Pearson Edexcel

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

Summer 2023 Exemplar
1MA1 1F 2F 3F
Foundation Tier

Senior Examiner's feedback on student responses

Contents

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Skip to Main Contents

About this booklet

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

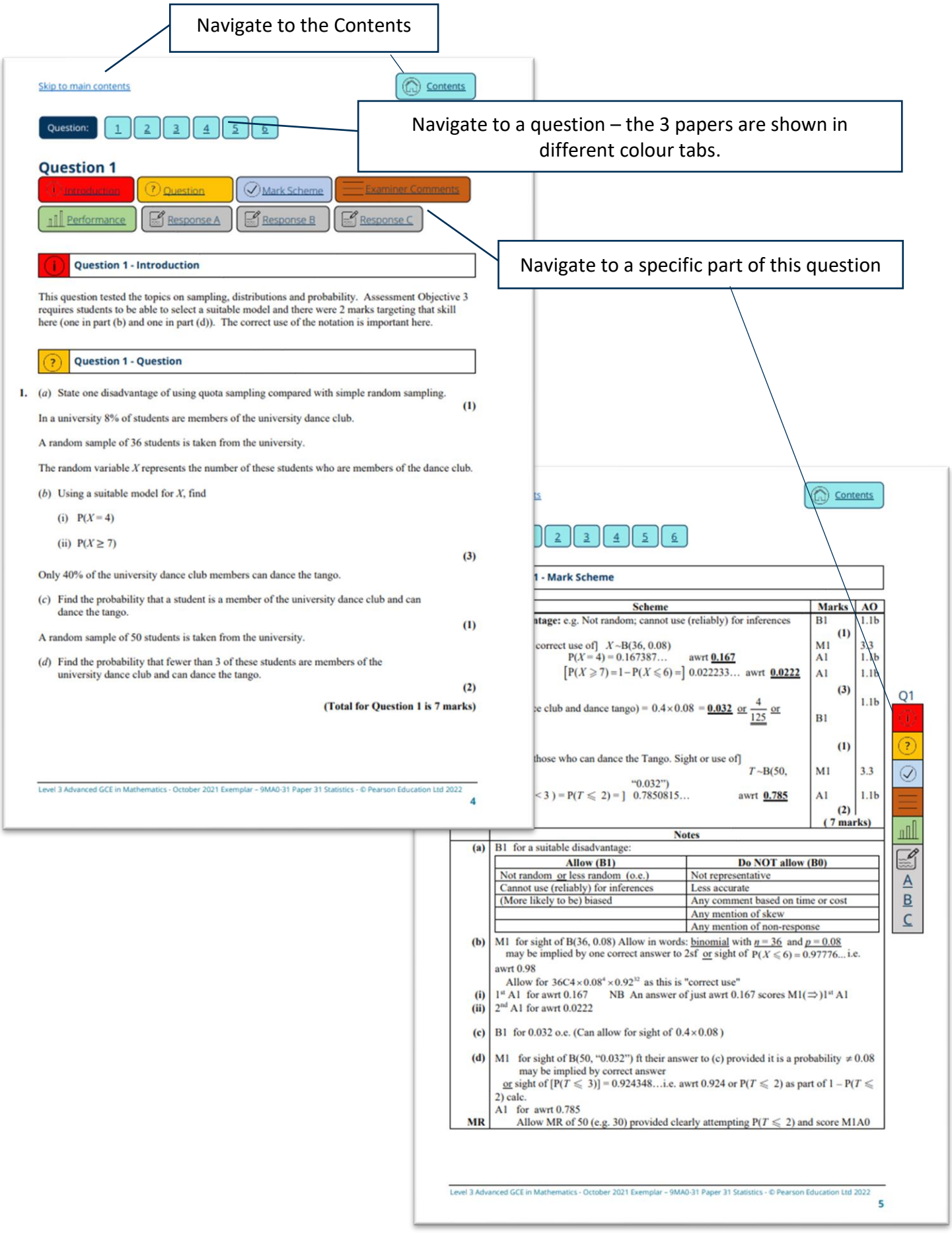
This document looks at a selection of questions from the Summer 2023 GCSE (9 - 1) Mathematics Foundation tier examination. It shows real student responses to selected questions and how the examining team follow the mark schemes to demonstrate how the students would be awarded marks on these questions.

Our examining team have selected student responses to Foundation tier questions across papers 1F, 2F and 3F for this booklet.

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.

Skip to Main Contents

How to use this booklet



Skip to Main Contents

General Examiner Feedback

Paper 1F

The great majority of students seemed to be entered at the appropriate level and coverage of the specification was good. Questions on this paper covered a good range of the specification for a non-calculator paper and offered an opportunity for students of all abilities to demonstrate their understanding of a variety of mathematical concepts.

Students were generally well prepared, however many clearly missed having access to a calculator. Questions 11, 14c, 20, 21 and 27 in particular were littered with arithmetical errors.

The early questions acted as good confidence builders and provided an accessible way into the paper, many students gaining a good proportion of the early marks.
It was pleasing to see so many students successfully expressing their communication skills when required, as exemplified in questions 6, 8, 10, 11 and 14. Some would have benefitted from re-reading over their work to check the sense of their sentences.

The quality of handwriting from some candidates made their responses difficult to read. Students are advised to avoid rushing through their work. More students failed to present their work in a logical way which caused them to lose track of their own working. It was noticeable how many students also gave a choice of method and failed to use the answer line for their final answer. Candidates should be encouraged to use the space provided for responses more effectively and be reminded that writing above a question itself could mean that their work is not seen by the examiners.

Areas of the curriculum that need more attention are, Estimations (Q11bc), Equation of a straight line (Q9d), Fractions (Q15 and Q21), Algebraic expressions/formulae (Q18), Long Division (Q20) Venn diagrams (Q24), Reverse percentages (Q26) and Using probability tree diagrams (Q31).

Paper 2F

This paper was accessible to all students with a good amount of clear working shown over most of the paper. Some questions, mainly towards the end of the paper, were not as well answered by students but this was due to the differentiation and ramping of the level of demand of the questions. It was pleasing to see students making improvements in their approaches to questions that required a written response, and in longer multi-step questions. In particular, written responses in questions 12b, and 22 showed improvements.

This paper requires the use of a calculator and students are expected to have access to and a reasonable working knowledge of how to use a calculator. There is evidence that some students continue to try to use written methods even when they have a calculator. This often means that calculations take longer and increases the chance of inaccurate answers. One example of this is when break-down or build-up methods were used in attempts to work out percentages. This approach is often far less successful than a more direct approach using a calculator.

A ruler and protractor were also required for this paper, but evidence suggests that some students did not have access to one or both of these items. It is essential that students have a full set of the required equipment when sitting a GCSE mathematics paper.

Students should carefully read the question fully and ensure they read both the numbers given in the question and their own handwriting carefully. Inaccurate reading leads to inaccurate answers and means students lose marks unnecessarily. Similarly, poor handwriting and layout of work remains a big problem. The inclusion of working out to support answers is essential to gain full credit but remains an issue for many. Working out not only needs to be shown, it also needs to be shown in a clear and logical way, demonstrating the processes of calculation used. This is most important in longer questions, and in “show that” questions. Contradictory work also remains a common cause of lost marks and was most notably seen in question 18b in which a range of approaches were attempted and the method intended to be marked was not always clearly identified.

Paper 3F

Centres are congratulated for the preparations they clearly undertook in preparing candidates for this paper. Overall, the quality of work was an improvement on the previous summer, with candidates showing their working to a greater degree. This enabled examiners to better consider the evidence for the award of marks.

However, the overall quality of the presentation of work has not improved. Of greatest concern is the proportion of work that is spoilt by miscopying of figures, either from the given question, or candidates who miscopy their own figures in working. This was most prolific in questions 5, 10, 12, 14, 23, 27 and both parts of 28 but was also seen in other questions. Poorly written (sometimes overwritten) figures prevented the award of marks significantly in questions 5 and 20.

There was little evidence that candidates did not have a calculator for this paper but there were many occasions when break-down methods were used in attempts to work out percentages, usually far less successful than a more direct approach using a calculator method. Although in most cases candidates used their calculator accurately, there were also instances seen where candidates prematurely rounded or truncated their figures, either their own figures or whilst in the process of taking them from the calculator, or the question. This was frequently seen in questions 12, 14, 19, 21 and 25. In most cases these errors prevent the award of any accuracy marks (A, B or C marks).

Most candidates demonstrated good use of both ruler and protractor though they need to ensure that these are used accurately. There were some surprising errors shown in questions 13 and 17 where evidence suggest that candidates either did not have a ruler or were using a ruler incorrectly.

Within a broad range of questions, the paper was able to discriminate well with nearly all candidates showing a broad range of proficiency across the specification content. Weakest areas continue to be the application of ratios, scales and rates, but also algebraic manipulation and problem solving. Time remains a weakness as in question 10, where some candidates were using their calculator inappropriately.

Questions which were slightly different and required more thought, caused immediate problems for many, even in the earlier part of the paper. This includes questions 12b, 14, 15 and 19. Question 24, 27 and 28 were the more challenging questions for those striving to demonstrate ability at the highest grades available.

The inclusion of working out to support answers remains an issue for many. Not only does working out need to be shown, it needs to be shown legibly, demonstrating the processes of the calculation used. This is most important in longer questions. Examiners reported frequent difficulty in interpreting complex responses, poorly laid out, in questions 10, 12, 14, 19 and particularly 21 and 24. Candidates occasionally gave their answers embedded in an expression in questions 11, 18 and 23, but full marks could not be awarded unless their embedded (correct) answer was highlighted (a different number was usually provided on the answer line). Confusing and contradictory work was also seen regularly in question 22.

Paper 1F - Question 11(b) and 11(c)

Question 11(b) and 11(c) - Question

For a different football match,

297 tickets were sold for £9.50 each.
399 tickets were sold for £19.50 each.

(b) Work out an estimate for the total amount of money paid for these tickets.
You must show all your working.

£.....

(3)

(c) Is your answer to part (*b*) an underestimate or an overestimate?
Give a reason for your answer.

(1)

(Total for Question 11 is 6 marks)

Question 11(b) and 11(c) - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
(b)	11000	P1	for evidence of rounding values to 1 significant figure, eg 300 **or** 400 **or** 10 or 9 **or** 20	
		P1	(dep on P1) for beginning a process to work with ticket sales, eg. 300 × 10 (= 3000) or 290 × 10 (= 2900) or 297 × 10 (= 2970) or 300 × 9 (= 2700) or 300 × 9.5 (= 2850) or 290 × 9 (= 2610) or 297 × 9 (= 2673) **OR** 400 × 20 (= 8000) or 390 × 20 (= 7800) or 399 × 20 (= 7980) or 400 × 19.5 (= 7800) or 400 × 19 (= 7600)	Note: **not** 290 × 9.5 (= 2755) or 297 × 9.5 (= 2821.5) Note: **not** 390 × 19 (= 7410) or 390 × 19.5 (= 7605) or 399 × 19 (= 7581) or 399 × 19.5 (= 7780.5)
		A1	for using **correct** values giving an answer in the range 10 200 to 11 000 from calculations using their rounded values	Award 0 marks for an answer in the range with no supportive working
(c)	Overestimate with reason	C1	(dep on P2 in (b)) for overestimate and reason, eg (ft from (b)) true total amount of money paid will be less as all values were rounded up	Must relate to estimation and not to rounding of their final answer and they must have a final answer to part (b)

Q11

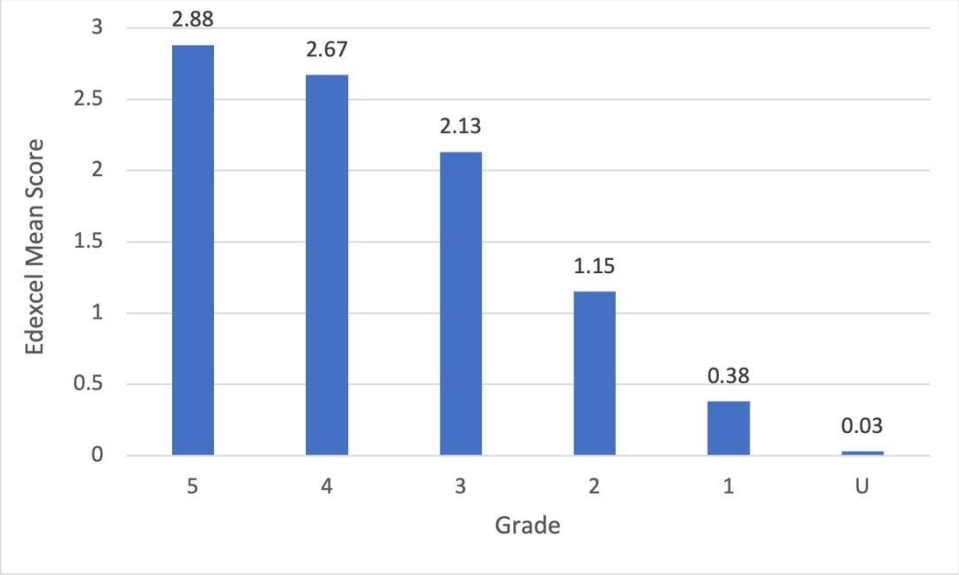
A
B
C

Question 11(b) and 11(c) - Examiner Comments

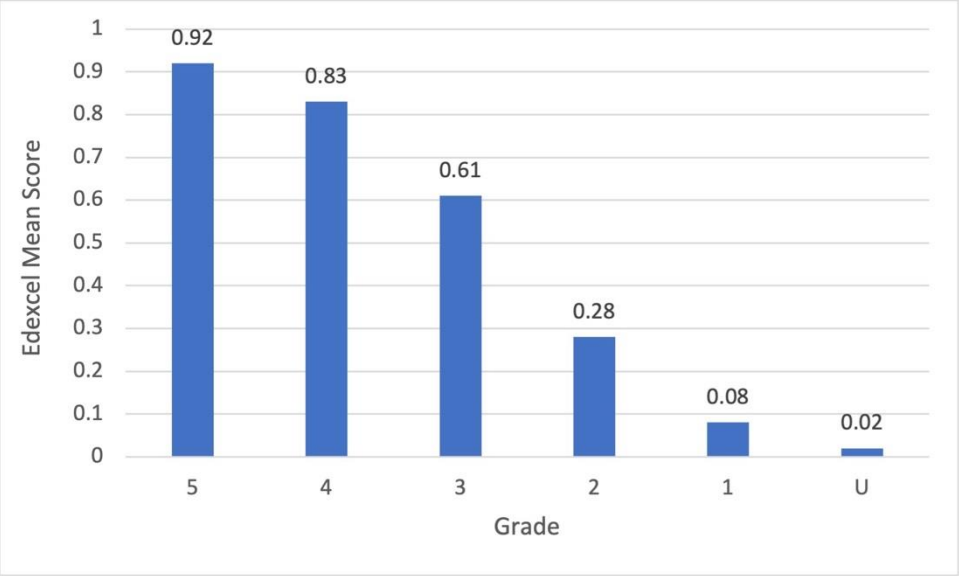
In part (b) many students insisted on trying to find the exact cost of the 696 tickets and consequently spent an inordinate amount of time following long multiplication processes. This life skill of estimating calculations is clearly an area that needs to be addressed. The numbers in the question are chosen to encourage, in this case, rounding up to values of 300, 400, 10 and 20 enabling the calculation to be straightforward. Those that did this usually gained the mark in part (c) for a correct reason for their answer being an overestimate. Some candidates thought rounding to the nearest 10, 100 etc explained that they had rounded up. Many students correctly said it was an overestimate but followed it up saying it had been rounded to the nearest whole number.

Question 11(b) and 11(c) - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.79	3	60	1.79	2.88	2.67	2.13	1.15	0.38	0.03



Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.52	1	52	0.52	0.92	0.83	0.61	0.28	0.08	0.02

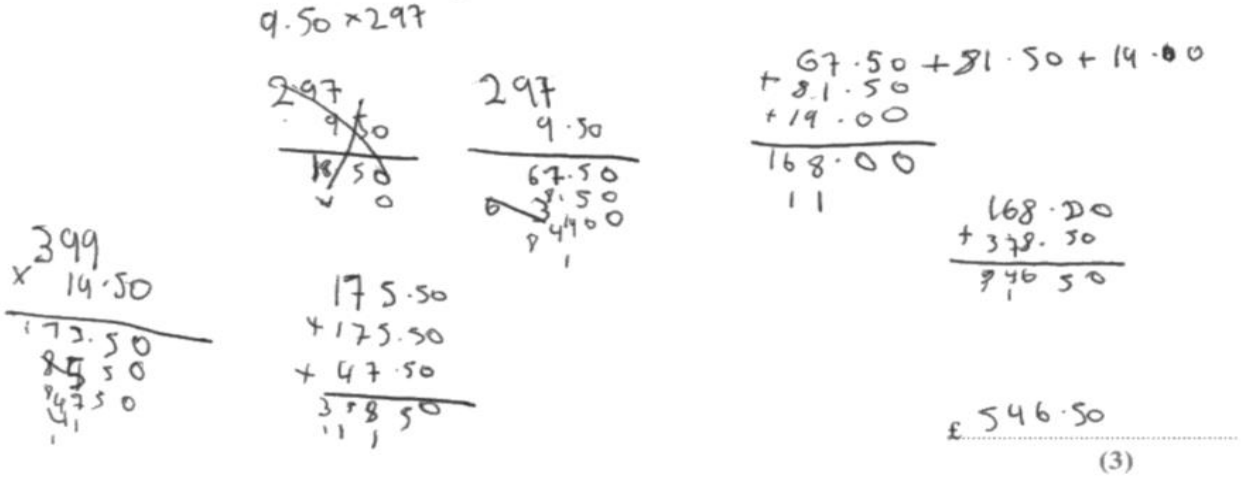


Question 11(b) and 11(c) - Response A

For a different football match,

297 tickets were sold for £9.50 each.
399 tickets were sold for £19.50 each.

(b) Work out an estimate for the total amount of money paid for these tickets.
You must show all your working.



(3)

(c) Is your answer to part (b) an underestimate or an overestimate?
Give a reason for your answer.

My answer is an overestimate

(1)

0 /4

Q11

The key word here is "estimate". Students need to use some sensible estimates of the given figures in their calculations. The annotation for examiners is as follows.

Part (b)
P0 P0 the working here clearly shows an attempt to work out the EXACT cost of the tickets. This gains NO credit even if the final answer is correct.
A0 for an incorrect answer. This would still get no marks even if the answer was within the accepted range.

Part (c)
C0 since no estimating of values have been carried out.

Note: If they had achieved a correct answer of 10602 in (b) and then rounded to say 11000, C0 would still have been awarded for an answer of 'overestimate because of rounding up'.

Question 11(b) and 11(c) - Response B

For a different football match,

297 tickets were sold for £9.50 each.
399 tickets were sold for £19.50 each.

(b) Work out an estimate for the total amount of money paid for these tickets.
You must show all your working.

297 9.50 each

399 £19.50 each

400 x
19.50

300.00
9.50 x
000 00
1500 00
900 00
22

400.00
x 19.50
000.00
+ 1200.00
3600 00
1400 00
4200.00

4200 +
2400
6600

£ 6600

(3)

(c) Is your answer to part (b) an underestimate or an overestimate?
Give a reason for your answer.

an overestimate as we rounded 297 to 300 and 399 to 400 to make it easier.

(1)

3 /4

Q11

A
B
C

Note that the errors in calculations here only lose the accuracy mark because the correct processes and reasoning are clearly shown.

Part (b)
P1 for 300 or 400
P1 for 300 x 9.50 or 400 x 19.50
A0 since there are errors in their calculations.

Note: If the answer comes from arithmetic errors in the multiplications , this mark is not awarded even if the answer is within the given range.

Part (c)
C1: Their answer to part (b) would have been an overestimate because of the rounding of 297 to 300 and 399 to 400. (The word UP can be implied by the figures stated.) This mark is awarded even though the answer in part (b) was incorrect.

Question 11(b) and 11(c) - Response C

For a different football match,

297 tickets were sold for £9.50 each.
399 tickets were sold for £19.50 each.

(b) Work out an estimate for the total amount of money paid for these tickets.
You must show all your working.

9.50 = 10£

19.50 = 20£

297 ×10.00

10.00 × 297
7000
90000
200000
£2970.00

2970 + 7980 = 10,950

20.00 × 399
18000
180000
6000000
7980.00

£ 10,950

(3)

(c) Is your answer to part (b) an underestimate or an overestimate?
Give a reason for your answer.

it is an over estimate as ~~we~~ I have rounded the numbers up so the amount will be higher

(1)

4 /4

Q11

A
B
C

Students don't need to use estimates for all of the given values, just some sensible use.

Part (b)
P1 for either 10 or 20
P1 for either 399 x 20 or 297 x 10
A1 since their arithmetic is fully correct and their 'correct' answer of 10 950 lies within the accepted range.

Part (c)
C1 for 'overestimate' with a correct reason of rounding values up.

Paper 1F - Question 14(c)

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

Question 14(c) - Question

On Friday,

500 people watched a film at the cinema.
70% of these people were children.

On Saturday,

720 people watched the film at the cinema.
$\frac{5}{8}$ of these people were children.

Kasim thinks more children watched the film on Friday than on Saturday.

(c) Is Kasim correct?
You must show how you get your answer.

(3)

Question 14(c) - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
(c)	No (supported)	P1	for method to find the number of children on Friday eg 0.7 × 500 oe (= 350)	
		P1	for method to find the number of children on Saturday eg 720 ÷ 8 × 5 oe (= 450)	
		C1	for No with correct figures, eg No **and** 350 **and** 450 **or** No **and** 100 more on Saturday	Award 0 marks for a correct answer with no supportive working.

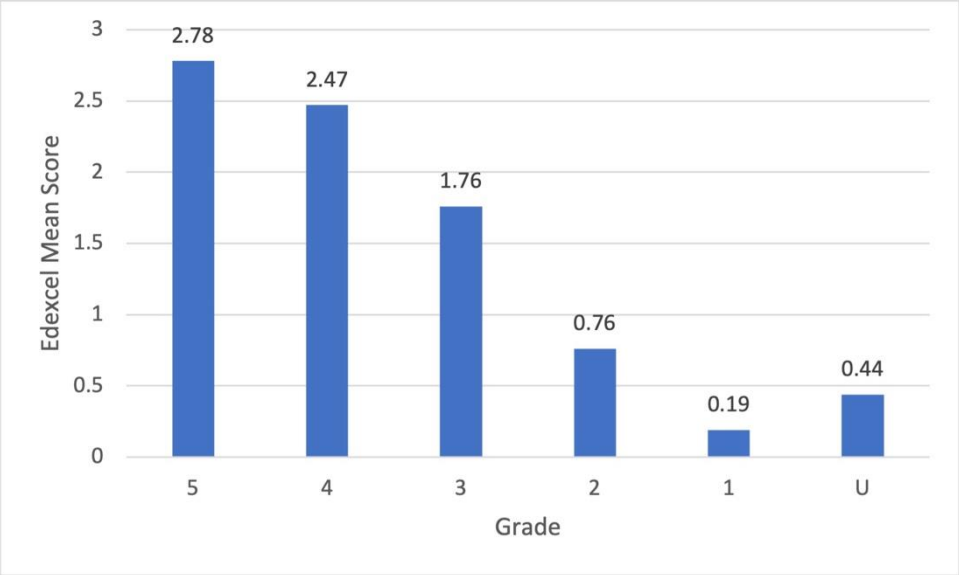
Question 14(c) - Examiner Comments

Part (c) offered a different challenge and while many were able to find 70% of 500, fewer were able to find $\frac{5}{8}$ of 720 and thus complete the solution. Some divided by 8 but were unable to then multiply their answer by 5. An interesting way round this was to find one half of the 720 and conclude that this was already larger than 350 and that as $\frac{5}{8}$ was larger than one half then Kasim was wrong. Others multiplied by 8 first and then divided by 5. Some attempted to convert 5/8 to a percentage. Those achieving this correctly were often unable to calculate 62.5% of 720.

Many students assumed that an equal number of people watched the film on each day and simply compared 70% with $\frac{5}{8}$, concluding that more children watched the film on Friday as 70% is greater than $\frac{5}{8}$. A number failed to state 'No' despite all workings being correct so did not gain the final mark.

Question 14(c) - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.51	3	50	1.51	2.78	2.47	1.76	0.76	0.19	0.44



Question 14(c) - Response A

On Friday,
500 people watched a film at the cinema.
70% of these people were children.

On Saturday,
720 people watched the film at the cinema.
$\frac{5}{8}$ of these people were children.

Kasim thinks more children watched the film on Friday than on Saturday.

(c) Is Kasim correct?
You must show how you get your answer.

Fri = 10% = 50 x 7 = 350

Sat = 720 ÷ 8 = 90

$8\overline{)720}$ 090

Kasim was right as Friday had 350 children, which is more the 90 ~~people~~ children which was on Saturday

(3)

1 /3

Q14

A B C

P1: The number of children on Friday has been correctly shown. The mark could be awarded for the 50x7 or the answer of 350.
Note: If 10% had not been correctly shown as 50 we would have had to see a method to find 10% eg 500 x 10/100 or 500/10

P0: An incomplete method to calculate 5/8 of 720. There has been a division by 8 but no x by 5 is seen.

C0: The award of this mark depends on having correct figures for Friday and Saturday.

Question 14(c) - Response B

On Friday,

500 people watched a film at the cinema.
70% of these people were children. 350.

70% of 500 = 350

500 ÷ 10 = 50 × 7 = 350

On Saturday,

720 people watched the film at the cinema.

$\frac{5}{8}$ of these people were children. 575

$\frac{5}{8}$ of 720 = 720 ÷ 8 = 115

115 × 5 = 575

Kasim thinks more children watched the film on Friday than on Saturday.

(c) Is Kasim correct? NO, 575 > 350.
You must show how you get your answer.

115
8 | 720

2 /3

P1: A correct process seen for Friday (to arrive at 350); 500 divided by 10 and x by 7

P1: A correct process seen for Saturday; 720 divided by 8 and the result x by 5 with an arithmetical error in the division of 720 by 8

Note: without a correct process, 5/8 of 720 is not enough for the award of this method mark. However 5/8 x 720 will score P1 even if it is not evaluated.

C0: This mark cannot be awarded since one of the two figures for comparison is incorrect and the award of this mark requires 'No' with correct figures.

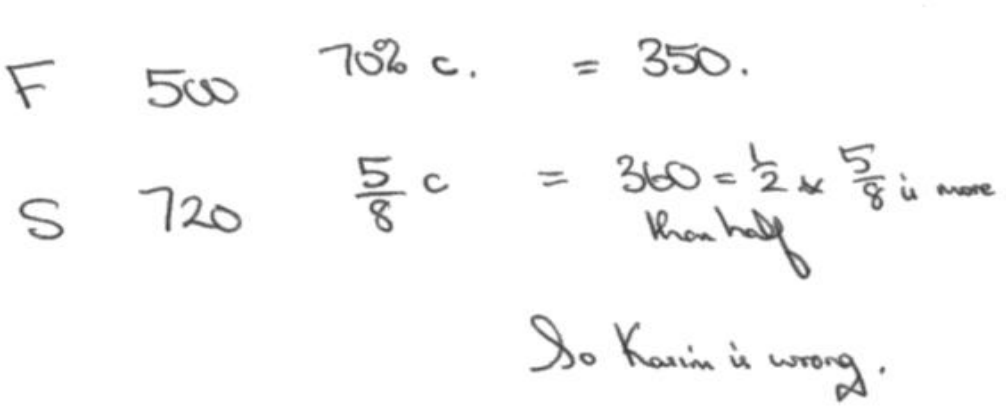
Question 14(c) - Response C

On Friday,
500 people watched a film at the cinema.
70% of these people were children.

On Saturday,
720 people watched the film at the cinema.
$\frac{5}{8}$ of these people were children.

Kasim thinks more children watched the film on Friday than on Saturday.

(c) Is Kasim correct?
You must show how you get your answer.



(3)

3 /3

The mark scheme will show the common approaches and how they should be marked. However, we will always accept any alternative correct approaches as is seen here.

P1 for a correct value 350 for Friday even though no working shown.

P1 C1: Here, they have worked out 1/2 of 720 = 360 for Saturday and then correctly stated that Karim is wrong since 5/8 is greater than ½

This is not a common approach but is perfectly acceptable.

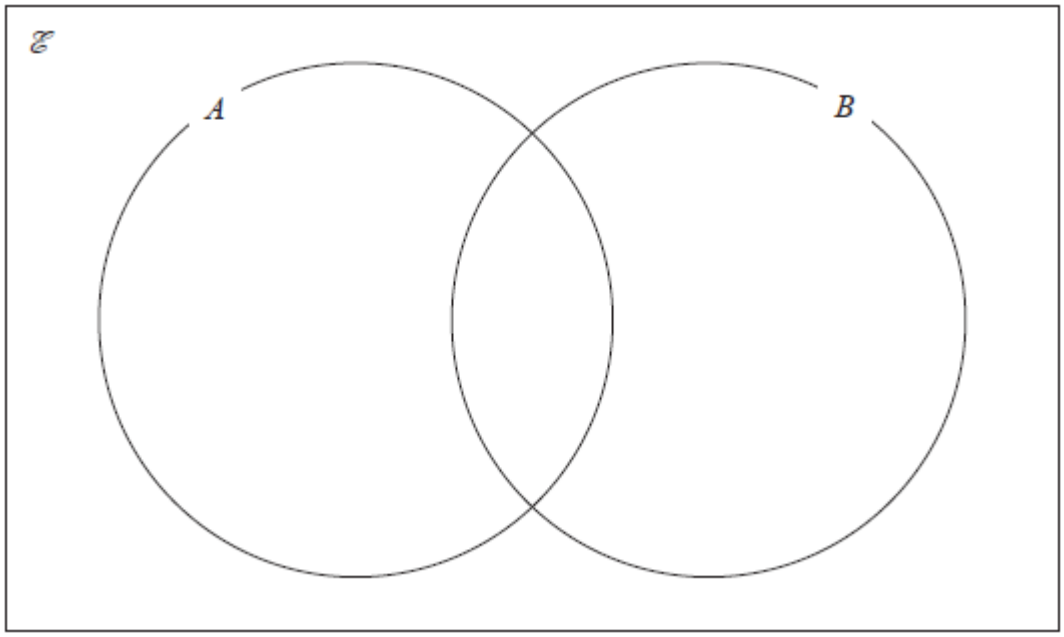
Paper 1F - Question 24

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

Question 24 - Question

24 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{odd numbers}\}$
$B = \{\text{square numbers}\}$

(a) Complete the Venn diagram for this information.



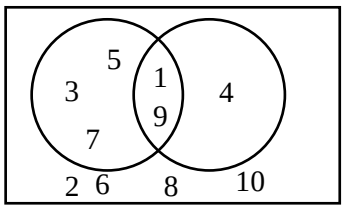
(3)

A number is chosen at random from the universal set $\mathscr{E}$

(b) Find the probability that this number is in the set B'

(2)
(Total for Question 24 is 5 marks)

Question 24 - Mark Scheme

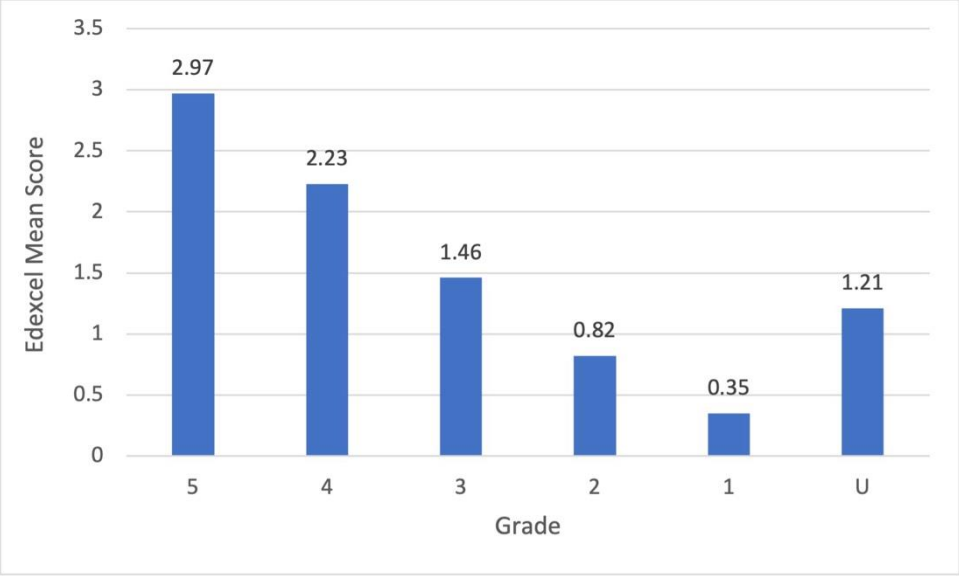
Question	Answer	Mark	Mark scheme	Additional guidance
24 (a)	Venn diagram	B3	for a fully correct Venn diagram	Ignore all entries except the region you are marking for each method mark
		(B2	for two or three of the four regions correct)	
		(B1	for just one of the four regions correct)	
(b)	$\frac{7}{10}$	M1	(ft diagram) for $\frac{a}{10}$ where $0 < a < 10$ and a is an integer or $\frac{7}{b}$ where $b > 7$ and b is an integer **or** $1 - \frac{3}{10}$ **or** 7 : 10	Repeated digits in the diagram should be counted as 2 elements
		A1	(ft diagram) for $\frac{7}{10}$ oe	Accept any equivalent fraction, or 0.7 or 70%

Question 24 - Examiner Comments

The completion of a fully correct Venn diagram in part (a) was rare. Many did not recognise "1" as a square number and many ignored the remaining numbers 2, 6, 8 and 10 from the universal set. Often students duplicated values in more than one section.
In part (b), it was very clear that only a very few students understood the complement notation preferring instead to just give the probability that the number chosen was in set *B*.
Many students gave their probability as a decimal without previously writing it as a fraction out of 10. 0.7 the correct answer of course gained full marks but an answer of say 0.3 alone begs the question, where has it come from, $\frac{3}{10}$? or $\frac{6}{20}$? etc.

Question 24 - Performance

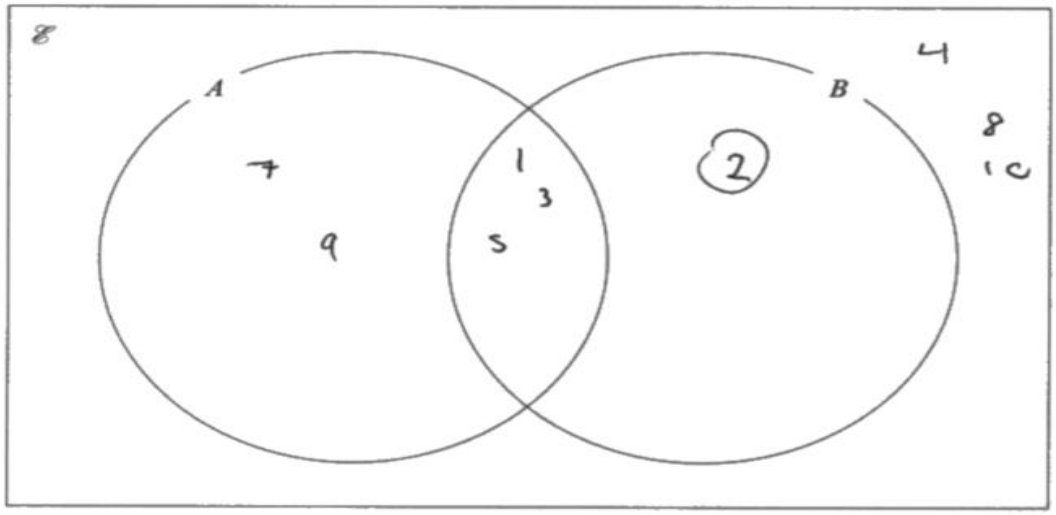
Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.42	5	28	1.42	2.97	2.23	1.46	0.82	0.35	1.21



Question 24 - Response A

24 $\mathscr{E}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
A = {odd numbers}
B = {square numbers}

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathscr{E}$

(b) Find the probability that this number is in the set B'

1/10

(2)

1 /5

Q24
A
B
C

Part(a)
B0: All 4 of the regions are incorrect.

Part (b)
M1 for an answer in the form a/10 .
A0: Incorrect answer

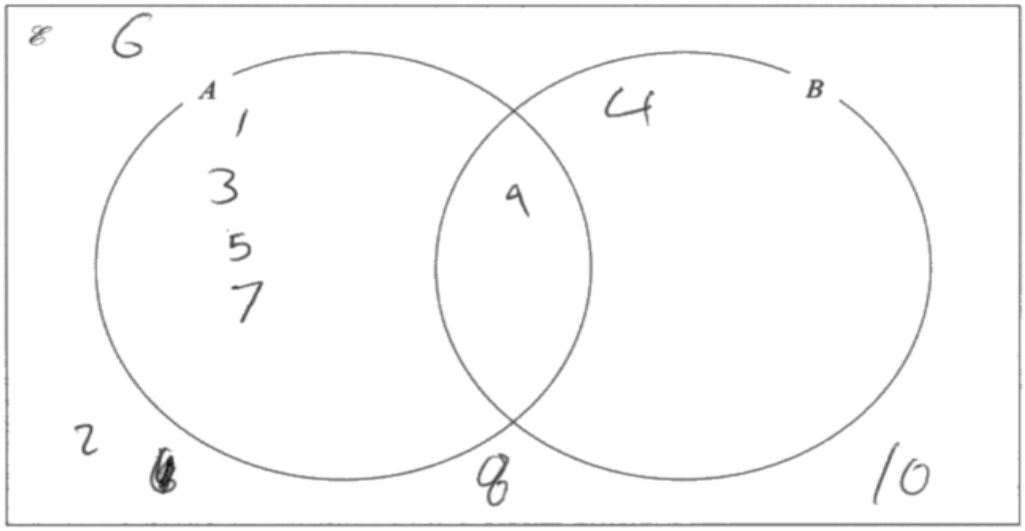
Note: The candidate has recognised that there are 10 numbers in the universal set but has not understood the area indicated by B'.

Note: For the award of the method mark, M1, the only acceptable ratio is 7 : 10 unless a 'correct' ratio is seen coming from their Venn diagram, i.e. for this case 5 : 9 would gain M1A0 ft.

Question 24 - Response B

24 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{odd numbers}\}$
$B = \{\text{square numbers}\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathscr{E}$

(b) Find the probability that this number is in the set B'

$\frac{2}{10} = \frac{1}{5}$

(2)

3 /5

Part (a)
B2: Two of the 4 areas are correct. (The 1 is in the wrong area which has the effect of making 2 areas incorrect).

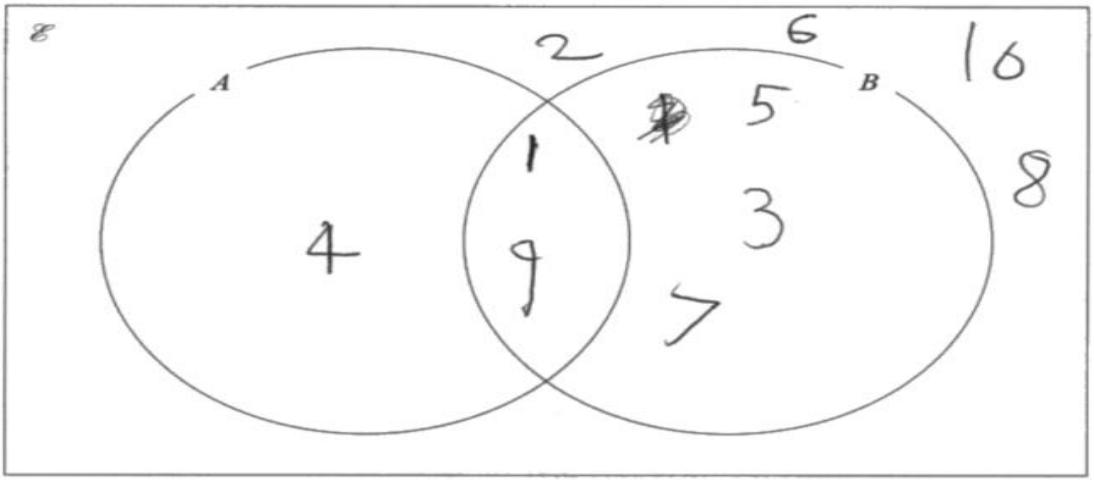
Part (b)
M1: probability in the form a/10.
A0: incorrect answer

Note: an answer of 1/5 alone would not have scored the M1. We cannot assume where the figures come from, here however we can see the 2/10 and thus mark at that stage.

Question 24 - Response C

24 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{odd numbers}\}$
$B = \{\text{square numbers}\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathscr{E}$

(b) Find the probability that this number is in the set B'

1
9 5
5
3
7

5/10

(2)

(Total for Question 24 is 5 marks)

4 /5

Q24

A B C

Part (a)
B2: Two correct areas, the intersection and the area containing (2,6,8,10)

Part (b):
M1: Probability in the form a/10
A1: Correct answer on follow through.

Paper 2F - Question 16

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

Question 16 - Question

16 Paulo drives at an average speed of 56 km / h for 1 hour 45 minutes.

Work out the distance Paulo drives.

..... km

(Total for Question 16 is 3 marks)

Question 16 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
16	98	M1	for method to use speed, distance and time, eg 56 × [time] or 56 × 105 (= 5880) **or** 56 ÷ 4 × 3 (= 42) **or** 56 ÷ 60 (= 0.933...) **OR** for method to convert decimal time, eg (60 + 45) ÷ 60 (= 1.75) or 45 ÷ 60 (= 0.75)	For this mark accept [time] written unconventionally eg as 1.45, 145, 175, 75
		M1	for a complete method using decimal time, eg 56 × "1.75" **or** "5880" ÷ 60 **or** "0.933..." × 105 **or** 56 + "42" or 56 + "28" + "14"	
		A1	for 97.65 to 98.3	

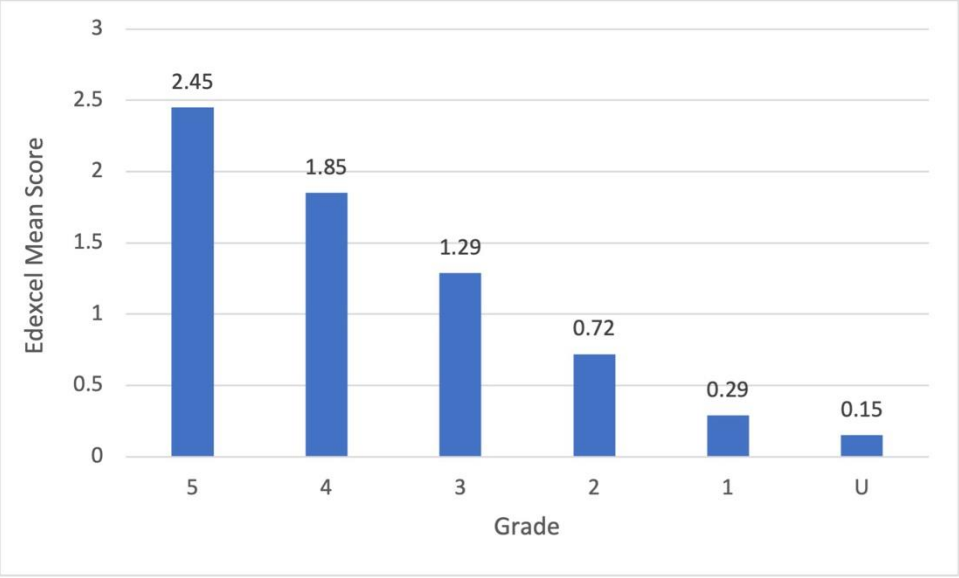
Question 16 - Examiner Comments

A single mark was often awarded in this question. Whilst a mark was often awarded for multiplying speed by time, frequently using minutes or an unconventionally written time, many students struggled to efficiently work with decimal time. Converting to minutes and calculating 56 ×105 was a popular start to the question, but this was often left as 5880 or divided by 100 rather than being divided by 60. Errors with decimal time were common with conversion to 145 min or 1.45 hours seen regularly. There were successful attempts by students who chose to use a partitioning approach by adding 56, 28 and 14 after splitting 56 in half and then in half again. However, a small number choosing this method then didn't add the correct quantities together to show a complete method and gained only 1 method mark.

A substantial number did not know the formula for speed, distance and time and some who drew the correct formula triangle for speed were still unable to rearrange or apply this successfully.

Question 16 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.22	3	41	1.22	2.45	1.85	1.29	0.72	0.29	0.15



Question 16 - Response A

16 Paulo drives at an average speed of 56 km/h for 1 hour 45 minutes.

Work out the distance Paulo drives.

distance = speed x time

distance = 56 km x 1 hour and 45 mins

56 x 105 minutes
= 5880

1 hour and 45 mins
= 60 + 45 = 105 mins

~~56 x 98 = 5480~~

5880 km

(Total for Question 16 is 3 marks)

1 /3

M1: There is some correct use of distance = speed x time. We allow 56 x 105 (i.e the time in minutes) here.

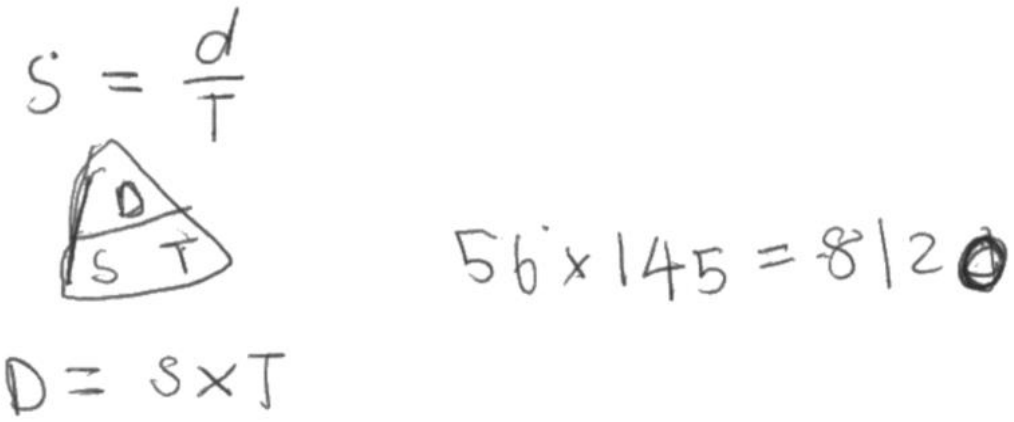
M0: The method is not complete. We need to see the 5880 divided by 60.

A0: The answer is incorrect.

Question 16 - Response B

16 Paulo drives at an average speed of 56 km/h for 1 hour 45 minutes.

Work out the distance Paulo drives.



8120 km

(Total for Question 16 is 3 marks)

1 /3

145 is clearly [time] written unconventionally but a correct attempt to use speed, distance, time formula is shown.

Award **M1** only.

Q16

A
B
C

Question 16 - Response C

16 Paulo drives at an average speed of 56 km/h for 1 hour 45 minutes.

Work out the distance Paulo drives.

56 ÷ 60 = 0.93

0.93 x 45 = 41.85

56 + 41.85 = 97.85

97.85 km

(Total for Question 16 is 3 marks)

3 /3

Q16

A
B
C

M1: Converting to km/minute is seen as the first step and is truncated to 2dp.

M1: A complete method is shown.

A1: The answer is in the acceptable range.

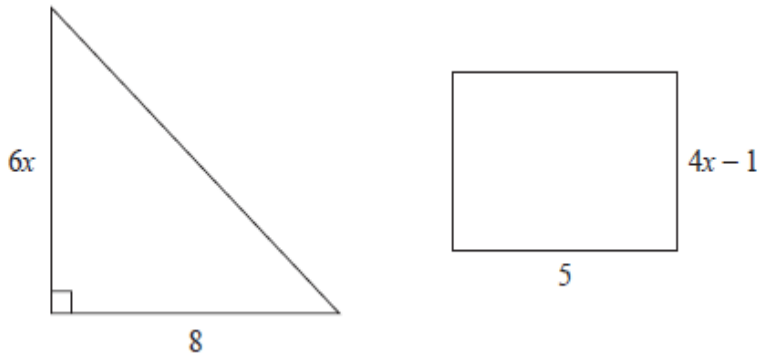
Note: using 0.93 to 0.94 using this method is acceptable.

Paper 2F - Question 24

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

Question 24 - Question

24 Here is a triangle and a rectangle.



All measurements are in centimetres.

The area of the triangle is 10 cm^2 greater than the area of the rectangle.

Work out the value of x.

x = ...

(Total for Question 24 is 4 marks)

Question 24 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
24	1.25	P1	for finding an expression for the area of one shape, eg $\frac{1}{2} \times 8 \times 6x$ (= $24x$) or $5(4x - 1)$ (= $20x - 5$) oe	Condone missing brackets for area of rectangle for all process marks
		P1	for finding an expression for the area of both shapes, eg $\frac{1}{2} \times 8 \times 6x$ **and** $5(4x - 1)$ oe **or** [area of triangle] – 10 or [area of rectangle] + 10 oe or [area of triangle] – [area of rectangle]	
		P1	for writing a correct equation, eg $\frac{1}{2} \times 8 \times 6x = 5(4x - 1) + 10$ oe **or** (dep on 1st P1) eg [area of triangle] – 10 = [area of rectangle] or [area of triangle] = [area of rectangle] + 10 or [area of triangle] – [area of rectangle] = 10	
		A1	for 1.25 oe	

Question 24 - Examiner Comments

This question proved to be challenging to most students and was not answered as well as expected. Some students were able to begin to write an expression for the area of the triangle, but many did not divide by 2. Of those who attempted to write an expression for the area of the rectangle, many gained the mark by writing $5 \times 4x - 1$ but this was often without using brackets which then caused difficulty in simplifying the expression later. Often $4x - 1$ was simplified as $3x$ or the area as $19x$. This demonstrated a weak understanding of creating expressions to represent the areas and collecting like terms.

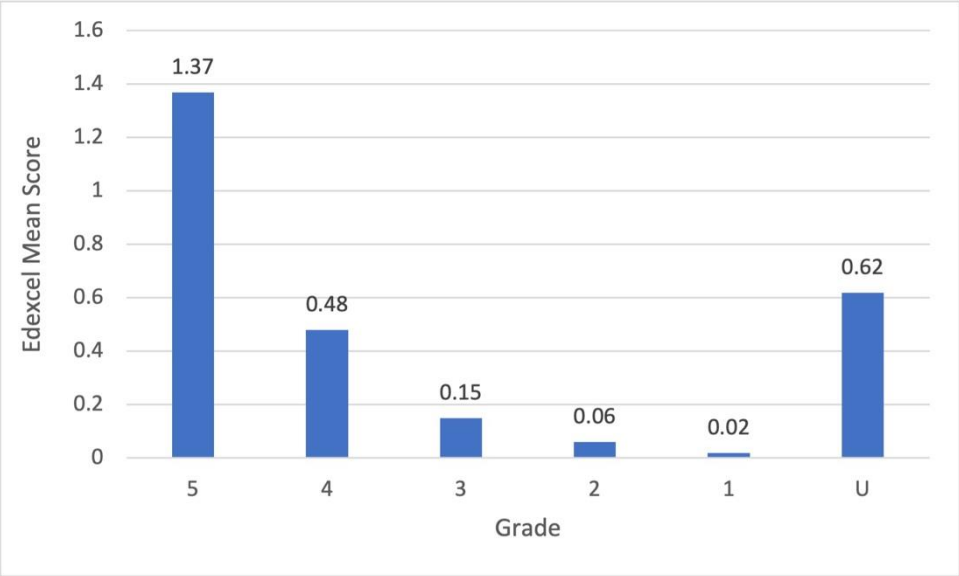
Whilst a small number of students were able to write a correct expression for both shapes, it was rare for any of them to include the additional 10 cm^2 correctly in either of their expressions or in an equation. Multiplying or dividing by 10 or 100 was often seen instead.

Some students omitted algebra altogether and wrote either '48' or '24' for the area of the triangle. Trial and improvement methods were often seen and, when used, were quite often unsuccessful. Another common mistake was to calculate the perimeter of the shapes and attempts to use Pythagoras' theorem by some students were seen.

Centres are encouraged to remind students that if only a method of trial and improvement is seen then they will score no marks unless a fully correct answer is given. This approach should not be encouraged.

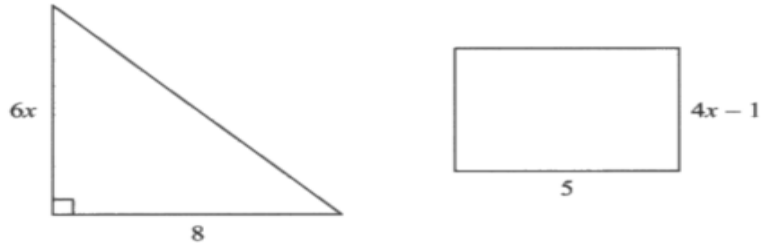
Question 24 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.29	4	7	0.29	1.37	0.48	0.15	0.06	0.02	0.62



Question 24 - Response A

24 Here is a triangle and a rectangle.



All measurements are in centimetres.

The area of the triangle is 10 cm^2 greater than the area of the rectangle.

Work out the value of x.

$6 \times x \times 8 = 42x^2$

$5 \times 4x = 20 - 1 = 19 \text{ cm } x$

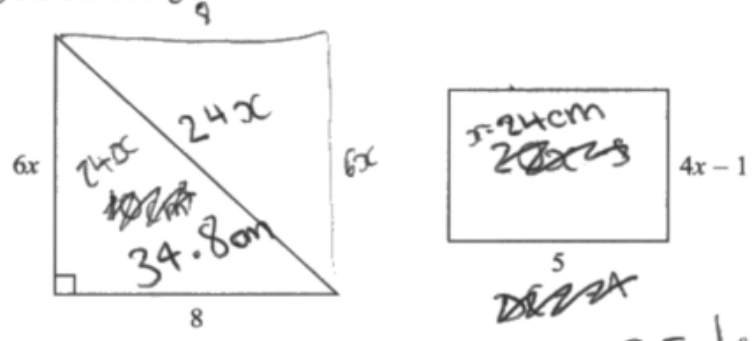
1 /4

There is an incorrect expression for the area of the triangle and no correct expression for the area of the rectangle.

No marks are therefore scored.

Question 24 - Response B

24 Here is a triangle and a rectangle.



All measurements are in centimetres.

The area of the triangle is $10\,cm^2$ greater than the area of the rectangle.

Work out the value of x.

$x = 1.45$

$6x + 8$

$6x - 4 = -24$

192

$10cm^2$

$20x - 5$

x

$\frac{20x - 5}{-5} = -4$

$(4x) - 1 + (4x) - 1 + (4x) - 1 + (4x) - 1$

-24×8

$\frac{4 \times 1.45 \times 5 = 24}{2}$

$20x - 5$

$8 \times 6x = 48x = 24x$

$6x + 8 + 8 + 6x$

$12x + 16$

$12x + 16 >$

$20x - 5 \times 10 = 24x$

$20x \times 10 = 29x$

$200x = 290x$

$x = 1.45$

$x =$ 1.45

(Total for Question 24 is 4 marks)

Q24

A B C

2 /4

There is more than one method here. Look back from the answer on the answer line to see which method has been used. They have used their 24x and their 20x – 5 to "derive" the answer of 1.45

P1: The 24x is a correct expression for the area of the triangle. (Their expression for the area of the rectangle would equally well have scored the first mark.)

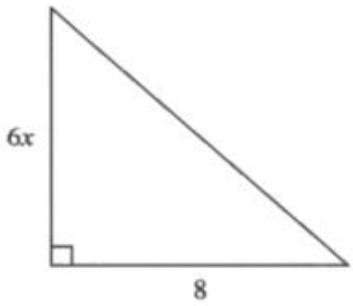
P1: They also have a correct expression for the area of the rectangle (the 20x – 5 is seen) so correct expressions are seen for both shapes.

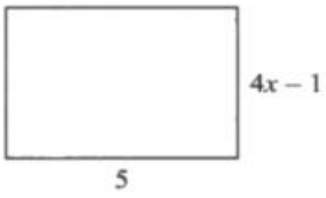
P0: They do not write a correct equation linking these two areas and using the given "10"

A0: The answer is incorrect.

Question 24 - Response C

24 Here is a triangle and a rectangle.





84 35

120 72

All measurements are in centimetres.

The area of the triangle is $10\,cm^2$ greater than the area of the rectangle.

Work out the value of x.

6 x 2 = 12
12 x 8 = 96 ÷ 2 = 48
7 x 5 = 35

triangle = 6 x 1·25 = 7·5
7·5 x 8 = 60 ÷ 2 = 30 cm

~~square~~
rectangle = 4 x 1·25 = 5 - 1 = 4
4 x 5 = 20 cm

$x =$ ~~1·25~~ 1·25

(Total for Question 24 is 4 marks)

Q24

A
B
C

4 /4

Correct answer on the answer line.

Award full marks (**P1 P1 P1 A1**)

This has presumably come from trial and improvement which gains no marks without a correct final answer.

Paper 2F - Question 25

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

Question 25 - Question

25 Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

..... kg

(Total for Question 25 is 3 marks)

Question 25 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
25	168	P1	for a start to the process, eg $\frac{57}{100} \times 800$ (= 456) or $57 \div (12 + 7)$ (= 3) **or** $800 \div (12 + 7)$ (= 42.1...) **or** [amount] $\times \frac{57}{100}$ or [amount] $\times \frac{7}{12+7}$	May be seen as part of other calculations, eg $\frac{7}{12+7} \times 57$ (= 21) or $\frac{7}{12+7} \times 800$ (= 294.7...) [amount] can be any figure considered as being 57% of 800 or 43% calculated incorrectly or a figure calculated from using full or partial ratio incorrectly as a first step
		P1	for a complete process to find the weight of glass, eg $\frac{57}{100} \times 800 \times \frac{7}{12+7}$ oe	
		A1	for an answer in the range 167.9 to 168 SCB2 for an answer of 288	

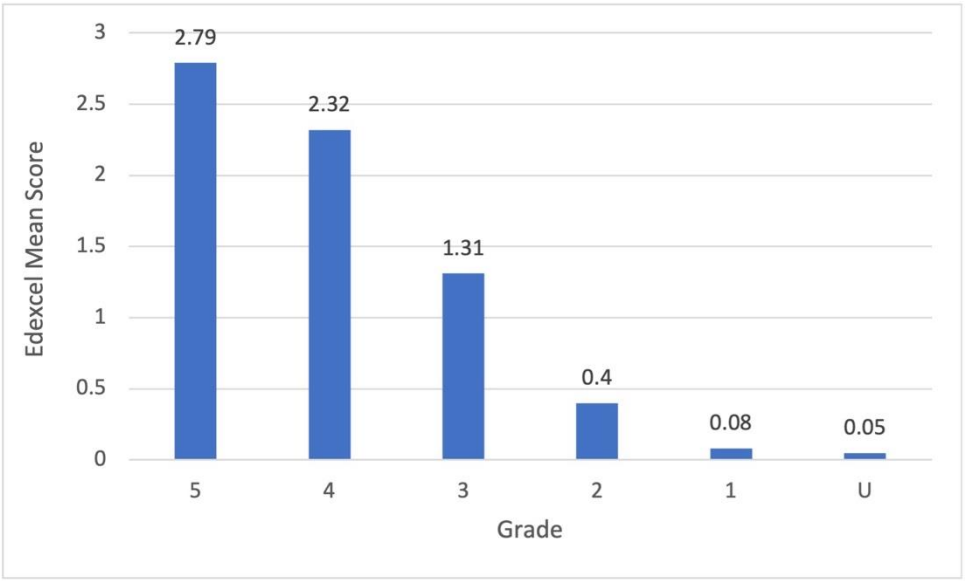
Question 25 - Examiner Comments

Combining the skills of applying percentages and ratio in this small problem appeared to be demanding for many students, with many often only being able to work with one or the other but not both together. Calculating 57% of 800 was by far the most common first step shown but, after finding 456, it was common either to multiply or divide by 7 or 12 without using 19 in their calculations. Of those who chose to work with percentage first, this was not always done correctly by those using a build-up method rather than the calculator. When doing this, very few showed a method for the individual percentages and just stated what they thought the percentage was, so any error lost the method mark.

Almost all responses that gained full marks worked through each part as an individual calculation such as dividing by 19 and then separately multiplying by 7, very few used fractions in their working. This approach proved to be the most successful and should be encouraged.

Question 25 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.27	3	42	1.27	2.79	2.32	1.31	0.40	0.08	0.05



Question 25 - Response A

25 Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

$\frac{12}{19}$ $\frac{7}{19}$

$800 \div 19 = 42.10526316$

12×42.10526316
$= 505.2631579$ kg
paper

7×42.10526316
$= 294.7368421$

295 kg

(Total for Question 25 is 3 marks)

1 /3

Q25

This question involved working with a percentage (57%) and with a ratio (12:7)

P1: Only the ratio has been worked with here so only 1 mark can be awarded.
Note: the first step of dividing 800 by 19 is enough for P1.

P0: There is no complete process.

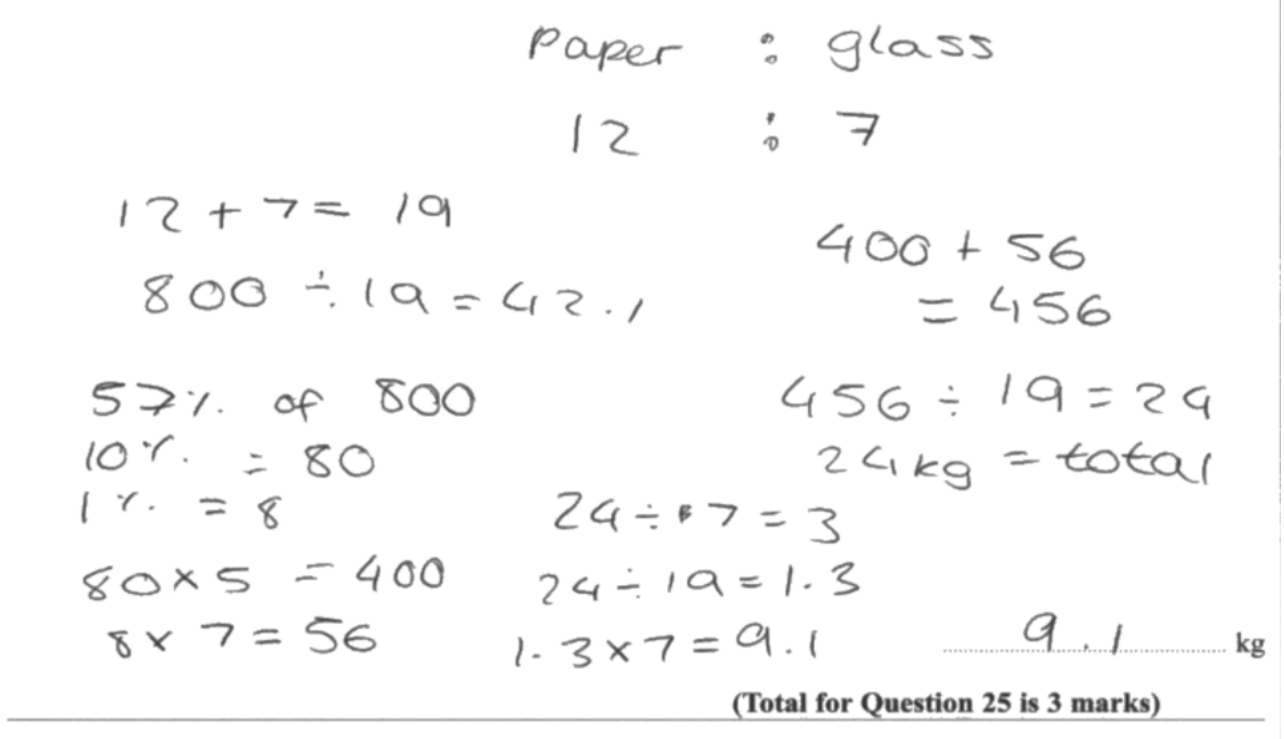
A0: The answer is not correct.

Question 25 - Response B

25 Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.



(Total for Question 25 is 3 marks)

Q25

A B C

1 /3

Two methods are shown with the final answer coming from use of 456.

P1: Finding 456 accurately is awarded the first mark.

P0 A0: The full process to work with ratio is incorrect (the 456 is divided by 19 but not then multiplied by 7) so no further marks are awarded.

Note: without the answer line indicating which method to mark, the lowest score would still be 1 for 800/19

Question 25 - Response C

25 Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

57% × 800 = 456

12 : 7 = 19 all together

456 ÷ 19 = 24

12 × 24 = 288
7 × 24 = 168

456 kg

(Total for Question 25 is 3 marks)

2 /3

A complete process is shown but an incorrect value is given as the final answer.

They have found the weights of both paper and glass, the correct selection of 168 is not shown so we can't ignore the subsequent working.

Award **P1 P1 A0**.

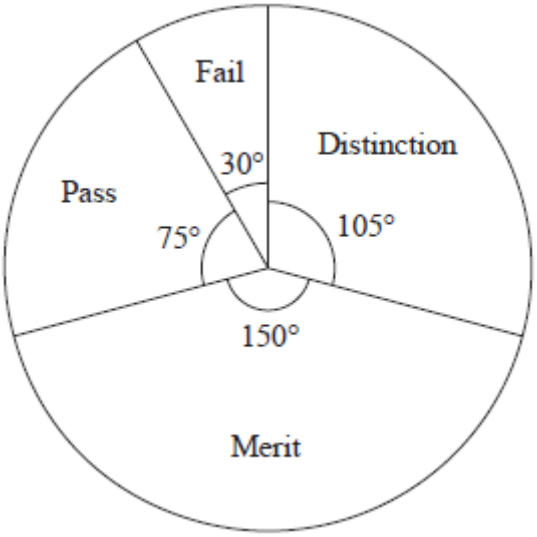
Paper 3F - Question 12

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

Question 12 - Question

12 Some students took a guitar exam.

The pie chart shows information about the grades the students got.



(a) Write down the modal grade.

.....

(1)

7 students got distinction.

(b) Work out the total number of students who took the guitar exam.

.....

(3)

(Total for Question 12 is 4 marks)

Question 12 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	Merit	B1	cao	
12 (b)	24	M1	for beginning to work with proportion eg 105 ÷ 7 (= 15) or 7 ÷ 105 (= 0.07 or 0.06....) or 360 × 7 (= 2520) **or** $\frac{360}{105}$ (= 3.4…) **or** works out a quantity for one sector eg $\frac{7}{105}\times 30$ (= 2), $\frac{7}{105}\times 75$ (= 5), $\frac{7}{105}\times 150$ (= 10),	
		M1	for a complete method eg $\frac{360}{105}\times 7$ oe or "3.4…" × 7 **or** 360 ÷ "15" or 360 × "0.06.." **or** "2520" ÷ 105 **or** 7 + "2" + "5" + "10"	
		A1	cao	

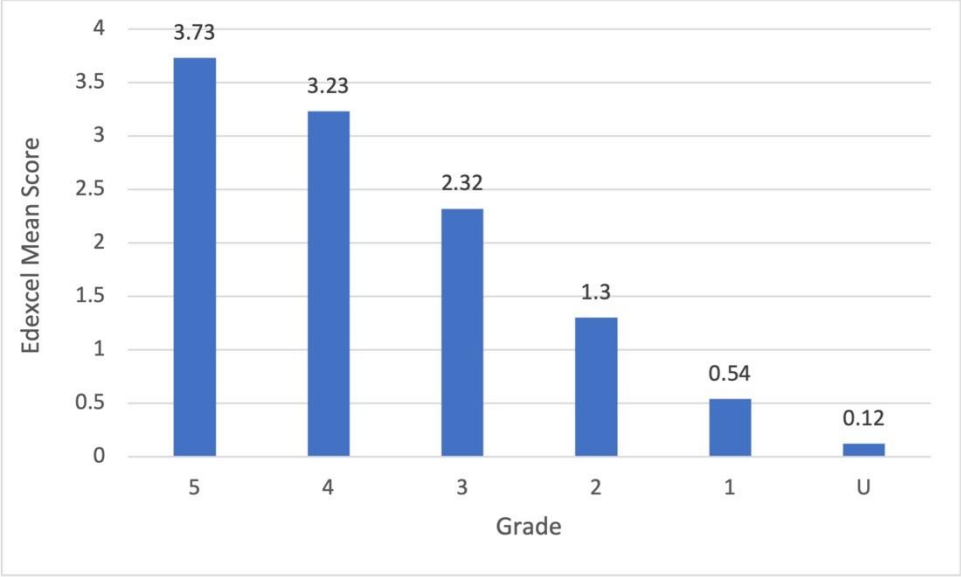
Question 12 - Examiner Comments

In part (a) most candidates answered correctly. A common error was for candidates to write the size of the angle, 150 degrees, instead of merit and some candidates wrote no response here.
In part (b) the most common approach was to work out the angle for one student and then divide each angle separately, summing the results. Of those who didn't score full marks the method was usually correct and so an incorrect answer was due to an arithmetic error. Some found 2, 5 and 10 but added these to get 15 instead of 7, losing 2 marks.

The more efficient approach of a single calculation $\frac{360}{105}\times 7$ was rarely seen. A common incorrect expression was 360 ÷ 4. Occasionally candidates found the percentage for each sector but rounded too early, leading to the loss of the accuracy mark.

Question 12 - Performance

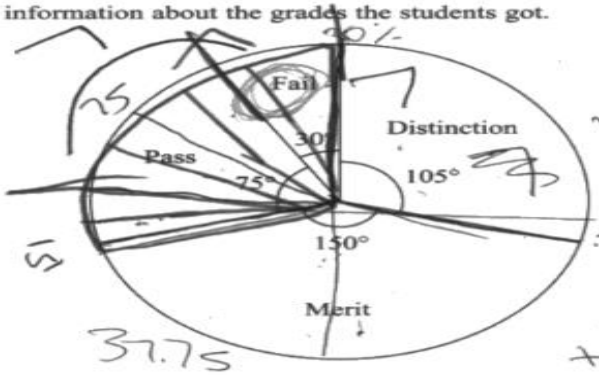
Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
2.13	4	53	2.13	3.73	3.23	2.32	1.30	0.54	0.12



Question 12 - Response A

12 Some students took a guitar exam.

The pie chart shows information about the grades the students got.



(a) Write down the modal grade.

255
(1)

7 students got distinction.

(b) Work out the total number of students who took the guitar exam.

D	M	F	P
7	12	2	5

7+12=19+2=21
+5=26

26
(3)

(Total for Question 12 is 4 marks)

Q12

1 /4

Part (a)
B0: We need to see the word "Merit"

Part (b)
M1 for 105/7 implied by 15 seen at the top of the page adjacent to the distinction sector. They could also have gained this mark for 2 or 5 in their table, being the correct number of students for Pass and Fail.

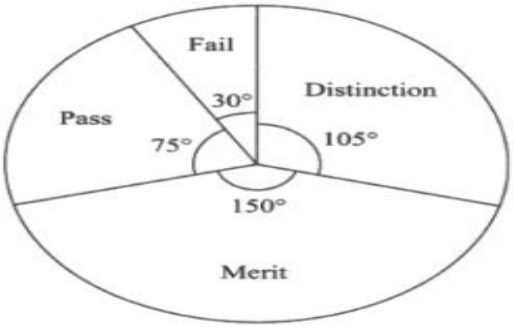
M0: There is no correct method seen for the 12 for merit in their table so we cannot give the mark for adding the values in their table. The use of inverted commas around the values 2, 5 and 10 in the mark scheme indicate that these values must have come from a correct method. See additional guidance section 12.

A0 follows

Question 12 - Response B

12 Some students took a guitar exam.

The pie chart shows information about the grades the students got.



105 = 7

1 = 0.06

0.06 × 30 = 1.8

× 75 = 4.5

150 = 9

7 + 9 + 4.5 + 1.8

= 22.3

(a) Write down the modal grade.

distinction

(1)

7 students got distinction.

(b) Work out the total number of students who took the guitar exam.

22.3

(3)

(Total for Question 12 is 4 marks)

2 /4

Q12

A B C

Part (a)
B0

Part (b)
M1 for beginning to work with proportion (0.06 is acceptable) or for working out a quantity for one sector (using the truncated value of 0.06)

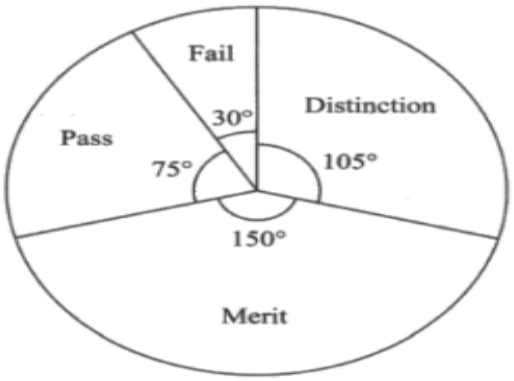
M1 for a complete method. The values 9, 4.5 and 1.8 are supported by method shown. Adding these with 7 is sufficient for this M mark.

A0: They pay the price for truncating their previous value at this stage as the answer is not correct.

Question 12 - Response C

12 Some students took a guitar exam.

The pie chart shows information about the grades the students got.



(a) Write down the modal grade.

merit

(1)

7 students got distinction.

(b) Work out the total number of students who took the guitar exam.

7 = distinction

105 ÷ 7 = 15

merit 150 ÷ 15 = 10

pass = 75 ÷ 15 = 5

fail = 30 ÷ 15 = 2

7 + 10 + 5 + 2 = 24

24

(3)

(Total for Question 12 is 4 marks)

Q12

A B C

4 /4

Part (a)
B1 correct.

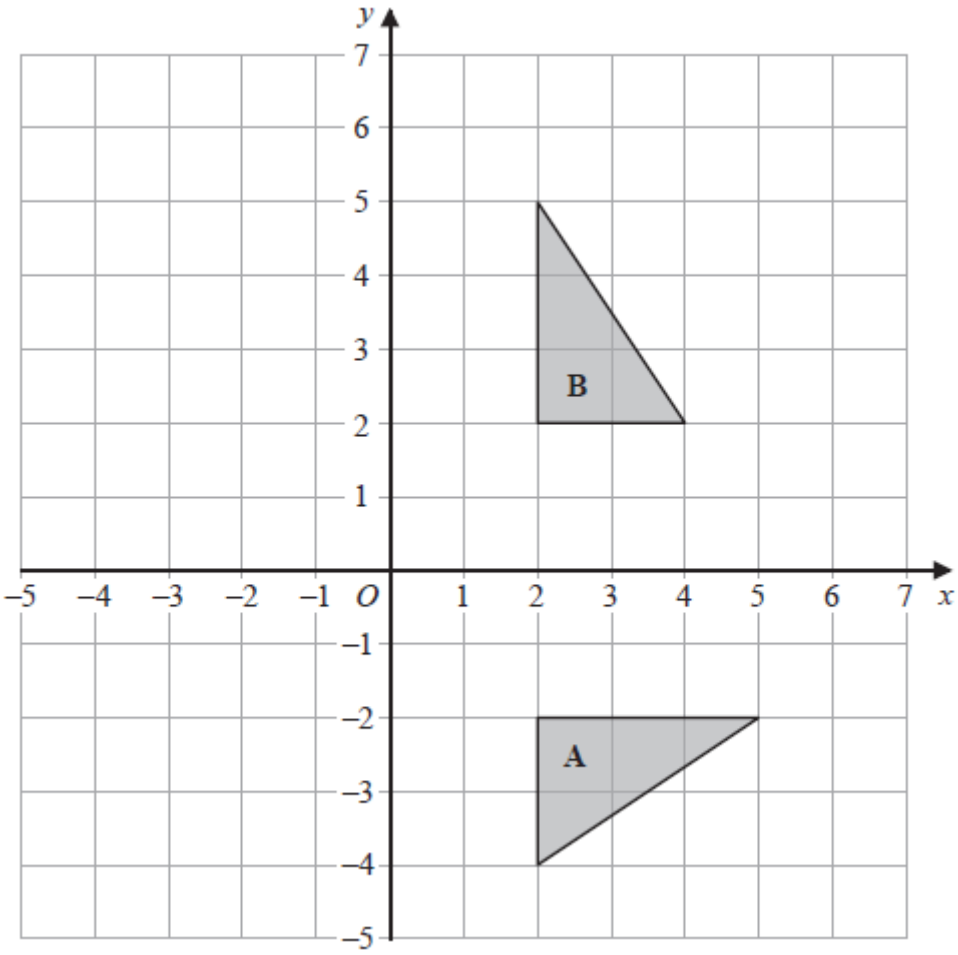
Part (b)
M1 M1 A1: A fully correct solution.

Paper 3F - Question 16

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

Question 16 - Question

16



Describe fully the single transformation that maps shape **A** onto shape **B**.

(Total for Question 16 is 2 marks)

Question 16 - Mark Scheme

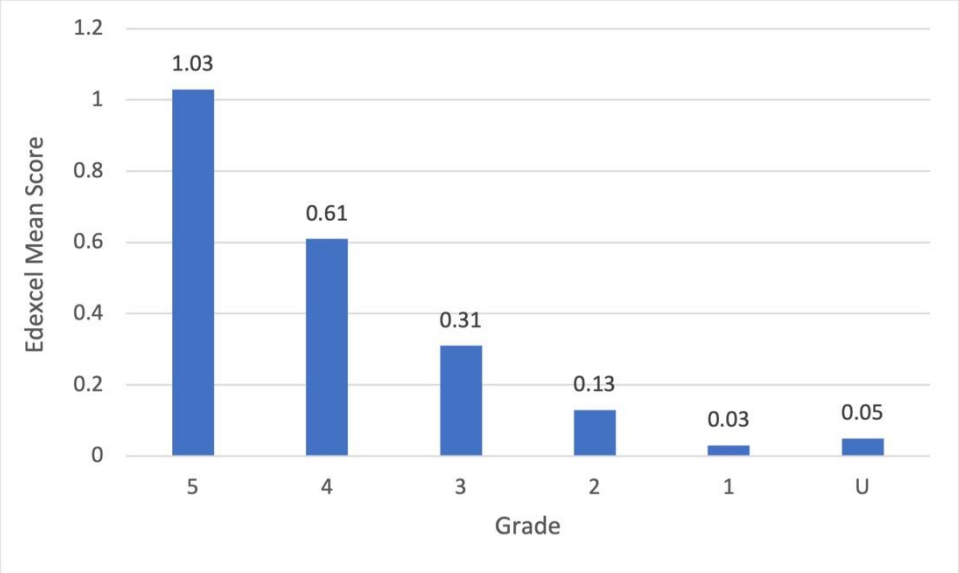
Question	Answer	Mark	Mark scheme	Additional guidance
16	Rotation of 90(º), centre (0,0)	B2 (B1	Rotation of 90 about (0,0) **or** Rotation of 270, clockwise about centre (0,0) Rotation and 90 **or** Rotation and 270, clockwise **or** Rotation about (0,0))	Accept “origin” or “O” for (0,0)

Question 16 - Examiner Comments

Centres are encouraged to reinforce learning in this type of question at this level as it tends to be less successfully answered. Candidates found it difficult to isolate the single transformation of "rotation" and this stopped them from securing any marks. Some candidates did not use the correct mathematical language and chose to use the word "turn", others spoiling their answers by combining two or more transformations. The fully correct response, to gain two marks, required candidates to state rotation with an angle of 90 (direction only required for an angle of 270) and a centre of rotation. Some spoilt their description by stating a “Rotation clockwise of 90º” which of course was a rotation from
B to **A**, rather than from **A** to **B**.

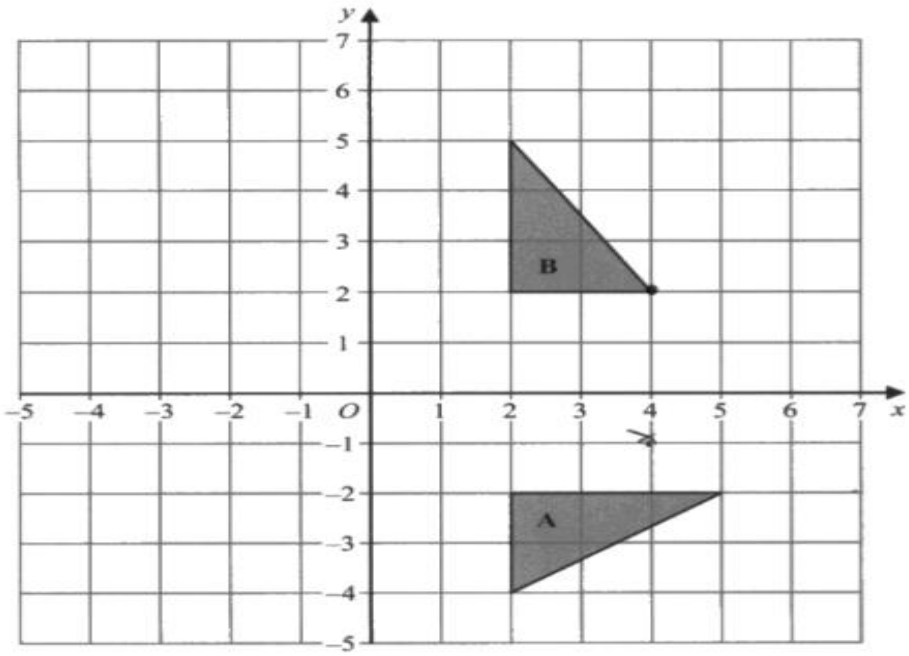
Question 16 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
0.36	2	18	0.36	1.03	0.61	0.31	0.13	0.03	0.05



Question 16 - Response A

16



Describe fully the single transformation that maps shape **A** onto shape **B**.

move Shape A 2 squares across from point (2,-2) and rotate from the point anti clockwise. and ~~see~~ 4 square up to point ~~(4,4)~~ (4,2)

(Total for Question 16 is 2 marks)

0 /2

Q16

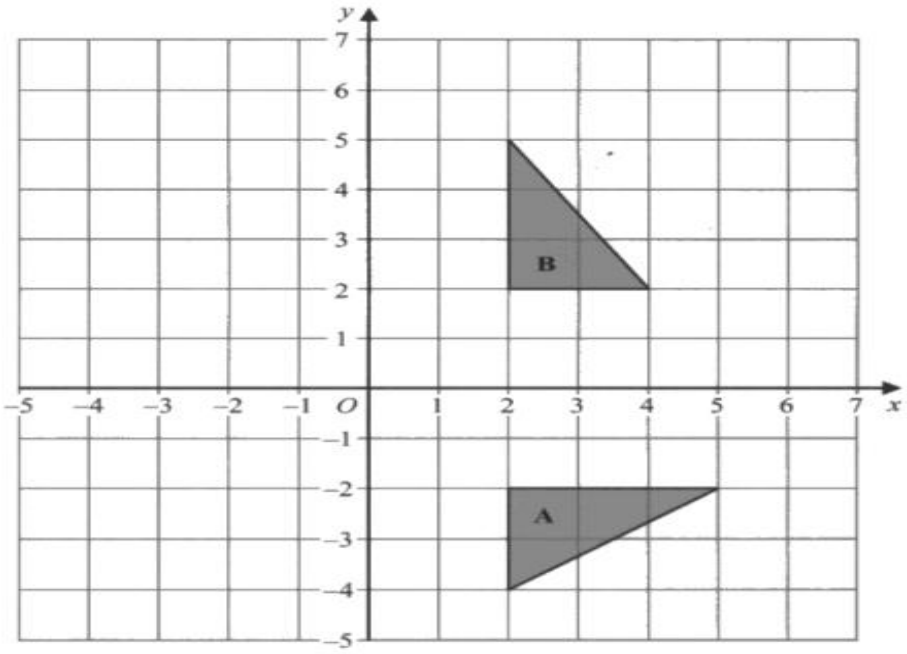
A
B
C

B0: no marks

Any reference to multiple transformations will score 0 marks. If (0,0) is written as a column vector this could indicate a translation, so 0 marks are then awarded as it is a case of multiple transformations.

Question 16 - Response B

16



Describe fully the single transformation that maps shape **A** onto shape **B**.

Rotation from the origin by 180° degrees

(Total for Question 16 is 2 marks)

Q16

A
B
C

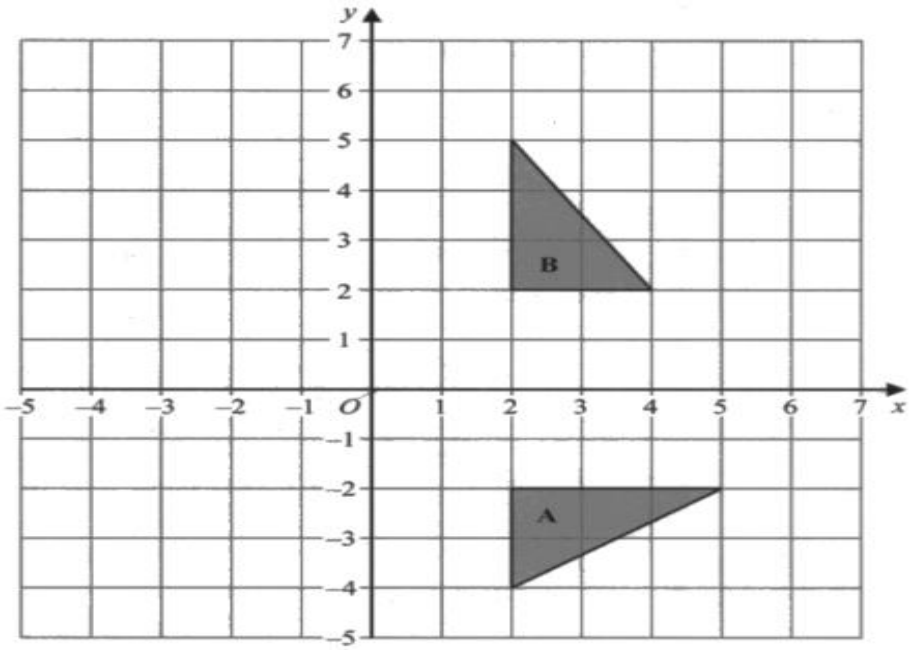
1 /2

B1: 1 mark
"Rotation" and "origin" is enough to score 1 mark.

N.B Other acceptable terms for the centre of rotation are "O" and "(0,0)".

Question 16 - Response C

16



Describe fully the single transformation that maps shape **A** onto shape **B**.

Rotation 90° anticlockwise (0,0)

(Total for Question 16 is 2 marks)

2 /2

B2 2 marks

The minimum response that scores full marks - "Rotate/Rotation", "90°" and "(0,0)/origin/O"

This is because a rotation of (+) 90° is by convention always anticlockwise. Students who wrote “rotation of 90 degrees clockwise” would score no marks whereas “rotation of 90 degrees” would score 1 mark because by implication the direction is anticlockwise. The centre of rotation as the origin also needed to be mentioned to score the 2nd mark.

Paper 3F - Question 21

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

Question 21 - Question

21 Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(a) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.

..... g

(4)

Jonny's assumption is wrong.
72% of the people will drink coffee.

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

(1)

(Total for Question 21 is 5 marks)

Question 21 - Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
21(a)	11533	P1	for working with 68%, eg 800 × 0.68 (= 544 people) oe or "16960" × 0.68 oe	Percentage calculation could be done at any stage
		P1	for a correct process, other than that of finding a %, eg "544" × 2 (= 1088) or 10.6 × 2 (= 21.2) or 800 × 2 (= 1600) or "544" × 10.6 (= 5766.4) or 800 × 10.6 (= 8480)	
		P1	for full process to find amount of coffee required eg "1088" × 10.6 or "544" × "21.2" or "5766.4" × 2 (= 11532.8) or for an answer of 11532	
		A1	for answer in the range 11532.5 to 11533	If a correct answer within the range is shown in working but incorrectly rounded award full marks.
21 (b)	Statement	C1	for a correct statement **Acceptable examples** the amount will be more; he will need more coffee it is an underestimate my answer in part (a) means there would not be enough for everyone he will need 12211(.2); needs 678(.4) more **Not acceptable examples** amount will decrease, amount of coffee will change	If figures are given as part of the answer they must be correct, but can allow ft.

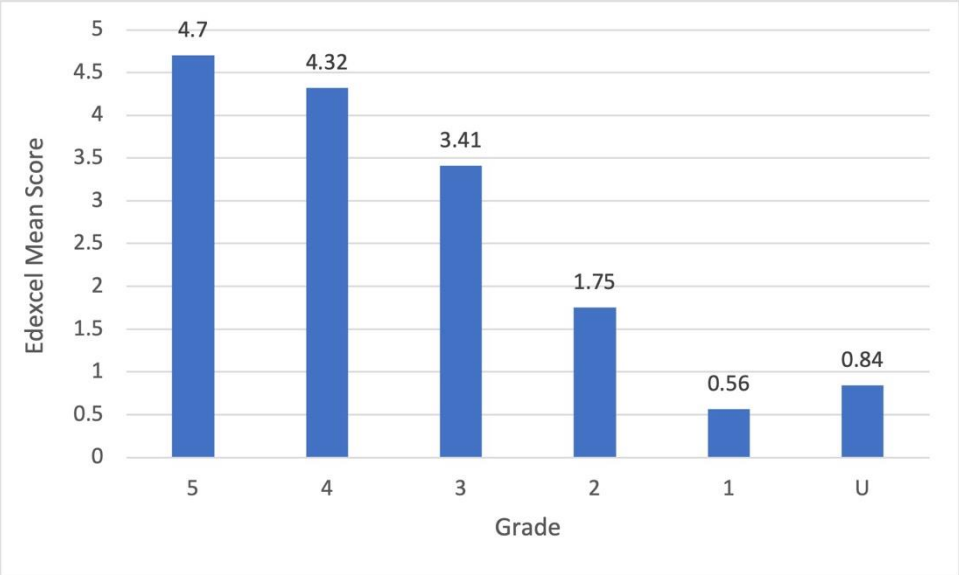
Question 21 - Examiner Comments

A large proportion of candidates were able to secure a mark for commencing this problem by taking into consideration the two cups of coffee by doubling one of the other stated values, or by multiplying by 10.6 to take into consideration the amount of coffee required for one cup of coffee. These two steps could have been completed after working with the proportion of the 800 people (68%) that would drink coffee. In order to progress with this problem, candidates had to work with the 68% and in most cases, this was completed by working out how many people this was. Although they could use calculators for this paper, a significant number of candidates chose to compute this by demonstrating a build-up method. When this was done correctly, most went on to arrive at the correct solution of 11532.8. Where candidates did not show all stages of their working and simply stated correct and incorrect percentage values that they then added, no marks or no further marks were able to be awarded. Generally, partitioning methods frequently led to error, but those using a more direct approach, typically by multiplying by 0.68, usually went on to work the percentage out correctly.

In part (b) responses of "there will not be enough coffee" or "more coffee will be needed" or similar equivalent responses were rewarded with the communication mark. Some candidates chose to recalculate the problem and chose to work out the new total of people drinking coffee or the new weight of coffee required. When they did this correctly this also secured this last mark. Candidates should be encouraged to generalise so that they do not have to complete additional unnecessary work, particularly when there was only one mark to be gained. It was encouraging to see many correct responses to this part.

Question 21 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
2.89	5	58	2.89	4.70	4.32	3.41	1.75	0.56	0.84



Question 21 - Response A

21 Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(a) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.

800 people at meeting
coffee drinkers → drink 2 cups
10.6g coffee → each cup of coffee
68% of people will drink coffee

$\frac{800}{2} = 400 \times 10.6g = 37.\dot{7}35 \times 68\% = 2565$

2565g
(4)

Jonny's assumption is wrong.
72% of the people will drink coffee.

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

This affects my answer in part A because the percentage of people who drink coffee is larger. will
(1)

(Total for Question 21 is 5 marks)

Q21

A
B
C

1 /5

Part (a)

P0 for the percentage calculation: 68% of 37.735 is not 2565. This mark can be awarded for finding 68% of any number that they are working with as long as it is the correct answer or the process is clearly shown to find 68% eg x 0.68 or x 68/100

P1: 800/2 is wrong; we award this mark though for 800 x 10.6 (embedded in 800/2 x 10.6)

P0 A0: no full (correct) process or correct answer due to the previous errors so no further marks.

Part (b)

C0 since this is just a restatement of the question without stating how this affects the answer.

Question 21 - Response B

21 Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(a) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.

68 % of 800 =
0.68 x 800 = 544

544/2 = 272 544/2 = 272

10.6g x 554 = 5872.4g

5872.4 / 272 = 21.58

22 g
(4)

Jonny's assumption is wrong.
72% of the people will drink coffee.

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

I would have to find out what 72% of 800 would be and add extra grams to how much coffee would be needed.
(1)

(Total for Question 21 is 5 marks)

Q21

A
B
C

3 /5

Part (a)

P1 for a correct % calculation, or for sight of 544

P1 for "544" x 10.6 Note that this candidate has actually written 554 x 10.6 which is a transcription error of their own correct answer, so we can still award the P mark. We must be convinced when allowing a transcription error that they are not just making up a figure; 554 is close enough to 544 to be convincing.

P0 A0 since the rest of the process shown is incorrect.

Part (b)

C1 is a description of what needs to be done, but "add extra grams" is a clear enough indication of needing more coffee, which is an acceptable example. Additional superfluous words in their explanation can be ignored as long as they are not contradictory.

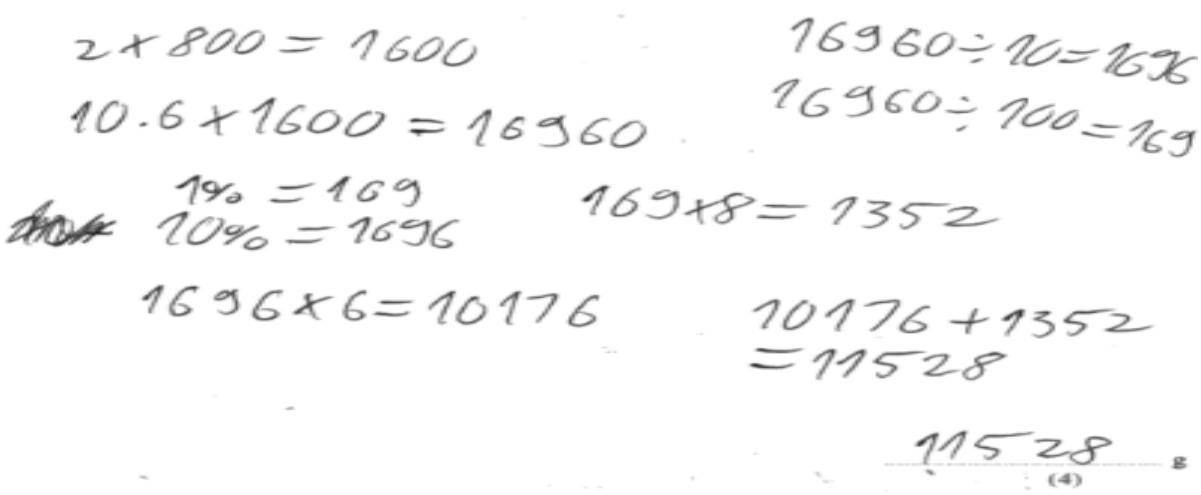
Question 21 - Response C

21 Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(a) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.



Jonny's assumption is wrong.
72% of the people will drink coffee.

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

he will need more grams of coffee

(1)

(Total for Question 21 is 5 marks)

4 /5

Q21

A
B
C

Part (a)
This is an example of premature rounding, but the process is sound.

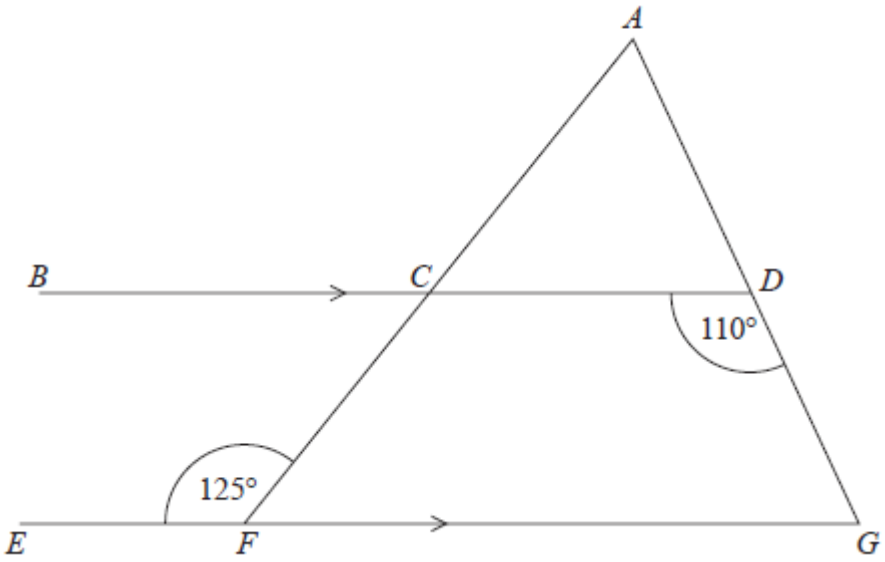
P1 for working with 68%. Using a partitioning method, they have the correct process to find 1% and 10% but have truncated the 1% however, the overall process is correct to find 68%.
P1 for a correct process other than the % - they have actually done this first by showing 2 x 800 x 10.6
P1 for a full process leading to 11528 using their truncated value.
A0: the final figure is incorrect due to the premature rounding.

Part (b):
C1: "more grams" is an acceptable example.

Paper 3F - Question 22

Question 22 - Question

22 *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

(Total for Question 22 is 5 marks)

Question 22 - Mark Scheme

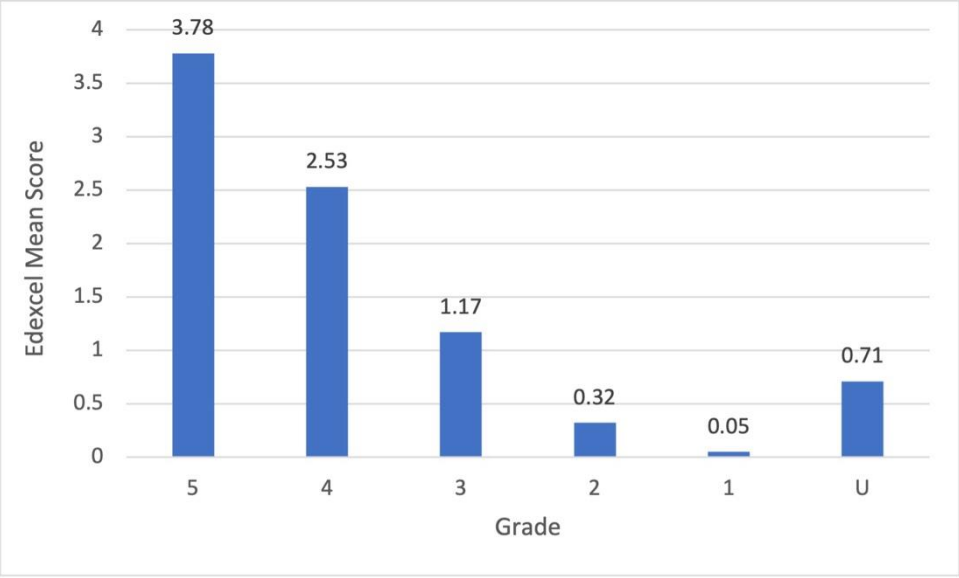
Question	Answer	Mark	Mark scheme	Additional guidance
22	Shown with reasons	M1	for method to find *ACD* using parallel lines eg *BCA* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *BCF* = 180 – 125 (= 55) = *ACD* **or** *FCD* = 125 **and** *ACD* = 180 – 125 (= 55) **or** *CFG* = 180 – 125 (= 55) = *ACD*	Angles must be clearly labelled on the diagram or otherwise identified. Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		M1	for method to find *ADC* eg 180 – 110 (= 70) **or** for method to find *CAD* eg 180 – ("70" + "55") (= 55) or 110 – "55" (= 55)	
		A1	for *ACD* = 55 **and** *CAD* = 55	
		C1	for one correct parallel lines reason linked to their method eg Corresponding angles are equal Allied angles / Co-interior angles add up to 180 Alternate angles are equal	Underlined words need to be shown; reasons need to be linked to their method, which can be implied from correctly identified angles (stated or written on the diagram).
		C1	for one other reason stated linked to their method eg Angles on a straight line add up to 180 Angles in a triangle add up to 180 Vertically opposite angles are equal OR Vertically opposite angles are equal The exterior angle of a triangle is equal to the sum of the interior opposite angles. Angles in a quadrilateral add up to 360. Accept "4-sided shape"	

Question 22 - Examiner Comments

There were three marks available for calculating each of the three angles in triangle *ACD*. There was an easy one step calculation using "angles on a straight line" to calculate angle *ADC* = 70. Some candidates then spoiled their work by then using the stated fact (isosceles triangle) to state the other two angles as 70 and 40. In order to complete this problem, candidates had to use a parallel line fact to work out another angle around point *C*, which they did by either directly calculating angle *ACD* or by finding another angle at the point that allowed another simple angle fact to be used to state angle *ACD* = 55. The final angle required the sum of angles in a triangle to deduce angle *CAD* = 55.
The communication marks were awarded for stating a parallel line fact and/or another simple angle fact that was linked to their method. Both were required to secure the final two marks of this five-mark problem. On this occasion it was not necessary to state that the triangle *ACD* was isosceles or what this meant. Very few students were able to state a parallel line reason. "Parallel lines are the same" was often seen as an incorrect answer. The use of correct angle notation was rare.
It should be noted that while most candidate's work was linked and sequential, some work was spoiled by not naming angles or naming angles ambiguously. Candidates should be encouraged to write their angles on the diagram, which is not ambiguous unless contradicted by alternative working.

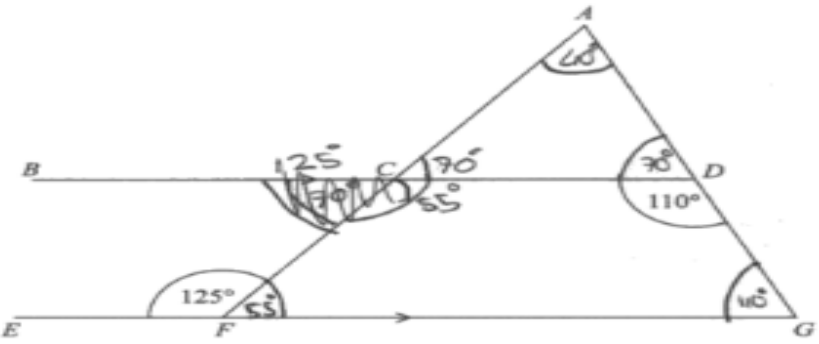
Question 22 - Performance

Mean score	Max score	Mean %	Edexcel averages: mean scored by candidates achieving grade:						
			ALL	5	4	3	2	1	U
1.35	5	27	1.35	3.78	2.53	1.17	0.32	0.05	0.71



Question 22 - Response A

22 *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

angles on a Straight Line add up to 180°

Parallel ines add up to 180°

all angles in an Isoceles tryangle add up to 18°

2 /5

M0 for parallel lines method - they are using allied angles but equated them instead of using supplementary angles.

C0: no parallel line reasons.

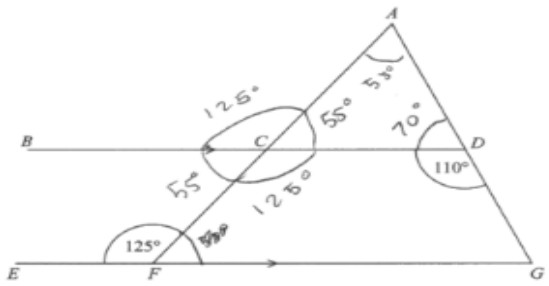
M1 for ADC=70 seen on the diagram

C1 for "angles on a straight line..." if ADC=70 wasn't shown we could still award C1 as we can see it was used to find CFG = 55

A0: since they don't give us the correct ACD and CAD.

Question 22 - Response B

22 *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

One angle is larger than the other two which are equal

(Total for Question 22 is 5 marks)

3 /5

M1: Angle *ACD* is given correctly as 55 degrees.

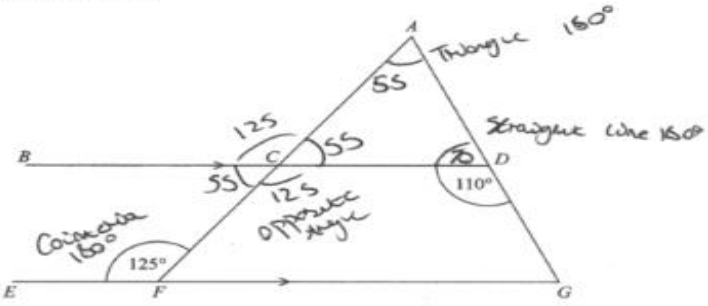
M1: Angle *ADC* is given correctly as 70 degrees.

A1: Angle *CAD* is given correctly as 55 degrees. They do not have to state that "therefore triangle *ACD* is isosceles".

C0 C0: No reasons are stated.

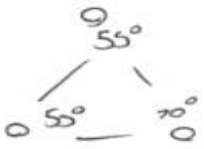
Question 22 - Response C

22 *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

- 180 - 125 = 55 - Cointerior
- 55 * = 55 - opposite
- 180 - 110 = 70 - Straight line
- (180 - 55) - 70 = 55 - Triangle



5 /5

M1 for ACD=55

C1 for Co-interior we can condone the incorrect spelling.

M1 for ADC=70 seen on the diagram

C1 for "opposite angles" in getting to ACD. Be aware it would be C0 for "straight line …180" since they have missed off the word "angles".

A1 for ACD=55 and CAD=55