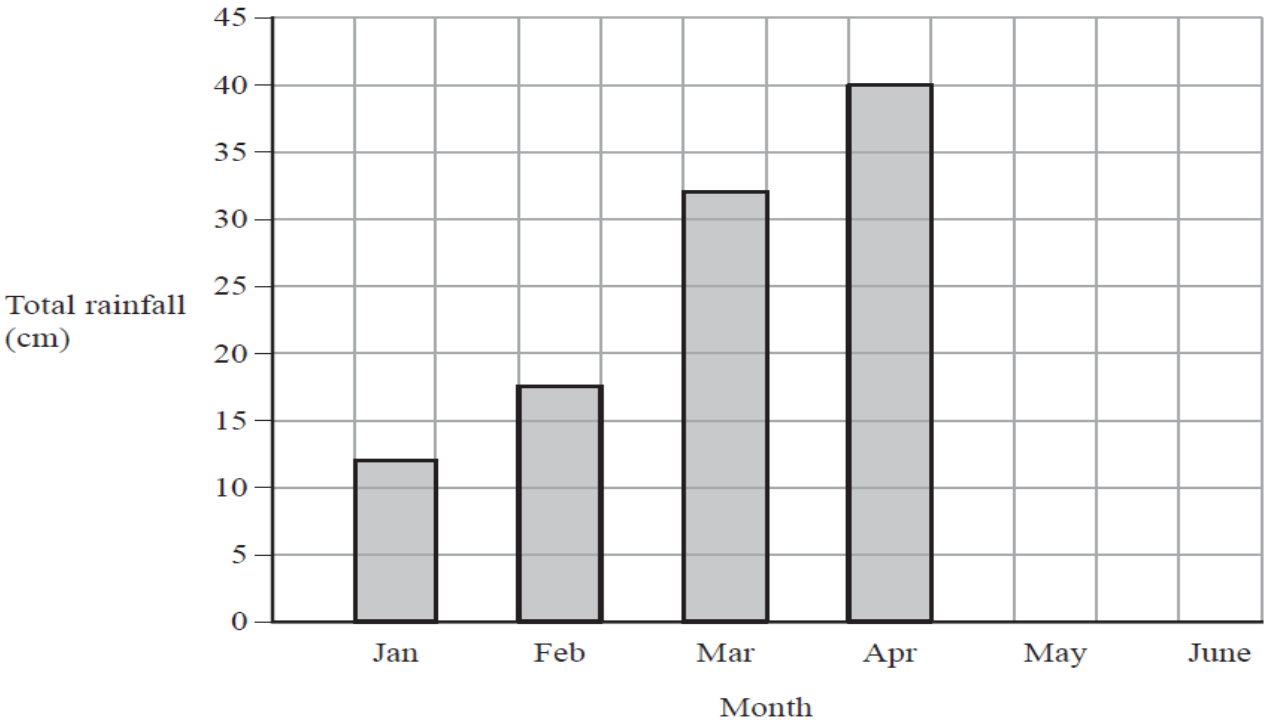
A0 since the answer is incorrect.

Question 8

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 8 - Question

8 The bar chart shows information about the total rainfall each month for four months in a city.



In May, the total rainfall was 35 cm.
In June, the total rainfall was 20 cm.

(*a*) Use this information to complete the bar chart.

(2)

Rupa says,
"In February there was 15.5 cm of rainfall because the bar is half a square above 15"

(*b*) Explain why Rupa is incorrect.

(1)

(Total for Question 8 is 3 marks)

Question 8 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
8 (a)	Completed bar chart	B2	for a fully correct bar chart	Condone bars of unequal width
		(B1	for one bar correct eg May plotted at 35 **or** June plotted at 20 **OR** May plotted at 20 **and** June plotted at 35)	Condone no gaps or inconsistent gaps
(b)	Explanation	C1	**Acceptable examples** Half a square is worth 2.5 (not 0.5) It goes to 17.5 Halfway between 15 and 20 is not 15.5 It is between 17 and 18 It could/would be 17 or 18 It goes up in 5s (not 1s) **Not acceptable examples** The bar is in the middle It could/would be 16 (or 19 or 15.6) You can't have half a cm of rain The answer would be a whole number	

Question 8 - Examiner Comments

In part (a), the modal mark was 2 for a fully correct bar chart. Sometimes just one bar was drawn correctly gaining one mark. Failure to score any marks was more often than not because the student left the whole diagram blank.

Part (b) was a little more demanding. Many realised why Rupa was incorrect but could not always express their reasons clearly. The marking was sympathetic and credit was given if explanations implied some understanding.

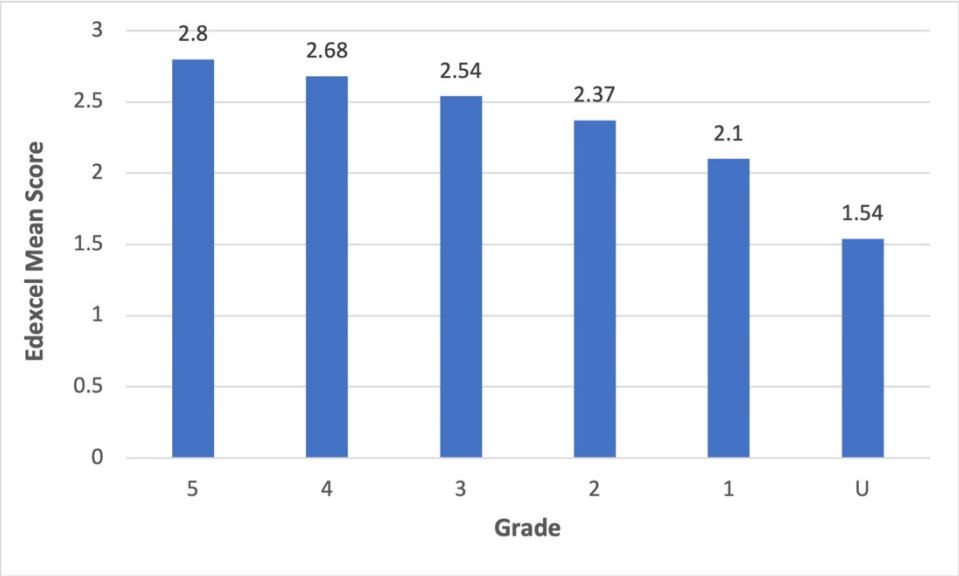
Some confused January's results with February's, resulting in contradictory information given in their response. A common misunderstanding was that only whole numbers could be used, or that rainfall could not be measured in part cm.

Some students found it difficult to find the half-way point between 15 and 20. Many read from the graph and stated that the amount of rainfall was 17 or 18 cm. This question exposed many mis-conceptions regarding decimal and whole numbers, discrete and continuous data.

Some students contradicted the question and asserted that Rupa was correct.

Question 8 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
2.48	3	83	2.48	2.80	2.68	2.54	2.37	2.10	1.54



Question 8 - Response A

Rupa says,

"In February there was 15.5 cm of rainfall because the bar is half a square above 15"

(b) Explain why Rupa is incorrect.

Rupa is incorrect as half way between 15 and 20 is 17.5 bar

1 /1

C1 for correctly explaining that the reading, half way between 15 and 20 should be 17.5

Question 8 - Response B

Rupa says,

"In February there was 15.5 cm of rainfall because the bar is half a square above 15"

(b) Explain why Rupa is incorrect.

She is incorrect because the total rainfall goes up 5cm each square not 1cm therefore it would not be ~~15~~ 15.5cm

1 /1

C1 for explaining that the scale goes up in 5 cm intervals, not 1 cm.

Note: Simply saying that the scale goes up in 5 cm intervals alone is sufficient to imply that the 1 cm interval is incorrect.

Question 8 - Response C

Rupa says,

"In February there was 15.5 cm of rainfall because the bar is half a square above 15"

(b) Explain why Rupa is incorrect.

because Rupa is incorrect ~~as~~ the bar chart goes up in 5's so the gaps between the numbers is and 20 is 16, 17, 18 and 19 so it cannot be a decimal

(1)

0 /1

Q8

C0 This explanation starts off asserting that the scale "goes up by 5's" which is perfectly acceptable. However, there is then a contradiction claiming that the halfway value cannot be a decimal.
No mark is therefore given because of this contradiction.

Question 11

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 11 - Question

11 At the end of October, Fiona's electricity meter reads 88 738 kWh.
At the end of November, her electricity meter reads 89 198 kWh.

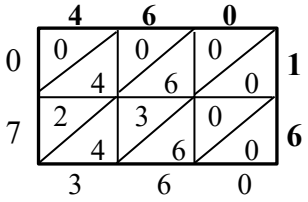
Each kWh of electricity Fiona uses costs 16p

Work out how much Fiona had to pay for the electricity she used in November.

.....

(Total for Question 11 is 4 marks)

Question 11 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
11	£73.60 or 7360p	M1	for 89198 – 88738 (= 460)	May see 0.16 used
			OR for showing 89198 × 16 **or** 88738 × 16	89198 × 16 = 1427168 88738 × 16 = 1419808
			OR for showing (89198 + 88738) × 16	(89198 + 88738) × 16 = 2846976
		M1	for showing "460" × 16	
			OR for showing 89198 × 16 – 88738 × 16	
		M1	(dep on M1) for a complete method of multiplication with relative place value correct including an intention to add all the appropriate elements of the calculation eg, 2 lines of the 1st method, internal numbers of grids, or complete structure shown of partitioning methods.	Accept in any units, correct figures would imply previous mark 4600 2760 7360  400 60 10 4000 600 6 2400 360 4000+2400+600+360
		A1	for £73.6(0) or 7360p SC B3 for an answer with digits 736 with incorrect or missing units	

Q11

A B C

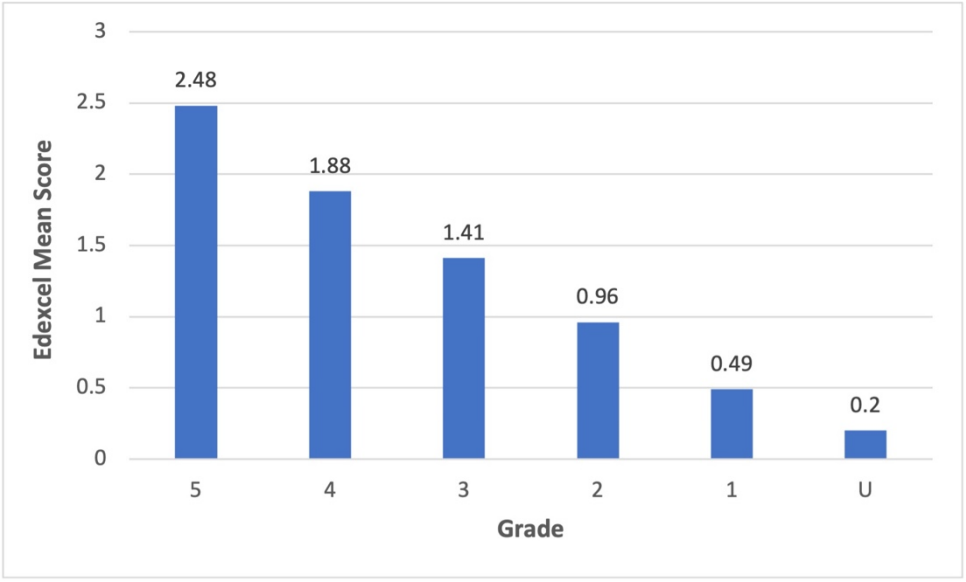
Question 11 - Examiner Comments

Many students did not realise that the number of units of electricity used in November was the difference in the two meter readings, and simply multiplied the November reading by the 16p. Two marks were still available here if a correct method for long multiplication was shown. Whilst a correct method of long multiplication was often seen, the number of simple arithmetic and place value errors in multiplying is a cause for concern. Place value errors were also common within the final answer, where £7360, £736.0 and £7.36 were seen on many occasions. Some managed to score 3 marks but lost the final mark as no units were included.

Some students tried to find the difference in the readings by subtracting the larger value from the lower value.

Question 11 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.41	4	35	1.41	2.48	1.88	1.41	0.96	0.49	0.20

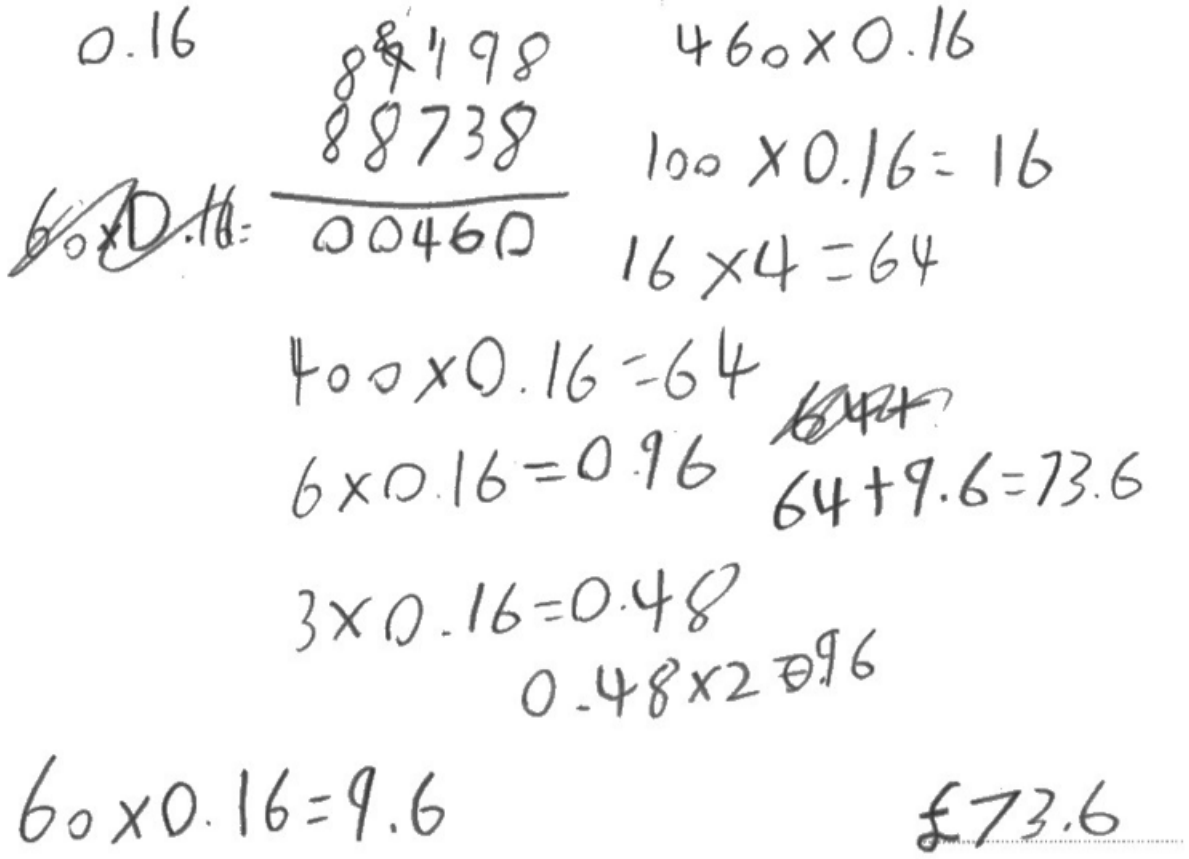


Question 11 - Response A

11 At the end of October, Fiona's electricity meter reads 88 738 kWh.
At the end of November, her electricity meter reads 89 198 kWh.

Each kWh of electricity Fiona uses costs 16p

Work out how much Fiona had to pay for the electricity she used in November.



Q11

A
B
C

4 /4

M1 for 89198 - 88738

M1 for 460 × 0.16 Note: 0.16 or 16 can be used here.

M1 for a correct multiplication process where 400 × 0.16 and 60 × 0.16 are calculated separately and then added together.

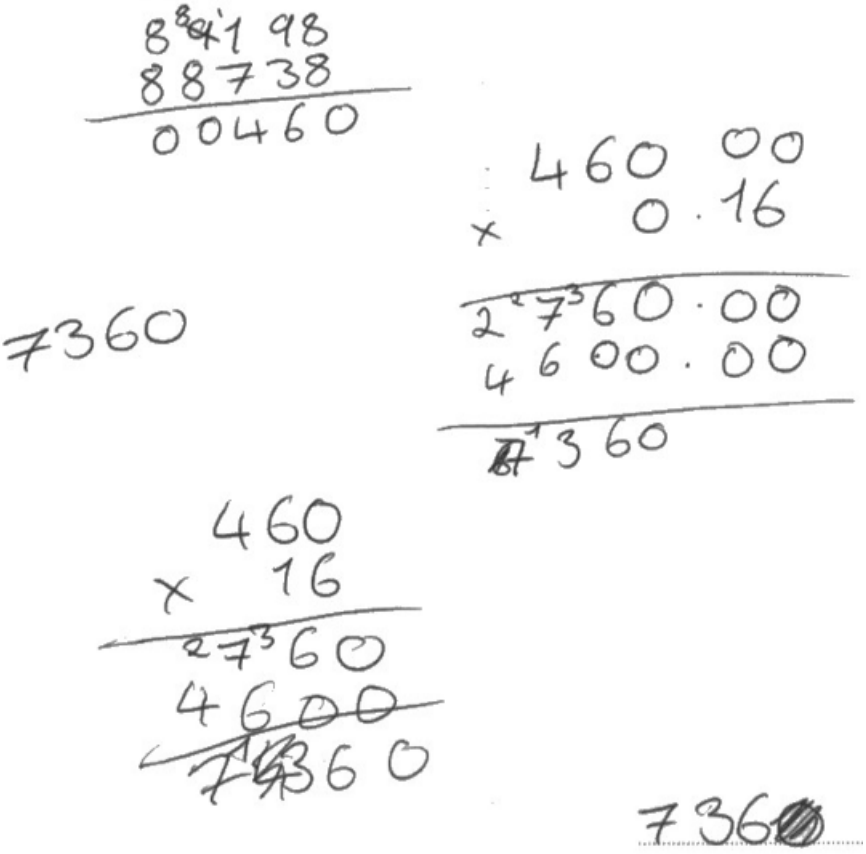
A1 for correct answer.
Note: the missing zero in their final answer is acceptable as this question is not assessing monetary notation.

Question 11 - Response B

11 At the end of October, Fiona's electricity meter reads 88 738 kWh.
At the end of November, her electricity meter reads 89 198 kWh.

Each kWh of electricity Fiona uses costs 16p

Work out how much Fiona had to pay for the electricity she used in November.



Q11

3 /4

M1 for 89198 - 88738

M1 for 460 × 0.16 or 460 × 16

M1 for a correct method of long multiplication with correct place value

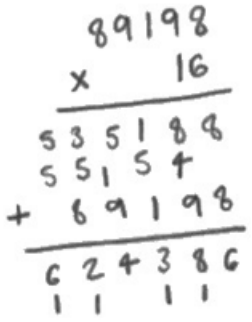
A0 Incorrect answer.
Note: this is also SCB3 for an answer with digits 736 with incorrect or missing units.

Question 11 - Response C

11 At the end of October, Fiona's electricity meter reads 88 738 kWh.
At the end of November, her electricity meter reads 89 198 kWh.

Each kWh of electricity Fiona uses costs 16p

Work out how much Fiona had to pay for the electricity she used in November.



£6243.86p

Q11

A
B
C

1 /4

M1 for 89198 × 16

M0 since there is no differencing of the readings shown.

M0 since the method of long multiplication shows a place value error; the 89198 should read 891980

A0 Incorrect answer.

Question 16

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 16 - Question

16 Savio leaves his home at 07 30 to drive to work.

He drives a distance of 50 miles.

Savio thinks he drives at an average speed of 40 miles per hour.

(*a*) If Savio is correct, at what time will he arrive at work?

.....

(3)

In fact, Savio's average speed was greater than 40 miles per hour.

(*b*) How does this affect your answer to part (*a*)?

.....

.....

.....

(1)

(Total for Question 16 is 4 marks)

.

Question 16 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	(0)8 45	P1	for 50 ÷ 40 (= 1.25) oe or (time =) (0)8 30 (after travelling for) 40 miles	
		P1	for a process to convert their time to minutes or hours and minutes, eg "1.25" × 60 (= 75 mins = 1 hr 15 mins) **or** for $\frac{10}{40} \times 60$ (= 15 mins)	May be seen as a build-up method and may state 1 hour 15 mins
		A1	for (0)8 45 oe	SC: B2 for answer of (0)8 55 (= 7.30 + 1.25)
(b)	Explanation	C1	**Acceptable examples** It will be earlier Time will be reduced He will get there quicker/faster He will arrive at a different time The journey will be shorter so he will arrive earlier **Not acceptable examples** He will arrive later The time will increase	Explanations must be unambiguous

Question 16 - Examiner Comments

Distance, speed and time formulae were understood by many students and 50 ÷ 40 was often seen in part (a). Poor arithmetic then often followed with results such as 1.1 or 1.2 hours. Very few students were then able to convert the part hours to minutes and 1 hour 10 mins or 1 hour 20 mins were the usual results. When a correct division giving 1.25 was found, this was then incorrectly converted to 1 hour 25 mins by many students giving a final answer of 08:55.

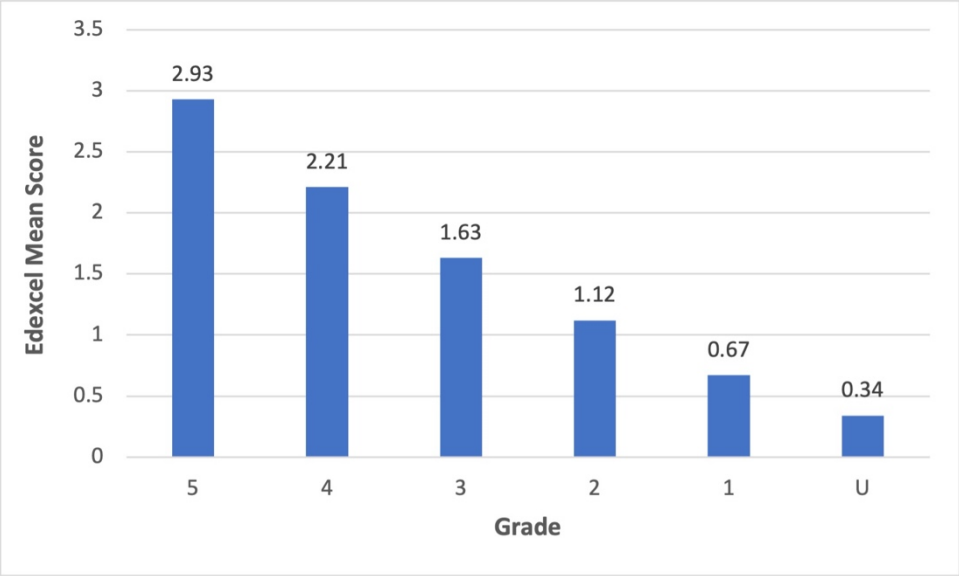
Build up methods were common for this question, with 1 hour associated with 40 miles. However, most of those who used this approach were unable to reconcile the remaining 10 miles with a correct time.

Weaker students often wrote 50 ÷ 40 and then proceeded to divide 40 by 50 and many worked out 50 × 40. Others used 7.30 as the 'time' in the formula. A small minority of students clearly didn't read the question carefully and gave an answer of 1hr 15mins for the time taken rather than the time of arrival.

More students had success in part (b), realising that if the average speed was greater then the time of arrival would be earlier.

Question 16 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.67	4	42	1.67	2.93	2.21	1.63	1.12	0.67	0.34



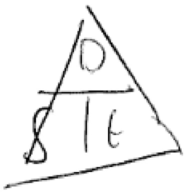
Question 16 - Response A

16 Savio leaves his home at 07 30 to drive to work.

He drives a distance of 50 miles.

Savio thinks he drives at an average speed of 40 miles per hour.

(a) If Savio is correct, at what time will he arrive at work?



t = D/S = 50/40 = 5/4 × 60 =

15 ... 4)60

1.25 = 75 mins

7:30 +75

8:45

08:45

(3)

In fact, Savio's average speed was greater than 40 miles per hour.

(b) How does this affect your answer to part (a)?

My answer will Decrease because he is going faster therefore he will reach their faster

(1)

4 /4

Part (a)
P1 for 50 ÷ 40

P1 for 5/4 × 60, correctly converting to minutes

A1 for a correct answer

Part (b)
C1 for an acceptable explanation

Q16 ? A B C

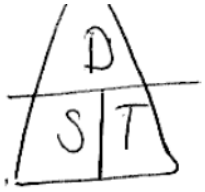
Question 16 - Response B

16 Savio leaves his home at 0730 to drive to work.

He drives a distance of 50 miles.

Savio thinks he drives at an average speed of 40 miles per hour.

(a) If Savio is correct, at what time will he arrive at work?



① D 50miles

40mph | T = 1·25

② £1.25
40 | 50·00·00

③ 07·30
+01·25
8·55

8·55am

In fact, Savio's average speed was greater than 40 miles per hour.

(b) How does this affect your answer to part (a)?

If Savios speed is greater then 40mph, this will mean that he would get to work quicker then 8:55am, which would make this answered Wrongas he would be earlier for work. (1)

3 /4

Q16

A B C

Part (a)
The answer of 8.55 comes from taking 1.25 to mean 1 hour 25 minutes. It does follow a correct process to find the time taken, ie 50 ÷ 40
The Special case is applied here and **B2** is scored.

Part (b)
C1 is awarded here for either "he would get to work quicker" or "he would be earlier for work"

Question 16 - Response C

6 Savio leaves his home at 07 30 to drive to work.

He drives a distance of 50 miles.

Savio thinks he drives at an average speed of 40 miles per hour.

(a) If Savio is correct, at what time will he arrive at work?

$\frac{50}{40} = 12.5$ ~~7.30~~

7.30 + 12.5 = ~~19.35 minutes~~

7:42

7:42

(3)

In fact, Savio's average speed was greater than 40 miles per hour.

(b) How does this affect your answer to part (a)?

We wont know what time he gets to work

1 /4

Q16

A
B
C

Part (a)
P1 for 50 ÷ 40

P0 since there is no attempt to convert to minutes. The student thinks that the 12.5 is minutes, not hours.

A0 for an incorrect answer

Part (b)
C0 The statement is true, but it is not addressing the question

Question 18

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 18 - Question

18 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones

75 g	butter
350 g	self-raising flour
40 g	sugar
150 ml	milk
2	eggs

Mia wants to make 25 scones.
Work out how much sugar she needs.

..... g

(Total for Question 18 is 2 marks)

Question 18 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
18	100	M1	M1 for a correct first step, eg 25÷10 (= 2.5) **or** 40 ÷ 10 (= 4) **or** 20 (scones) = 40 × 2 (= 80g) **or** 5 (scones) = 40 ÷ 2 (= 20g)	Multiplier may be seen as evidence of this mark
		A1	cao	

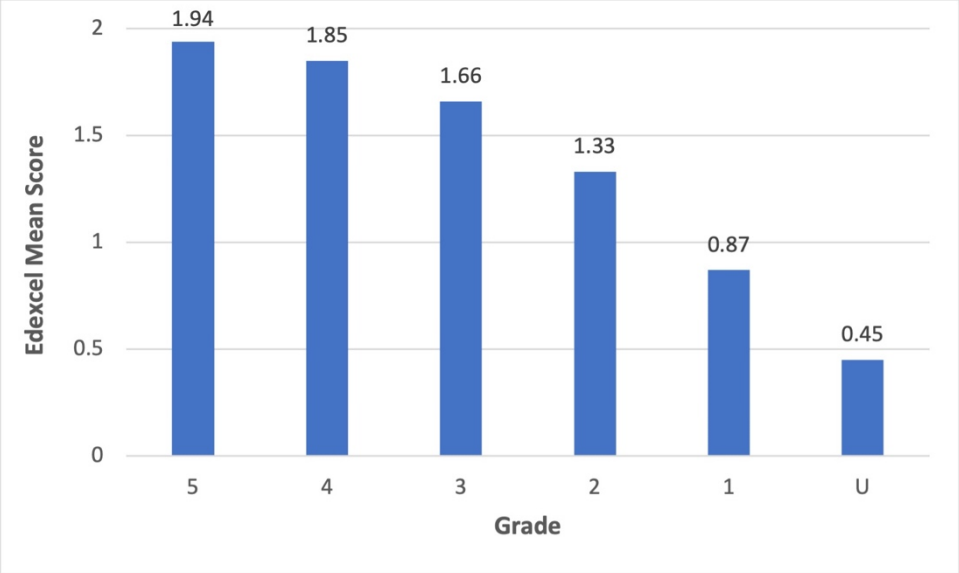
Question 18 - Examiner Comments

The most popular method in answering this question was by working out the amount of sugar required to make 20 and then 5 scones. Some did simply work out 40 × 2.5
In the former method, loss of marks was a result of not explicitly identifying the number of scones that were being considered. or finding the amount of sugar required for 20 scones accurately but then simply adding 5 more grams for the 5 extra scones.

A significant number just multiplied by 25, thinking the ingredients given were for one scone.
Some students wasted considerable time by working out the amount of each ingredient in making 25 scones

Question 18 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.52	2	76	1.52	1.94	1.85	1.66	1.33	0.87	0.45



Question 18 - Response A

18 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones

75 g	butter
350 g	self-raising flour
40 g	sugar
150 m/	milk
2	eggs

Mia wants to make 25 scones.
Work out how much sugar she needs.

40 ÷ 2 = 20 (5 the scones)

40 + 40 = 80 (20 scones)

80 + 20 = 100 g

100g

2 /2

M1 for either 40 ÷ 2 or 40 + 40

A1 for a correct answer

Q18

A
B
C

Question 18 - Response B

18 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones		10	5
75 g	butter	150 g	
350 g	self-raising flour	700g	175
40 g	sugar	80g	20
150 ml	milk	300ml	75ml
2	eggs	4	1

Mia wants to make 25 scones.
Work out how much sugar she needs.

75 + 75 = 150

65 + 65 = 130

25

350 + 350 = 700

170 + 170 = 340

172 + 172 = 344

175 + 175 = 350

55 + 55 = 110

35

135

0

80 + 40 + 20 = 140

140

1 /2

M1 for 20 (g) for 5 (scones) as shown in the table. There first column in the table is for 20 scones (not 10 as the heading says) and is correct for sugar.

A0 for an incorrect answer since subsequent working of 80 + 40 + 20 is wrong.

Q18

A
B
C

Question 18 - Response C

18 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones

75 g	butter
350 g	self-raising flour
40 g	sugar
150 ml	milk
2	eggs

Mia wants to make 25 scones.
Work out how much sugar she needs.

Q18

85g

0 /2

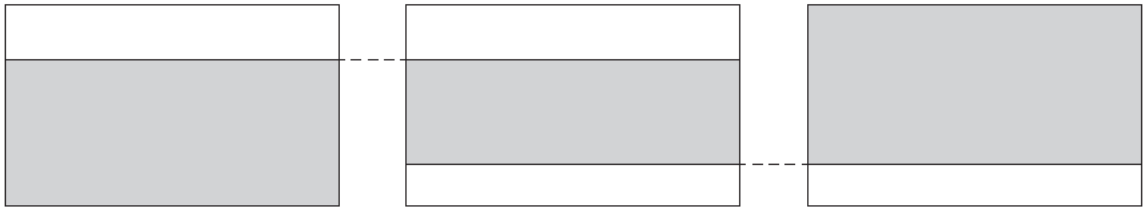
M0 A0 for an incorrect answer with no working shown.

Note: This is a very common answer which has probably been derived from 2 lots of 40 for 20 scones and then just adding the 5 scones instead of a quantity of sugar. With this working out shown, 1 mark would have been awarded.

Question 20

Question 20 - Question

20 The diagram shows three identical rectangles **A**, **B** and **C**.



Rectangle **A** Rectangle **B** Rectangle **C**

$\frac{5}{8}$ of rectangle **A** is shaded.

$\frac{9}{11}$ of rectangle **C** is shaded.

Work out the fraction of rectangle **B** that is shaded.

.....

(Total for Question 20 is 3 marks)

Question 20 - Mark Scheme

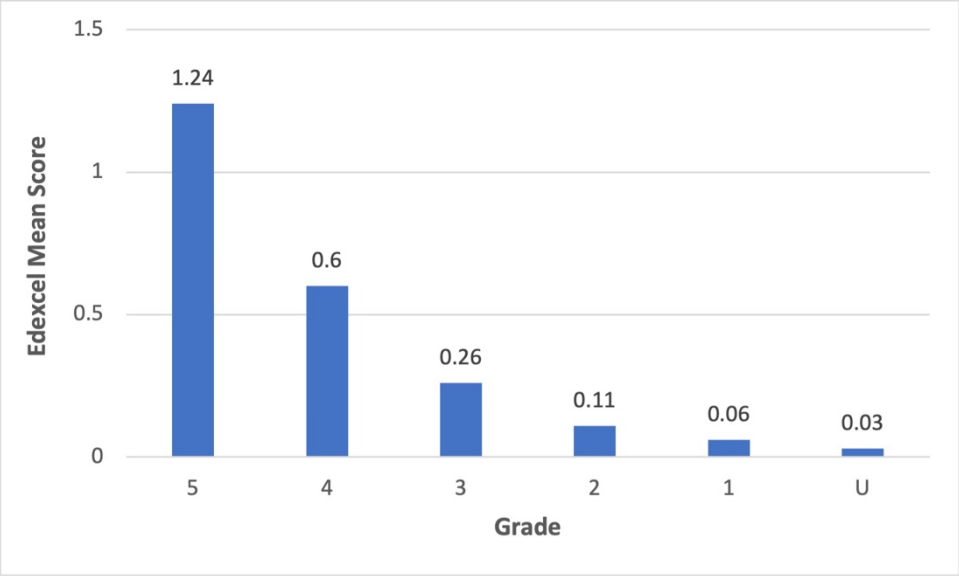
Question	Answer	Mark	Mark scheme	Additional guidance
20	$\frac{39}{88}$	M1	for finding the gap (A) $1-\frac{5}{8}$ $(=\frac{3}{8}=\frac{33}{88})$ **or** (C) $1-\frac{9}{11}$ $(=\frac{2}{11}=\frac{16}{88})$ **or** $\frac{5}{8}+\frac{9}{11}$ $(=\frac{55}{88}+\frac{72}{88}=\frac{127}{88})$	
		M1	for $\frac{9}{11}-\frac{3}{8}(=\frac{72}{88}-"\frac{33}{88}")$ **or** $\frac{5}{8}-\frac{2}{11}$ $(=\frac{55}{88}-"\frac{16}{88}")$ **or** $1-\frac{3}{8}-\frac{2}{11}(=1-"\frac{33}{88}"-"\frac{16}{88}")$ oe **or** $\frac{5}{8}+\frac{9}{11}-1(=\frac{55}{88}+\frac{72}{88}-1)$	
		A1	oe	

Question 20 - Examiner Comments

Many students found the demand of this question just too great, and where to start puzzled a great many. Some just worked with the given fractions, adding or subtracting and in some cases multiplying them together. Very few were able to tease out a process to find the required fraction. One mark was awarded for adding the two given fractions, this being just one step away from a correct solution. One mark was also available for identifying the fraction of the unshaded parts of rectangles A and C. However, many simply wrote 3 (instead of $\frac{3}{8}$) and 2 (instead of $\frac{2}{11}$) in the appropriate places. Fraction arithmetic remains an issue with many students writing $\frac{5}{8}+\frac{9}{11}=\frac{14}{19}$. Of those who did make a sensible start, $\frac{49}{88}$ was a common answer which gained 1 mark. Also, $\frac{127}{88}$ was a similar common incorrect answer.

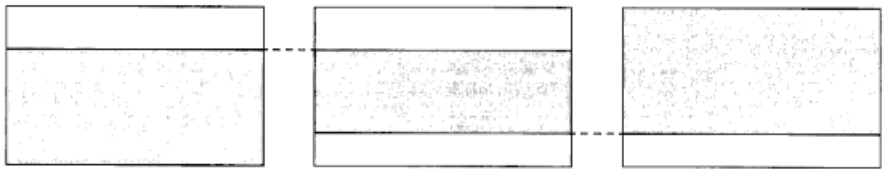
Question 20 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.41	3	14	0.41	1.24	0.60	0.26	0.11	0.06	0.03



Question 20 - Response A

20 The diagram shows three identical rectangles **A**, **B** and **C**.

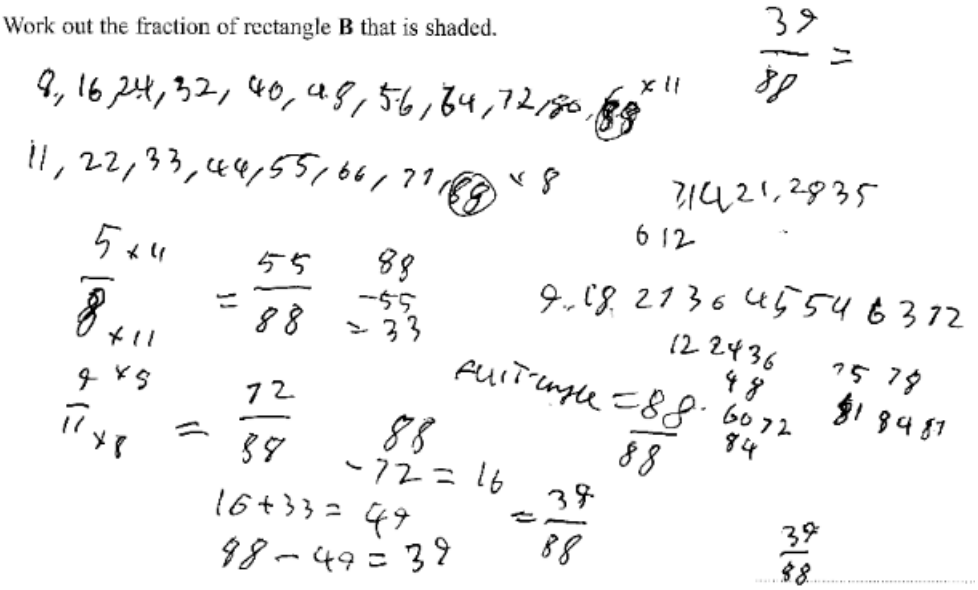


Rectangle **A** Rectangle **B** Rectangle **C**

$\frac{5}{8}$ of rectangle **A** is shaded.

$\frac{9}{11}$ of rectangle **C** is shaded.

Work out the fraction of rectangle **B** that is shaded.



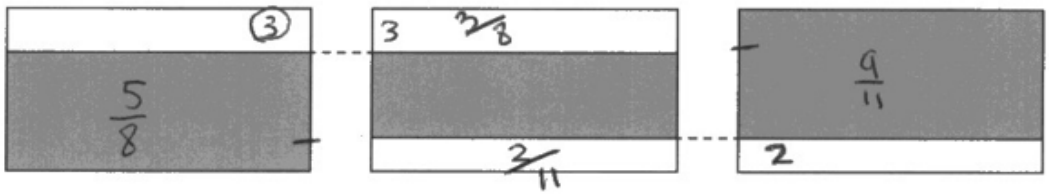
3 /3

M1 The working here shows 5/8 and 9/11 converted to fractions with a common denominator of 88. This mark is awarded on sight of the 33 (88ths) or 16 (88ths) for the unshaded regions.

M1 for 88 – (33 + 16) = 39

A1 for a correct answer.
Note: the 33 (88ths) and the 16 (88ths) are acceptable only because the final answer is given as a fraction of 88

Question 20 - Response B



Rectangle A Rectangle B Rectangle C

$\frac{5}{8}$ of rectangle **A** is shaded. $\frac{3}{8}$ not shaded $= \frac{1.5}{4}$

$\frac{9}{11}$ of rectangle **C** is shaded. $\frac{2}{11}$ not shaded $= \frac{1}{5.5}$

Work out the fraction of rectangle **B** that is shaded.

8 16 24 32 40 48 54 88

11 22 33 44 55 66 77 88

19.5 × 3 = 16.5

8 − 5 = 3

11 − 9 = 2

3 + 2 = 5

$\frac{5}{8}^{\times 11} + \frac{9}{11}^{\times 8} = \frac{55}{88} + \frac{72}{88} = \frac{127}{88} = 1\frac{39}{88}$

A C

$\frac{3}{8}^{\times 11} + \frac{2}{11}^{\times 8} = \frac{33}{88} + \frac{16}{88} = \frac{49}{88} =$

39

Q20

1 /3

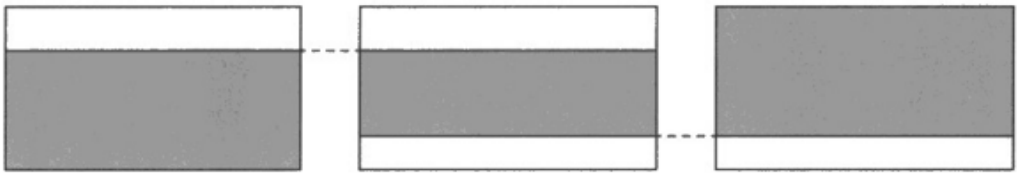
M1 The working here shows a choice of method; 5/8 + 9/11 and 3/8 + 2/11 Either of these approaches would gain the method mark as per the mark scheme, M1for 5/8 + 9/11 or M1 for either 3/8 or 2/11

M0 The second method mark is for a complete method and whilst the calculations shown are correct, we need to see 127/88 - 1 or 1 - 49/88

A0 No answer given

Question 20 - Response C

20 The diagram shows three identical rectangles **A**, **B** and **C**.



Rectangle **A** Rectangle **B** Rectangle **C**

$\frac{5}{8}$ of rectangle **A** is shaded. $\frac{5}{8}$

$\frac{9}{11}$ of rectangle **C** is shaded. $\frac{9}{11}$

Work out the fraction of rectangle **B** that is shaded. ?

$\frac{9}{11} - \frac{5}{8} = \frac{72}{88} - \frac{55}{88} = \frac{17}{88}$

0 /3

M0 M0 A0 Even though their fraction working is correct, 9/11 – 5/8 is not an acceptable start to the method.

Q20

A B C

Question 21

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 21 - Question

21 Here are the ages, in years, of 15 people.

19	28	29	33	27
27	37	25	27	37
17	45	47	25	26

Show this information in a stem and leaf diagram.

Key:

(Total for Question 21 is 3 marks)

Question 21 - Mark Scheme

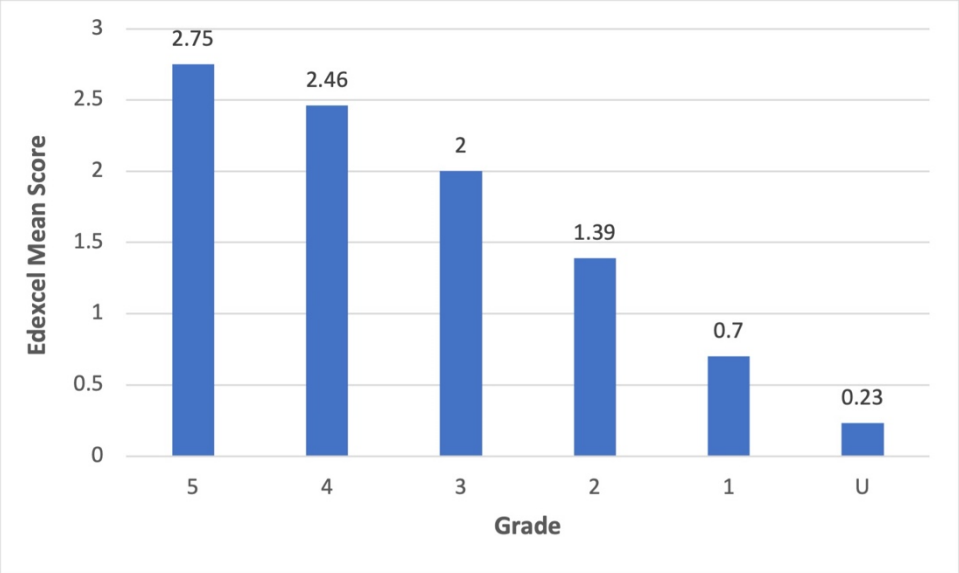
Question	Answer	Mark	Mark scheme	Additional guidance
21	1 79 2 55677789 3 377 4 57	B2	for a fully correct ordered diagram	Accept stem of 10, 20, 30, 40 Can be in reverse vertical order (with matching leaves) eg 4, 3, 2, 1
		(B1	for a complete unordered diagram **or** for an ordered diagram with at most one error or omission)	Errors can be omissions; one number in the wrong position is one error.
	Key: eg 2|5 = 25 **or** 20|5 = 25	B1	for correct key (units not required but must be correct if stated) eg 2|5 **or** 20|5 represents 25 (years)	Key must be consistent with the stem

Question 21 - Examiner Comments

Those students who understood the concept of a stem and leaf diagram usually scored well, losing marks generally through carelessness by omitting a value or giving an unordered diagram or an incomplete key. Some errors in the key including 'people' when the figures were ages. Pictograms and tally charts were quite often seen.

Question 21 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.85	3	62	1.85	2.75	2.46	2.00	1.39	0.70	0.23



Question 21 - Response A

21 Here are the ages, in years, of 15 people.

19 28 29 38 27
28 37 25 27 38
19 45 47 26 26

Show this information in a stem and leaf diagram.

1	7 9
2	5 5 6 7 7 7 8 9
3	3 7 7
4	5 7

Key: 1 | 9 = 19 years old

3 /3

B2 for a fully correct ordered diagram.

B1 for a correct key consistent with the stem of the diagram.

Q21

A
B
C

Question 21 - Response B

21 Here are the ages, in years, of 15 people.

19 28 29 33 27
27 37 25 27 37
17 45 47 25 26

Show this information in a stem and leaf diagram.

1	7 9
2	5 5 6 7 7 7 8 9
3	3 7 7
4	5 7

Key: 1 | 7 = 17 people

2 /3

B2 for a fully correct ordered diagram.

B0 since the units quoted in the key are incorrect

Question 21 - Response C

21 Here are the ages, in years, of 15 people.

~~19~~	~~28~~	~~29~~	~~33~~	~~27~~
27	~~37~~	~~25~~	~~27~~	~~37~~
~~17~~	~~45~~	~~47~~	~~25~~	26

Show this information in a stem and leaf diagram.

1	7, 9
2	5, 5, 7, 7, 8, 9
3	3, ~~8~~ 7, 7
4	5, 7

Key: 1/7 = 17

1 /3

Q21

A
B
C

B0 for an ordered diagram with more than one error; a 26 and a 27 have not been included in the diagram.

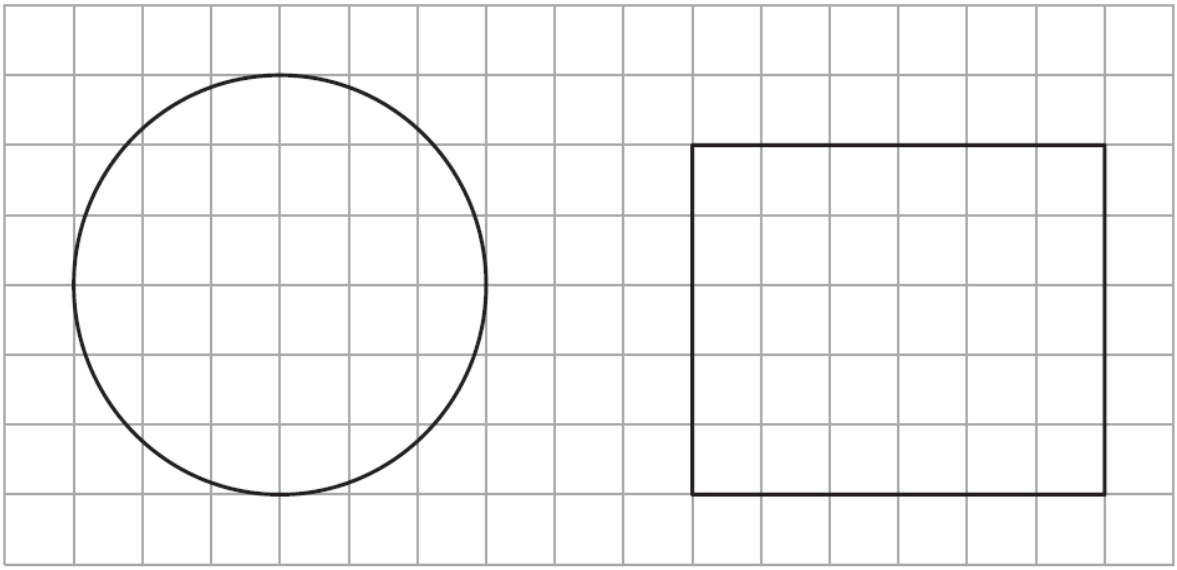
B1 for a correct key.

Question 22

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 22 - Question

22 The centimetre grid shows the plan and the front elevation of a cylinder.



Plan Front elevation

Work out the volume of the cylinder.
Give your answer in terms of π

..... cm3

(Total for Question 22 is 3 marks)

Question 22 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
22	45π	P1	for (area of circle =) $\pi \times 3^2$	
		P1	for (volume =) [area of circle] × 5	[area of circle] × 5 = $\pi \times 3^2 \times 5$ or $\pi \times 6^2 \times 5$ or $\pi \times r^2 \times 5$
		A1	cao	

Question 22 - Examiner Comments

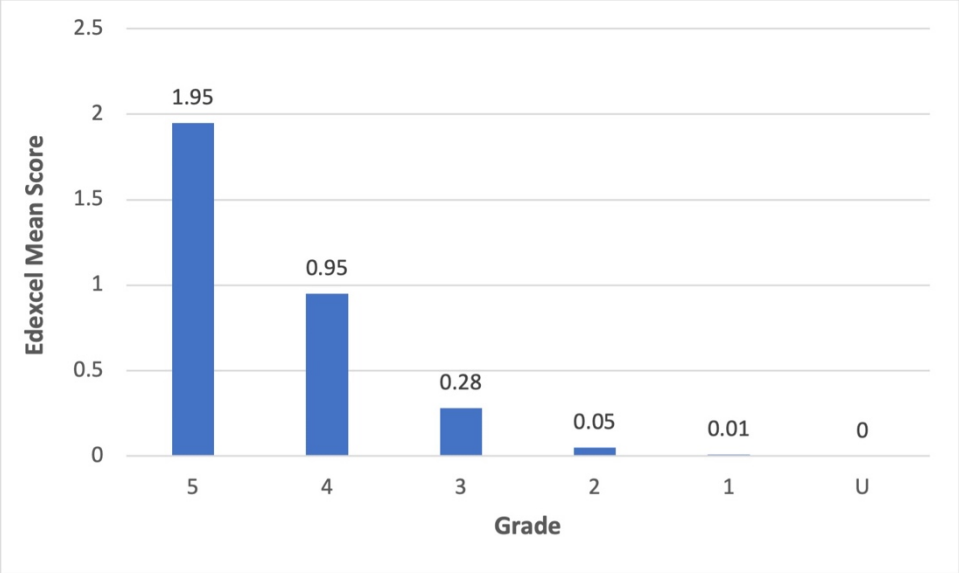
This question was answered poorly by all but a few students. Many recognized the radius as being 3 cm but were unable to find an expression for the area. The height of the cylinder was often taken as 6 cm instead of 5 cm.

A common error was to correctly find the area of the plan, 9π, and then multiply it by the area of the front elevation. Some students used numerical values for π and this was acceptable in assessing the process but not in the final answer. Whilst many students did realise that they needed to use πr^2, or even $\pi r^2 h$ they lacked the confidence to evaluate this with the given information.

Weaker students did attempt to count squares in working out the area of the plan but this was usually accompanied by counting squares to find the area of the front elevation as well.

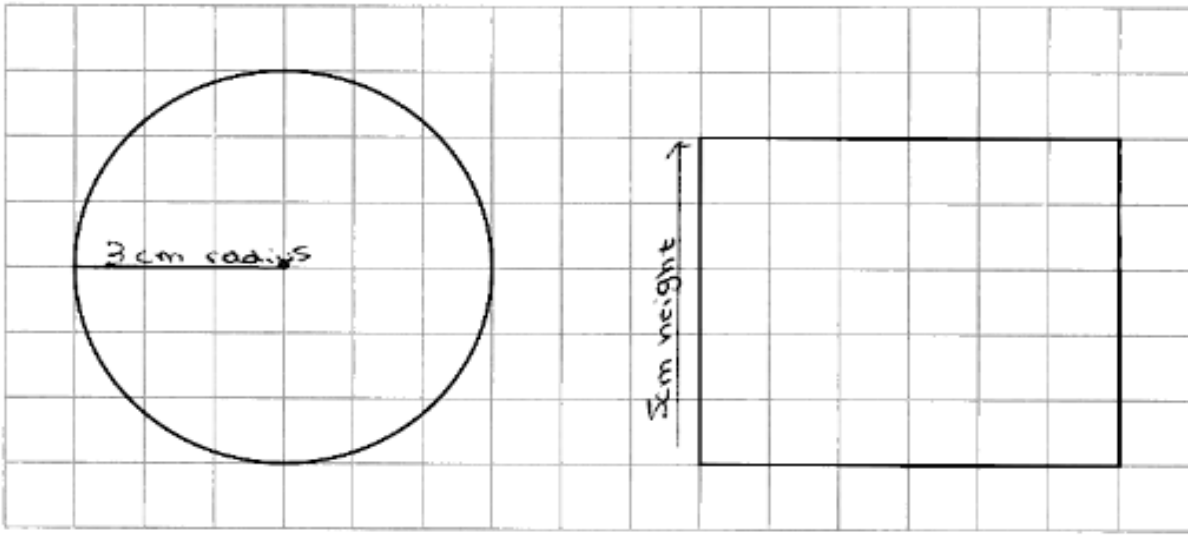
Question 22 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.58	3	19	0.58	1.95	0.95	0.28	0.05	0.01	0.00



Question 22 - Response A

22 The centimetre grid shows the plan and the front elevation of a cylinder.



Plan Front elevation

Work out the volume of the cylinder.
Give your answer in terms of π

$= \pi r^2 \times$ height

$= \pi \times 3^2 \times 5\text{cm}$

$\pi \times 9 \times 5$

$\pi 45$

$= 45\pi$

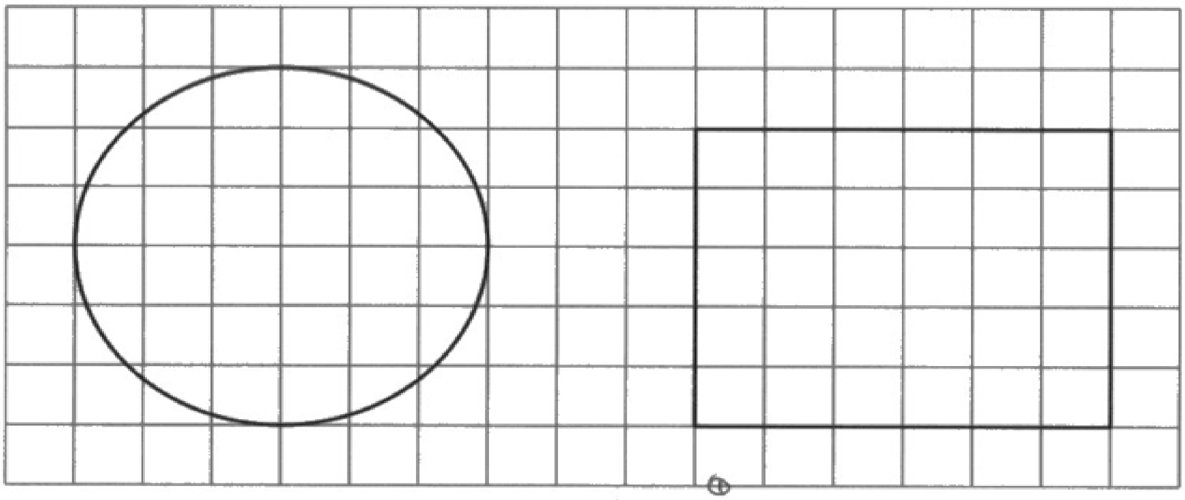
3 /3

P2 for $\pi \times r^2 \times 5$ One mark for $\pi \times r^2$ and one mark for multiplying the area of the circle by 5

A1 for a correct answer given in terms of π.

Question 22 - Response B

22 The centimetre grid shows the plan and the front elevation of a cylinder.



Plan

Front elevation

Work out the volume of the cylinder.
Give your answer in terms of π

$V = \pi r^2 h$

$= 3.14 \times 3^2 \times 5$

$= 3.14 \times 9 \times 5$

$= 3.14 \times 45 = 141.30 \text{ cm}^3$

2 /3

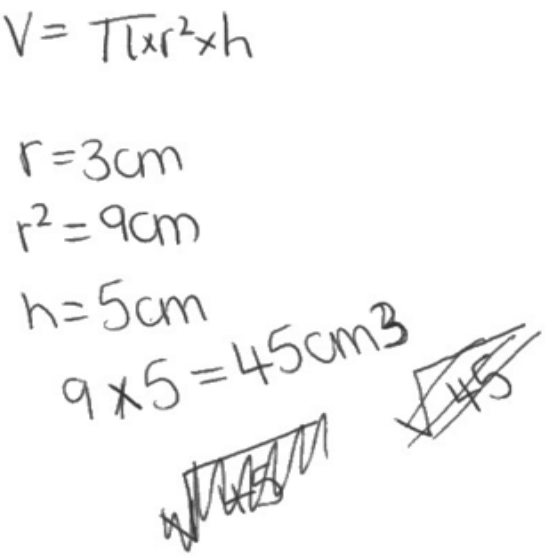
P2 for $3.14 \times 3^2 \times 5$ The use of a numerical value for π is acceptable in awarding the process marks.

A0 since the answer is not given in terms of π.

Q22 ? A B C

Question 22 - Response C

Work out the volume of the cylinder.
Give your answer in terms of π



45 cm³

0 /3

The formula for the volume of a cylinder is given so there can be no credit for this.

P0 since the calculation for area of a circle does not include π.

P0 the 9 cannot be used for [area of circle] as it does not include π.

A0 incorrect final answer

Note: had this candidate recovered by including π in their final answer then they would have been awarded P1 P1 A1, full marks.

Question 25

Question 25 - Question

25 A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.

25% of the cars use diesel.
The rest of the cars use petrol.

Work out the number of cars that use petrol.
You must show all your working.

.....

(Total for Question 25 is 5 marks)

Question 25 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
25	30	P1	for 160 ÷ (3+7) (= 16) **or** $\frac{3}{3+7}$ (= $\frac{3}{10}$)	
		P1	for "16" × 3 (= 48) **or** "$\frac{3}{10}$" × 160 (= 48)	
		P1	for a correct step using 48 eg "48" ÷ 8 (= 6) **or** "48" × 25 ÷ 100 (= 12) **or** (indep) for combining $\frac{1}{8}$ and 25%, eg $\frac{1}{8} + \frac{1}{4}$ (=$\frac{3}{8}$) or "0.125" + "0.25" (= 0.375) or "12.5"(%) + 25(%) (= 37.5(%))	
		P1	for a complete process to find the number of petrol cars, eg "48" – "6" – "12" oe **or** (1 – "$\frac{3}{8}$") × "48" oe **or** $\frac{3}{10}$ × (1 – "$\frac{3}{8}$") × 160 oe	
		A1	cao SC B2 for an answer of 100 if P0 scored	Award no marks for a correct answer with no supportive working

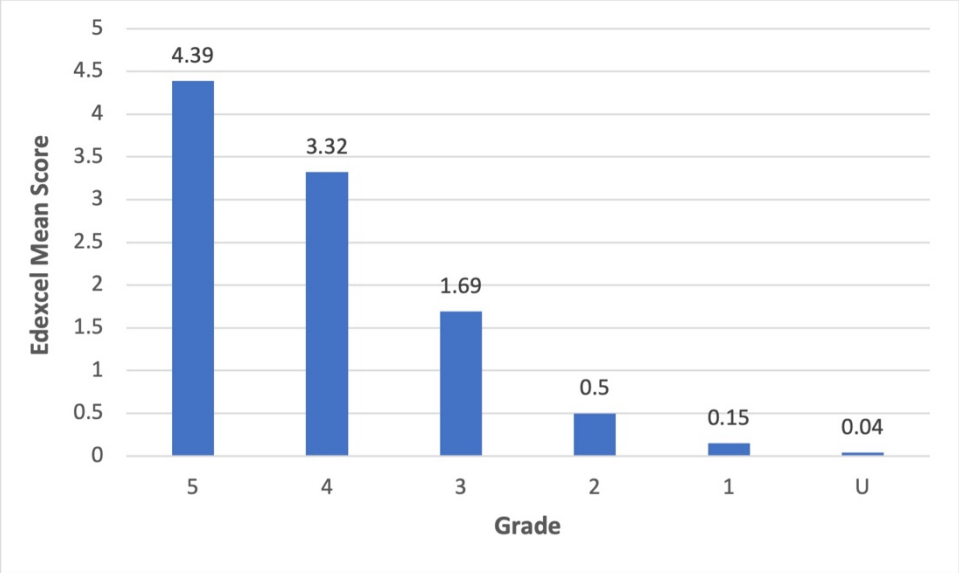
Question 25 - Examiner Comments

Those students understanding the concept of ratio usually started correctly by dividing the 160 vehicles in the ratio 3 : 7, resulting in 48 (16 × 3) cars. Failure to then complete the solution correctly was generally a result of finding either $\frac{1}{8}$ of 48 or 25% of 48 and then immediately subtracting the single result from 48 and then calculating either $\frac{1}{8}$ or 25% of the remainder.

Some students misinterpreted the first line of the question and assumed that here were 160 cars and then proceeded to find $\frac{1}{8}$ and 25% of 160 leaving them with an answer of 100. This was marked as a special case with the award of two marks.

Question 25 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.94	5	39	1.94	4.39	3.32	1.69	0.50	0.15	0.04



Question 25 - Response A

25 A delivery company has a total of **160** cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

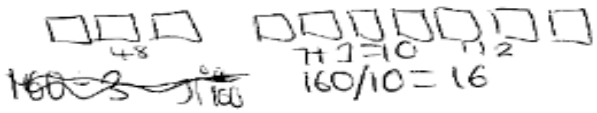
$\frac{1}{8}$ of the cars use electricity.

25% of the cars use diesel.

The rest of the cars use petrol.

Work out the number of cars that use petrol.

You must show all your working.



$\frac{1}{8}$ of 48 = 6 cars use electricity = 18 cars

48 ÷ 4 = 12

48 − 18 = 30

1

① 3+7=10 ② 160/10=16 ③ 16×3=48 16×7=112

④ 48/8=6 cars use electricity ⑤ $\frac{1}{4}$ of 48 = 12 ⑥ 6+12=18

⑦ 48 − 18 = 30 cars use petrol

Q25

A B C

5 /5

P1 for 160 divided by 10

P1 for 16 × 3

P1 for either 48 divided by 8 or ¼ of 48 = 12

P1 for a complete process subtracting 6 + 12 from 48

A1 for a correct answer.

Question 25 - Response B

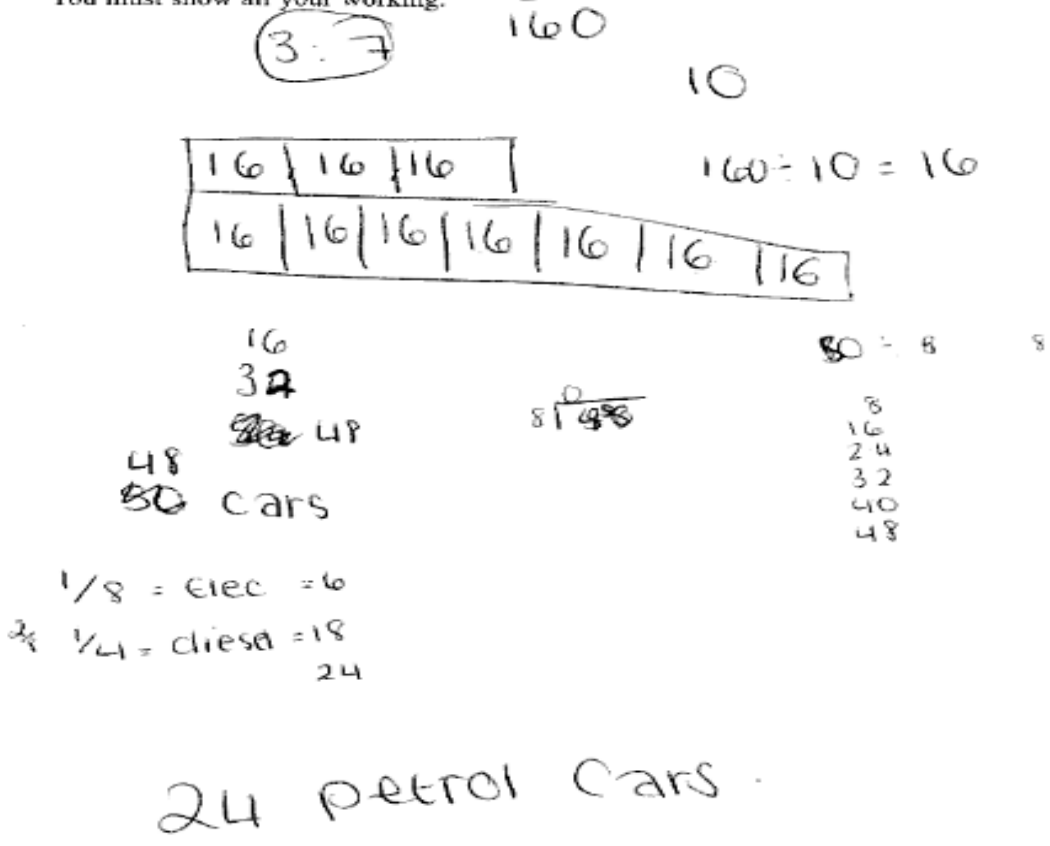
25 A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.
25% of the cars use diesel.
The rest of the cars use petrol.

Work out the number of cars that use petrol.
You must show all your working.



Q25

A
B
C

3 /5

P1 for 160 divided by 10

P1 for 3 lots of 16 giving 48 cars

P1 for 48 divided by 8 showing a correct process to find 1/8 of a quantity.

P0 since the process to find 25% (1/4) of 48 is not given; simply saying ¼ = 18 is insufficient.

A0 for an incorrect answer.

Question 25 - Response C

25 A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.
25% of the cars use diesel.
The rest of the cars use petrol.

Work out the number of cars that use petrol.
You must show all your working.

Q25

A
B
C

1 /5

P0P0 no calculations to find the number of cars has been shown.

P1 (indep) for combining 1/8 and 1/4 (=3/8)

P0 although they appreciate that they will have 5/8 of the cars using petrol. there is no calculation to find the number of cars.

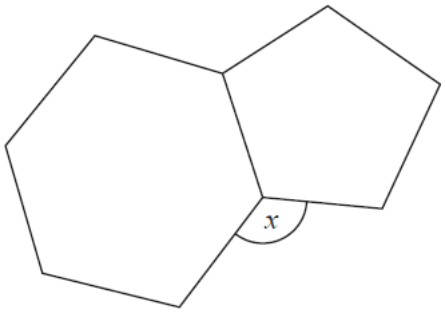
A0 no answer found.

Note: If 5/8 of 160 had been correctly calculated, the Special Case could have been applied, scoring 2 marks.

Question 27

Question 27 - Question

27 Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x.
You must show all your working.

.....°

(Total for Question 27 is 3 marks)

Question 27 - Mark Scheme

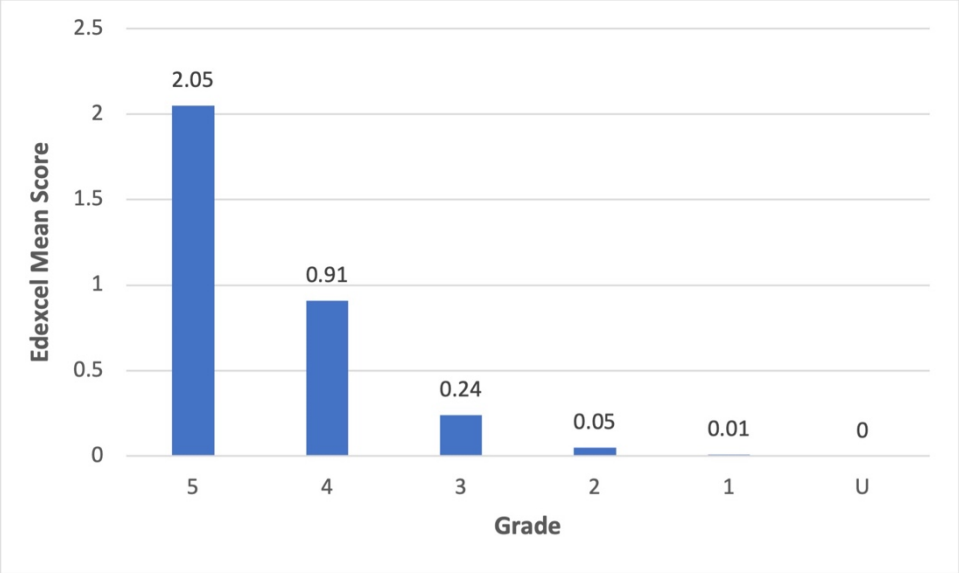
Question	Answer	Mark	Mark scheme	Additional guidance
27	132	M1	for finding an exterior angle eg 360 ÷ 6 (= 60) or 360 ÷ 5 (= 72) **or** an interior angle eg 180 × 4 ÷ 6 (= 120) or 180 × 3 ÷ 5 (= 108)	Angles may be shown on the diagram Only award this mark for an angle that is not contradicted
		M1	for a complete method eg 360 − "120" – "108" or "60" + "72"	
		A1	cao	Answer only award no marks

Question 27 - Examiner Comments

Predictably in this question, many students were confused between interior and exterior angles in regular polygons. Many times the interior angles of a regular pentagon and a regular hexagon were quoted (or worked out to be) 72º and 60º respectively. No marks were available after this major error. Contradictions between diagram and working were often seen. A significant number of students simply divided 360 by 3 or measured the angle with a protractor. Students who found the correct interior or exterior angles usually went on to score well, arithmetical errors again preventing full marks at times; 18 as the answer to $\frac{540}{5}$ being frequently seen. It was good to see that so many students know how to find the total number of degrees in the sum of the interior angles of a polygon.

Question 27 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.57	3	19	0.57	2.05	0.91	0.24	0.05	0.01	0.00

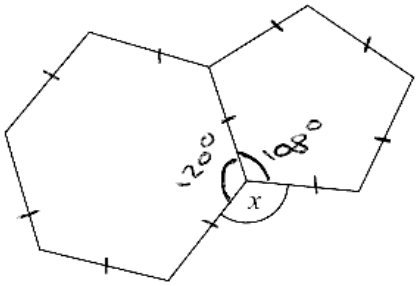


Question 27 - Response A

27 Here is a regular hexagon and a regular pentagon.

180 × 4 = 720

720 ÷ 6 = 120°



180 × 3 = 540

540 ÷ 5 = 108

540 + 180 = 720°

Work out the size of the angle marked x.
You must show all your working.

- Interior angle in a Pentagon (5 sides) = (5 − 2) × 180 = 540°
  So each side of this regular Pentagon = 108°

- Interior angles in a regular hexagon = (6 − 2) × 180 = 720°
  so each side is = 120°

120 + 108 = 228°

360 − 228 = 132

Q27

A B C

3 /3

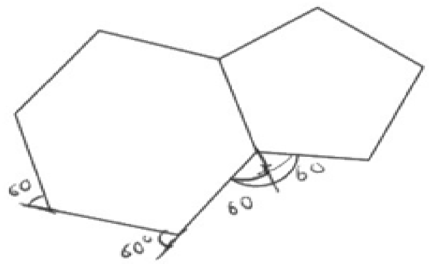
M1 for either 540 ÷ 5 or 720 ÷ 6, clearly referring to interior angles.
Note: there is no credit for simply finding the sum of the interior angles of either polygon.

M1 for a complete method.

A1 for a correct answer

Question 27 - Response B

27 Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x.
You must show all your working.

6 − 2 × 18
4 × 180 = 548
548 ÷ 6 =

360 ÷ 6 = 60
60 × 2 = 120

120 °

1 /3

M1 for a correct method seen to find the exterior angle of the hexagon, supported by the diagram.
Note: At this stage we only need one calculation for the interior or exterior angles

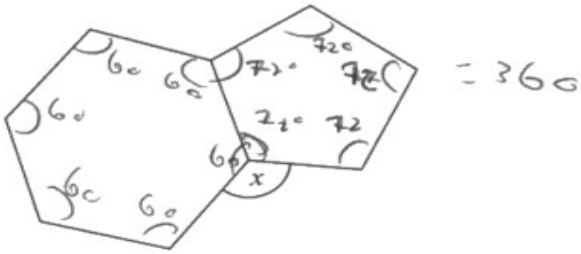
M0 since the method is incorrect. The answer on the answer line comes from assuming the exterior angle of the pentagon is also 60. (A common error to only do 1 calculation and assume the other is the same).

A0 for an incorrect answer.

Q27
?
A
B
C

Question 27 - Response C

27 Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x.
You must show all your working.

360 ÷ 5 = 72°

5 | 360
72

360 ÷ 6 = 60

6 | 360
60

72° + 60 = 132°

72
60
132

360 − 132
= 360
132
228

228 °

0 /3

Q27
A
B
C

M0 We do see some correct working, ie 360 ÷ 5 and 360 ÷ 6. However, these are clearly referring to interior (not exterior) angles as shown on the diagram.

M0 since the complete method is incorrect.

A0 for an incorrect answer.

Question 28

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

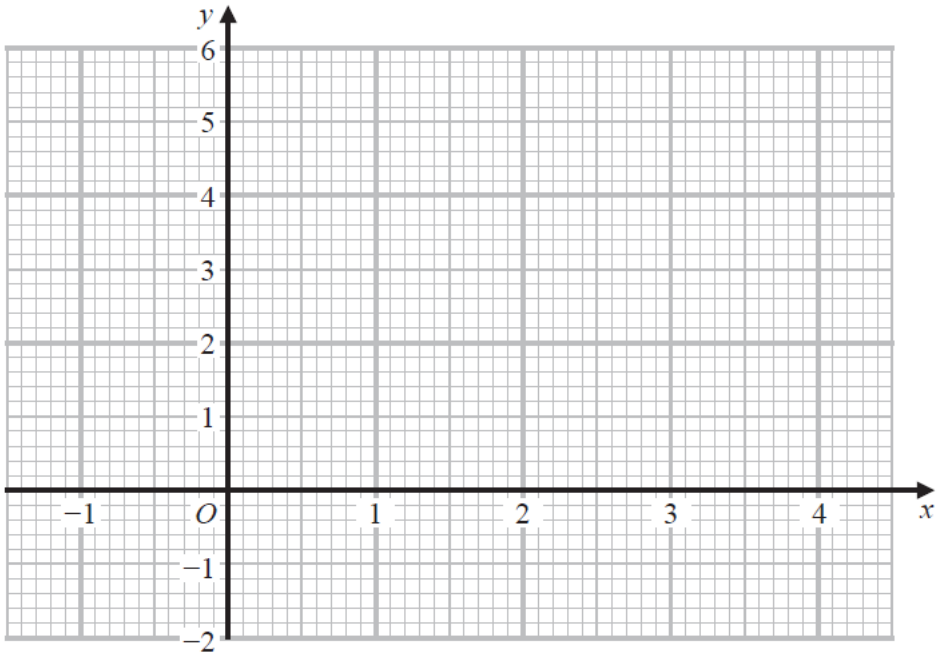
Question 28 - Question

28 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	-1	0	1	2	3	4
y		1	-1			

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from -1 to 4



(2)

(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

.....

(2)

(Total for Question 28 is 6 marks)

Question 28 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
28 (a)	5,(1),(-1),-1,1,5	B2	for all 4 values correct	
		(B1	for 2 or 3 correct values)	
(b)	Graph drawn	B2	for a fully correct graph	Accept a freehand graph drawn that is not made of line segments Ignore anything drawn outside the required range
		(B1	ft (dep on B1in (a)) for plotting at least 5 of the points from their table correctly)	
(c)	0.3 to 0.5 and 2.5 to 2.7	M1	for a correct method, eg marking intercepts with x-axis **or** one correct solution **or** both solutions given as a coordinates, eg (0.4, 2.6) **or** (0.4, 0) **and** (2.6, 0)	ft their graph for this mark Accept these coordinates reversed
		A1	for answers in the range 0.3 to 0.5 and 2.5 to 2.7 **or** ft their graph with at least 2 solutions	

Question 28 - Examiner Comments

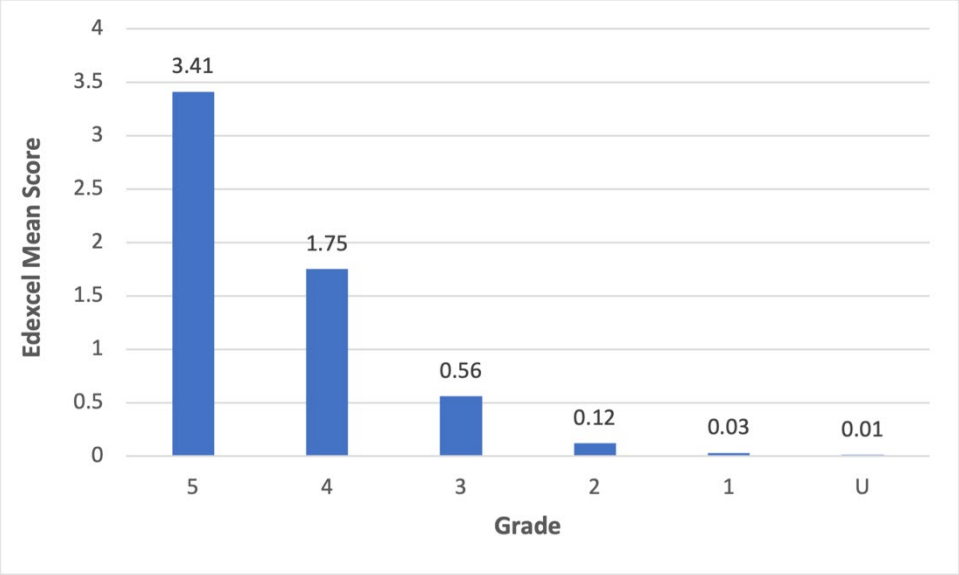
Accurately completing the table of values in part (a) was rare with the usual mistake occurring when substituting the negative value of x. Some ignored the quadratic expression given and simply tried to complete an arithmetic sequence.

If a mark had been awarded in part (a) for at least two correct values, then at least one mark was usually earned in part (b) for correctly plotting their values. The drawing of a graph following a fully correct table in part (a) was sometimes spoiled by a 'flat bottom' to the quadratic curve through (1, -1) and (2, -1) or by joining the points with line segments.

Many students did not understand what was required in finding solutions to the quadratic equation in part (c). Those that did, often wrote their solutions in a coordinate form; one mark was still available for this.

Question 28 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.05	6	18	1.05	3.41	1.75	0.56	0.12	0.03	0.01



Question 28 - Response A

28 (a) Complete the table of values for $y = x^2 - 3x + 1$

$(-1)^2 - 3(-1) + 1$
$= 1 - 3(-1)$

x	−1	0	1	2	3	4
y	5	1	−1	-1	1	5

$1 - -3 + 1$

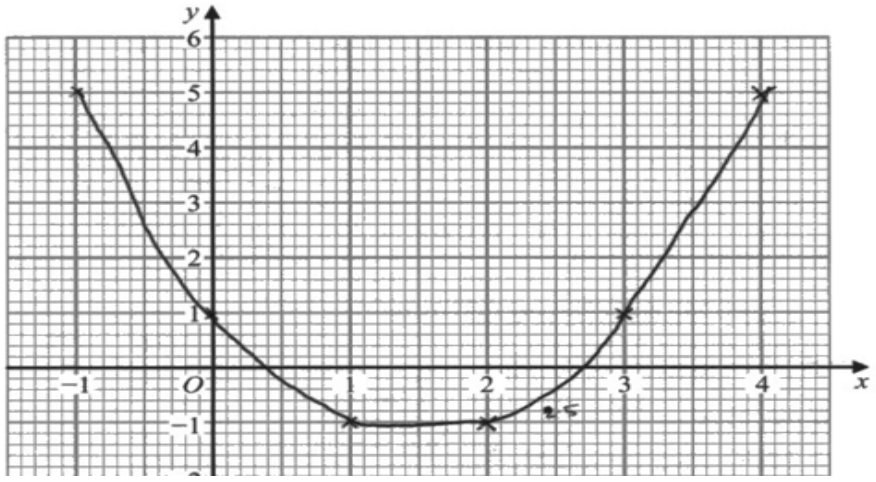
$(3)^2 - 3(3) + 1$
$9 - 9 + 1$

$(4)^2 - 3(4) + 1$
$16 - 12 + 1$

$(2)^2 - 3(2) + 1$
$4 - 6 + 1$

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from −1 to 4



(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

$x = 0.4$ and $x = 2.7$

(2)

5 /6

Q28

Part (a)
B2 for all 4 values correct.

Part (b)
B1 for all points plotted correctly; only 5 are required for this mark.
B0 since to award the second B mark, we need to see daylight between the curve and the line y = -1. In this case, no daylight canbe seen.

Part (c)
M1 A1 for answers within the required ranges, supported by the position of the intersections of their graph with the *x*-axis.

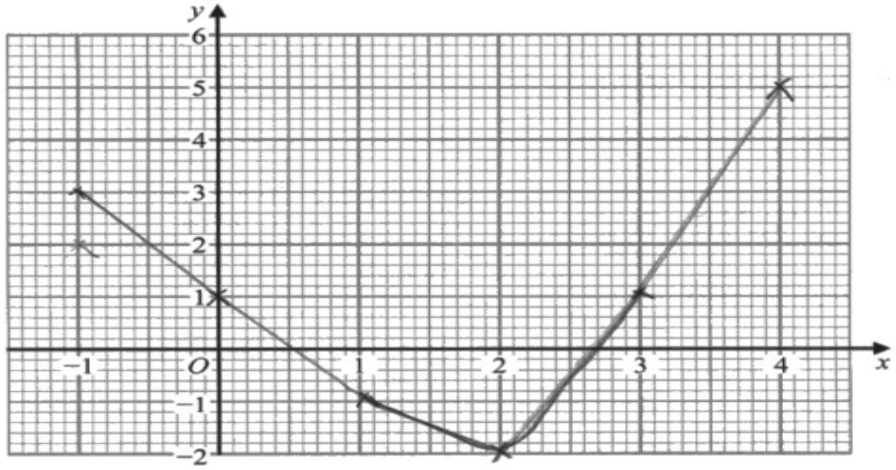
Question 28 - Response B

28 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	−1	0	1	2	3	4
y	5	1	−1	−2	1	5

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from −1 to 4



(2)

(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

$x = 0.5$
$x = 2.6$

(2)

4 /6

Q28

A
B
C

Part (a)
B1 for 2 correct values in the table; 1 and 5

Part (b)
B1 for all of ***their*** points correctly plotted; only 5 are required for this mark and it is dependent upon the award of at least one mark in part (a).

Part (c)
M1 A1 for answers within the required ranges, supported by the position of the intersections of their graph with the x-axis.

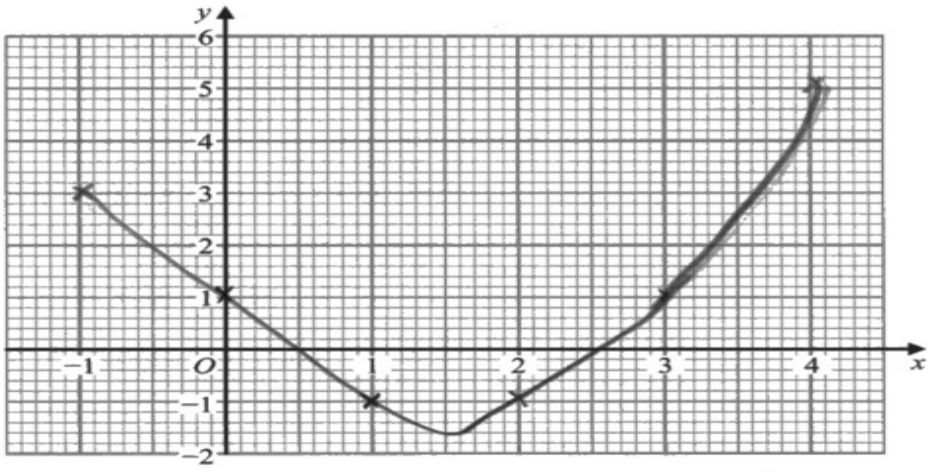
Question 28 - Response C

28 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	−1	0	1	2	3	4
y	5	1	−1	−1	1	5

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from −1 to 4



(2)

(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

(0,0.5) (0,2.5)

(2)

3 /6

Q28

A
B
C

Part (a)
B1 for 2 or 3 correct values in the table;
Note: The common error is in the substitution of the negative value of x.

Part (b)
B1 for all of ***their*** points correctly plotted; only 5 are required for this mark and it is dependent upon the award of at least one mark in part (a).

Part (c)
M1 We can accept the solutions written as coordinates in reverse order, if both given. The 0.5 and 2.5 have clearly been identified.

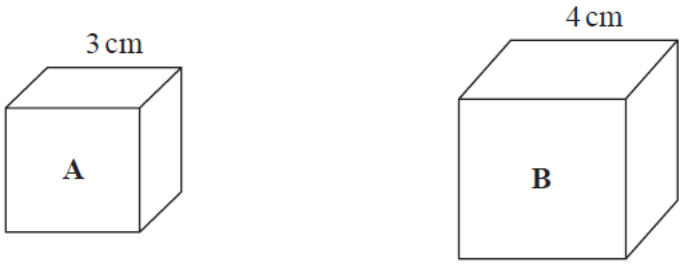
A0 Coordinates given and therefore the accuracy mark cannot be awarded.

Question 29

Question | Mark Scheme | Examiner Comments | Performance | Response A | Response B | Response C

Question 29 - Question

29 Here are two cubes, **A** and **B**.



Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where a and b are integers.

.....

(Total for Question 29 is 3 marks)

Question 29 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
29	3 : 2	P1	for a process to find either volume eg 3^3 (= 27) or 4^3 (= 64)	
		P1	for showing density **A** = 81 ÷ "27" (= 3) or density **B** = 128 ÷ "64" (= 2)	
		A1	for 3 : 2 oe	Ignore units quoted

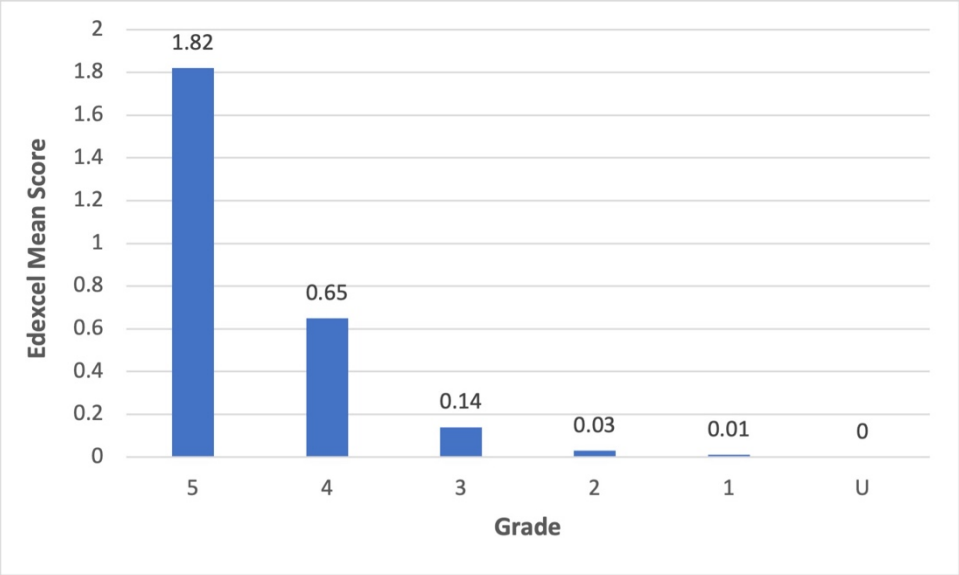
Question 29 - Examiner Comments

Only the more able students, appreciating the need to find the volumes of the given cubes, made any progress in this question. Some multiplied the mass by the volume and then tried to simplify their ratio. Some did divide the masses by the volumes but left the un-simplified ratio $\frac{81}{27} : \frac{128}{64}$

The most common error was to divide the masses by the length of an edge, leaving a ratio of 27:32. Also common was to multiply the 81 and 128 by 3 and 4 to get 243:512

Question 29 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.45	3	15	0.45	1.82	0.65	0.14	0.03	0.01	0.00



Question 29 - Response A

29 Here are two cubes, **A** and **B**.

Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where a and b are integers.

$D = \frac{m}{V}$

$3 \times 3 = 9 \times 3 = 27$

$D = \frac{81}{27} =$

$4 \times 4 \times 4 = 64$

$D = \frac{m}{V}$ $D = \frac{128}{64} = 2$

64
+64
128

$27 + 27 = 54 + 27 = 84$

57
+27
84

3 : 2

Q29

A
B
C

3 /3

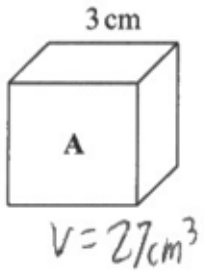
P1 for either $3 \times 3 \times 3$ or $4 \times 4 \times 4$, a process to find the volume of either cube.

P1 for either 81 divided by 27 or 128 divided by 64

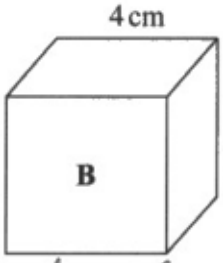
A1 for a correct answer

Question 29 - Response B

29 Here are two cubes, **A** and **B**.



$V = 27 cm^3$



$64 cm^3$

Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where a and b are integers.

$\frac{81}{27} : \frac{128}{64}$

2 /3

Q29

A B C

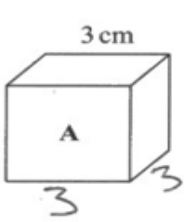
P1 for either 27 or 64. The working is not seen but the values are correct.

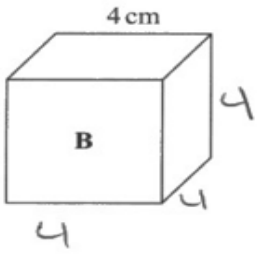
P1 for either 81/27 or 128/64

A0 since the ratio must be given, "in the form ***a* : *b*,** where ***a*** and *b* are integers"
Note: If we see a correct ratio in the form $a : b$, where a and b are integers (e.g. 3:2) which is then further processed to for example 1.5:1 we would ignore subsequent working and award the accuracy mark.

Question 29 - Response C

29 Here are two cubes, **A** and **B**.





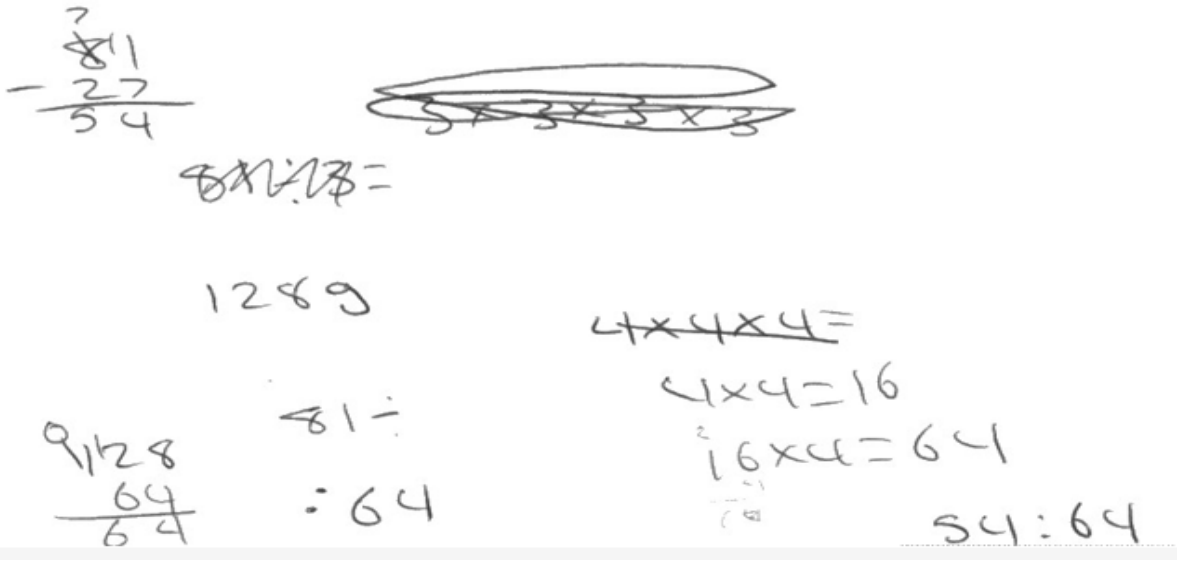
Cube **A** has a mass of 81 g.

Cube **B** has a mass of 128 g.

Work out

the density of cube **A** : the density of cube **B**

Give your answer in the form $a : b$, where a and b are integers.



Q29

A
B
C

1 /3

P1 for 4 × 4 × 4
It is unclear where the 27 has come from but in this case, it can be assumed to be the volume of cube A.

P0 for 81 - 27 and 128 – 64, subtracting instead of dividing.

A0 for an incorrect answer