Examiners' Report
Principal Examiner Feedback

Summer 2019

Pearson Edexcel iLower Secondary Curriculum
Mathematics Year 9
(LMA11)

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General Comments

This paper was the first to examine the new specification, so included a number of new topics, with fewer multiple-choice questions and an increased proportion of problem-solving questions. The level of difficulty presented was therefore increased compared with previous series on the legacy specification, and the raw scores achieved illustrated this. However, there was still a good distribution across the full mark range, with grade boundaries amended accordingly so that the proportion of candidates achieving each grade was not significantly different to previous years.

The new, shorter Section A and longer Section B both had a range of questions which differentiated between candidates of different abilities effectively. The majority of questions in both sections were attempted by all candidates and relatively few questions were missed out, particularly in Section A.

There was a slight improvement in the standard of candidates answer in Section A but a significant fall in the proportion of marks scored on Section B. However, there was not a significant difference in the proportion of marks scored on each different mathematical topic, which has been seen in previous years, which suggests an improvement in the standard of work on geometry and statistics and/or a decline in the standard of work on number and algebra. There was a noticeable difference in the proportion of marks scored within each of the attainment objectives, with significantly weaker performance on AO5 problem solving questions than on questions in the other 4 AOs.

Candidates seem to have had access to suitable calculators and this allowed them to tackle a number of the questions in an efficient, effective manner. However, there were a number of the questions that were worth a higher number of marks where several candidates failed to show enough working to earn any credit and offered only an (often incorrect) answer. This may have been an indication that the candidates concerned were not able to effectively attempt these questions, so simply offered a guess at the answer, but may also be an indication that some candidates are using calculators to do working out without recording it in the spaces provided. In order to maximise their achievement, candidates should be encouraged to write down as much of their working as possible, even if they are not capable of reaching a correct answer, as this would potentially attract method marks which would otherwise be lost.

Issues that have been seen in previous series with inappropriate rounding and overly severe truncation were not as prevalent this year. Candidates generally gave answers to the required degree of accuracy but must still be aware of the impact that premature rounding has on the accuracy of an answer. Some candidates benefitted from writing out their full calculator display and/or giving answers in surd form, before rounding or truncating their answers further, so that accuracy was assured even if their rounding was severe and/or incorrect.

Section A

There were 15 multiple choice questions in the first section of the paper, with one correct answer given alongside three incorrect distractors.

As mentioned above, almost all candidates attempted all the questions in this section, and performance overall was slightly better than in previous series. As usual, the multiple-choice questions generated very little evidence of working from the majority of candidates, which makes it impossible to know which answers were secured due to good mathematics and which were simply good fortune.

The questions towards the beginning of the paper were not generally done better than the later questions, as is usually the case, with the strongest performance coming from question around the middle of this section (Questions 6-9) and on the penultimate question. Performance on the other questions towards the end of Section A were weaker, as is expected as the questions get harder, but the overall performance on the first five questions was significantly weaker than expected. This may be a sign of candidates rushing carelessly through what they perceive to be easy questions, or possibly an indication that less time was spent on these easier topics in preparation for the test.

As Section A was again marked by OMR during this series, it is impossible for candidates to gain credit for indicating their choice of answers incorrectly. However, inspection of the scripts showed that this was very rare, with the vast majority of answers being indicated clearly, in the manner required.

Section B

This section contained eighteen questions, seven of which had more than one part. Each question (or part) attracted between one and six marks towards the total of 65 for this section. For questions that were worth more than one mark, marks were available to reward evidence of correct working. Further comments on each individual question can be found below.

Question 16

The vast majority of candidates scored both marks on this question. Almost all substituted for y immediately and then solved the resulting equation correctly. A minority of candidates substituted correctly but had problems rearranging the equation. A small number mishandled the 1, leading to 22=2x and an incorrect answer of 11.

Question 17

Just over half of the candidates got this question correct, with each part being done equally well.
In part (a) the most common error was to find 85%, or find 15% and then subtract it, which scored no marks.
In part (b) a number of candidates seemed to struggle with the worded content of the question and failed to understand what was being asked of them. The majority did manage to score one mark for finding 2300 but only around half then went on to score any further credit. However, those who did almost always went on to score full marks.

Question 18

Part (a) was completed correct by almost all candidates and those who did not earn this mark generally drew a bar that was the wrong height (often 4 instead of 3). However, there were a large number of candidates who only earned this mark despite some slightly inaccurate bars being drawn. For future series, candidates need to remember that bars should all be the same width, that the spaces between them should be the same and they should be drawn above the label given.
Part (b) proved to be significantly more challenging though, with less than half of the candidates getting it correct. The majority did manage to get at least one mark, often for an answer of 12/20 (using 15 or more, rather than more than 15) which would suggest that more careful reading and better understanding of the question is required, rather than any mathematical issues. It is worth noting that there is no need to give answers in their simplest form on a probability question, as many candidates reached a correct answer but then simplified it incorrectly (although this did not jeopardise their full marks).

Question 19

This question was done very well on the whole, with a large majority of candidates scoring full marks. Answers were expressed both as a simple product or using index notation, and both of these were perfectly acceptable. Where full marks could not be awarded, it was generally due to an arithmetic error within a correct method, so at least one mark was scored. For the small minority of candidates who scored no marks on this question, it was usually for attempting to list all factors of 150.

Question 20

This question was completed considerably less well than in previous series with similar questions, and only around two-thirds of candidates scored full marks on it this year. Some had clearly not read (or understood) the question and gave the next term (or terms) in the sequence. Several of those who scored no marks gave an incorrect term involving n (often n + 7) while the majority of candidates who scored the first mark for finding 7n went on to get the second mark too for getting the -6 too. There were a few different ways of writing/arranging these terms but, on the whole, these were acceptable due to the 'oe' on the mark scheme.

Question 21

This proved to be one of the most challenging questions in the early part of the paper, with less than half of the candidates getting it completely correct, despite the relatively straight-forward mathematics required. Again, it seems that reading and/or understanding of the question was an issue, as several candidates failed to answer the question asked (ie. did not give a name) and many others failed to calculate the amount that each person had left. There were marks awarded to candidates who calculated other comparable amounts (amounts spent, percentages spent, etc) but it was very common to see disorganised working out with no clear strategy.

Question 22

This question differentiated between candidates very effectively with around half scoring no marks but then a good mix of candidates scoring one and two marks. Those who scored zero generally seemed to lack any knowledge of what format the answer should be in, although there were a number who wrote y=mx+c and then stopped. Those who scored one mark usually had an answer in the correct format but either calculated the gradient incorrectly (often doing 1÷3 instead of 3÷1) or gave the intercept incorrectly (often giving +2 instead of -2). Those who did score full marks usually did so by writing the correct equation, in the correct format, but without any working out as only a small minority showed how they had calculated the gradient.

Question 23

A surprisingly small majority of candidates got part (a) correct by listing the six combinations of names (or at least initials) required. Those who did not get both marks usually got one mark for listing most of the correct combinations but either missed one or two out or repeated one that they'd already given. The candidates who failed to earn any credit either gave just one possible combination, listed the ten different combinations of two students (ignoring the requirement for one boy and one girl) or

wrote a sentence explaining why Piotr's method was not acceptable (rather than answering the question given).
Part (b) presented a greater level of challenge, as expected, although it was still a surprise that over two-thirds of candidates scored no marks on this item. The majority of those who scored no marks added the totals for each person correctly but then divided every total by three (rather than dividing by the number of tests they had taken). Again, there were some candidates who misunderstood what was required of them and gave a written answer about whether Serena's suggestion was appropriate, or which two people they would've chosen without any numerical reasoning. Candidates who scored 2 marks usually did so by calculating mean or median (both were equally acceptable) correctly but then failed to answer the question by giving the names of two students. Very few candidates earned one mark, and those who did usually found correct averages for three or four people but then either missed the other person/people out or used an incorrect method.

Question 24

The vast majority of candidates scored either full marks or no marks on this question. The small majority who recognised that it was a similar triangles question generally showed an appropriate calculation and performed it efficiently to get a correct answer and earn both marks. However, most of the candidates who did not score full marks earned no credit at all, usually because they had attempted to use Pythagoras and/or trigonometry to solve the problem. There were a very small minority who thought that they could use addition and subtraction to find the missing side, giving EF as 47 from either 50–(15-12) or 12+(50-15).

Question 25

Candidates seemed to find this question more difficult than expected, and the marks awarded were lower than on similar questions in previous years.
Part (a) was only done correctly by just over half of the cohort and those who did not get full marks generally scored zero. The main reason for this was that they failed to expand the second bracket correctly, with 12h-14 as the most common result. Those who did manage to expand the second bracket correctly almost always managed to simplify correctly too, although a small proportion over-simplified by stating that $12h^2–2h=10h$.
Part (b) was done slightly better by candidates in general, and it was pleasing to see a greater proportion dealing with the signs correctly, as this had been an issue in previous series. Again, the majority of candidates who managed to secure the first mark went on to earn the second one as well, although there were a very small number who lost the final mark due to arithmetic errors. Those candidates who failed to earn any marks often tried to simplify (usually treating the equals sign as an addition) or failed to rearrange any of the terms correctly.

Question 26

This was one of the most badly answered questions on the paper, with over half of the cohort scoring zero and less than a third of the marks being earned by candidates overall. A large proportion seemed to be unfamiliar with Venn diagrams and showed little understanding of what was expected of them. Of those who failed to score any marks on part (a) hardly any went on to earned credit in part (b), as their answer did not provide them with suitable numerical values to use in a probability.
The majority of candidates who did earn credit on part (a) secured both marks, as there was very little evidence of inaccurate arithmetic.
However, a number of these candidates still failed to earn credit in part (b) as their probability either ignored the values in their Venn diagram or was given in words or as a ratio, neither of which was acceptable.

Question 27

Part (a) proved to be a challenging question, with more than half of all candidates scoring no marks. The majority of these either calculated volume instead of surface area or calculated the surface area incorrectly (often by adding only three, four or five areas and occasionally by assuming that four of the faces had equal areas). However almost all of the candidates who scored one mark for a correct method then went on to secure both marks, as arithmetic errors were very rare.
In part (b) candidates performed slightly better overall as those who had done part (a) incorrectly by finding the volume often went onto use the volume correctly in part (b) to score full marks. Conversely, there were a number of candidates who got part (a) correct but then tried to use their surface area to find density, and hence scored no marks. A small number of candidates scored one mark for finding 480 but then went on to multiply it by 720, or divide it by 720, so lost the second mark. However, there were a significant number of candidates who seemed to have no understanding of density and hence score no marks at all.

Question 28

Performance across the varying parts of this question were very mixed.
Part (a) was done very well by a large majority of candidates, both on (i) and (ii), making this one of the best completed items on the paper.
However, part (b) was done far less well than expected, and less well than in previous years, with over half of the cohort scoring zero on it. Many of these candidates gave an answer of 4 538 000 so do not seem to have read or understood what was required of them. There were a very small proportion who gave an answer that was in standard form but incorrect.
Part (c) was one of the best questions on the paper for differentiating between candidates of different abilities, with roughly equal proportions scoring zero, one and two marks. Those who scored both marks often showed very little working but seem to have found

the answer correctly from their calculator. Those who scored one mark often did so by giving a correct answer but not in standard form. A high proportion of the candidates who scored no marks had divided one of the amounts by the other, rather than multiplying.

Question 29

This question had the weakest performance of all items on the paper with almost three-quarters of the cohort scoring no marks on it, and only around half of the remaining candidates scoring full marks. A large majority of candidates failed to use pi at all in their working, suggesting that they had little understanding of what was being asked of them. Many of these candidates did manage to measurements into the same units but this was not enough to earn any credit. Of the students who did recognise the need to use pi, some used the formula for area rather than circumference (and some even stated that they were intentionally using area too, rather than just getting the formulae confused) while others failed to covert measurements into consistent units correctly. The candidates who used a correct method to find circumference and convert to consistent units usually then went on to score full marks, although some of them failed to secure the final mark because they rounded their answer down to 63, which is unfortunately not quite enough to travel 100m. Answers that were rounded up to the least number of full turns that were needed (ie. 64) were condoned and awarded full marks though.

Question 30

This question was expected to provide a high level of challenge but, even with that in mind, was done surprisingly badly by a high number of candidates and far less well than similar questions in previous years. Almost half of the cohort scored no marks, and many of these appeared to have no idea of how to tackle such a question either. Answers being given without any working out at all were fairly common, and these often had 35 or 235 as a numerator and either 99, 999, 100 or 1000 as a denominator. The remaining candidates generally had a correct method to find their answer, and used it accurately to score both marks, although there were a small proportion who gave a correct answer with little or no working out, which would suggest that they had potentially used their calculators. This was condoned on this paper but centres should be aware that, on questions that state that working must be shown, full marks may not be awarded for just a correct answer in subsequent series.

Question 31

Performance across the various part of this question was very mixed and, whilst generally challenging, the question overall differentiated very well.

Part (a) was done surprisingly badly for a relatively straight-forward question, with only just over half of the cohort getting it correct. Of those who didn't, there was a fairly even split between those who came close (incorrectly including 4 at the end of their answer) and those who had no idea what was required (who generally gave an answer that was an algebraic term, rather than a list of integers).
Performance on part (b) was pleasing, given that this was one of the weakest algebraic topics in previous years, with almost two-thirds of candidates finding the correct answer. There were still a large number who found the correct value but failed to score both marks though, because their answer was not expressed as an inequality. Where a candidate stated the correct inequality but then went on to rewrite the numerical part of their answer on its own on the answer line, full marks were awarded as this was condoned. However, the final mark was withheld when the inequality symbol was incorrectly replaced with an equal sign, which was another common error.
Part (c) differentiated between candidates very well, with almost equal proportions scoring zero, one, two and three marks. Candidates who scored all three marks generally did so with precise, accurate algebra shown clearly in their working. Where two marks were awarded, it was usually either for a correct method without incorrect solutions (often giving -2 and 9 instead of 2 and -9) or for the special case with one correct solution being found (sometimes from a trial and improvement method). Relatively few candidates scored one mark, but those that did usually did so by factorising into two brackets with 2 and 9 but incorrect signs. Of the candidates who scored zero, there were a mixture of those who had no idea what to do (either leaving it blank of just writing a random number/term as their answer) and those who tried to rearrange the equation using all manner of techniques to get to an incorrect answer. There were even some candidates who reached one correct solution from an incorrect method, although this did not earn the two marks for the special case, as correct answers that clearly come from incorrect working do not earn any marks.
Part (d) also differentiated very effectively between candidates, with just less than half of the cohort scoring full marks, but then a roughly even spread of other candidates scoring zero, one or two marks. Most candidates who scored two marks expanded and rearranged correctly but then failed to solve the equation correctly, and either ended up with 49/3 or -3/49 as their final answer. Those who scored one mark usually earned it for at least one correct expansion, although many also completed the second expansion correctly too, but failed to isolate the letter and number terms by dealing with signs incorrectly. Some candidates who scored one mark also expanded correctly but gave their answers over a denominator of 5, 6 or 30. Candidates who scored zero were again split between those who had no idea (so left it blank or gave a random number/term as their answer) and those who tried other incorrect methods to rearrange the algebra, without doing so well enough to earn any credit.

Question 32

This was one of the most difficult questions on the paper and the marks awarded reflected this, with over a third of the cohort scoring zero and only a third of the marks available being secured. A surprisingly large number of candidates knew the formula for the area of a trapezium, but not a parallelogram, which limited them to earning only one mark. Those who did know how to find the area of a parallelogram generally did so correctly, and usually went on to score full marks. Although there were relatively few arithmetic errors seen that prevented candidates from earning the final mark, a significant proportion were limited to two or three marks as they were not able to form or solve their equation correctly.

Question 33

The final question was not as challenging as some may have expected, with almost two-fifths of all candidates scoring full marks and over half of the marks available being secured across the cohort. There were very few candidates who scored no marks on this question, and even fewer who left it blank, which is an indication that the vast majority were able to complete the full paper in the time allowed. Perhaps surprisingly, the trigonometry used was generally better than Pythagoras, and there were even a number of candidates who used trigonometry twice (instead of using Pythagoras) with the triangle on the right. Candidates scoring one or two marks usually did so by forming a correct trigonometric ratio although some then went no further or proceeded incorrectly (sometimes because their calculators were in the wrong mode). A common error with the triangle on the right was to add the square of the given sides (rather than subtracting) which limited candidates to a maximum of three marks. Of those who found both heights correctly, the vast majority went on to secure the final mark too, although there were a small proportion who lost the final mark due to inaccuracy caused by severe and/or premature rounding earlier in the question. Whilst candidates were asked to give answers accurate to 3 significant figures, answers of 1.3 (rather than 1.30) were condoned and awarded full marks, as were answers of 1.30(…) although centres should continue to stress the importance of giving answers to the required degree of accuracy, as this may be insisted upon in subsequent papers. Because a large amount of the working required for this question was done on a calculator, there were a number of responses which lacked evidence of working. This may have cost a number of candidates marks, because the first four marks were only available if methods were shown, or answers were accurate (while there were many cases where no method was shown, and a slightly inaccurate answer was given but then attracted no marks).