Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International Primary Lower Secondary (iPLS)
Year 9 Mathematics (LMA11)
Paper 01

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General Comments

This year's paper appears to have presented candidates with a similar challenge to previous years with a number of the same topics examined in similar types of question that have been used before. This is illustrated by candidates' attainment throughout the paper, where the marks achieved are distributed across the full mark range as they were in other series. Sections A (multiple choice questions) and Section B (short open questions) both had questions that differentiated effectively between candidates of varying ability.

Almost all of the questions across both sections of the paper were attempted by a larger majority of candidates, with only a small number of questions left blank. Most of the questions that were left blank were around the latter part of Section B, where questions were generally more-complex, higher-level topics were being examined and questions involved problem-solving. There may have been some candidates who did not have time to attempt these questions, although very few questions were left part-completed.

The range of questions that involved algebra are still an obvious area of strength for many candidates, while performance on questions involving number work remained consistent with previous series. However, several questions on shape, space and measures or data handling seem to have presented a greater challenge to candidates, despite an improvement in these areas in recent years. These may, therefore, be an area of the curriculum which centres wish to concentrate on as they prepare their candidates for subsequent examination series.

There were a few instances of arithmetic errors on relatively straight-forward questions in this paper that would indicate that candidates are not using calculators to calculate, or at least check, their basic arithmetic. This was not as much of an issue as it was in the previous series, although it was still more evident than it had been prior to that. The vast majority of candidates appear to have an appropriate calculator which enabled them to effectively attempt a number of questions that required them in an efficient manner. However, centres may also want to encourage their candidates to use their calculators to check all answers to ensure that they are not losing marks that they could easily have gained.

A large majority of candidates showed a suitable amount of working on most of the questions, especially in Section B, which was positive as it allowed method marks to be achieved, even where final answers lacked accuracy. Inaccurate answers often came from the basic arithmetic errors mentioned above, but were also due to rounding or truncation errors in several cases. This was usually due to rounding severely, often to the nearest whole number, during early stages of working that led to answers which were not within the acceptable range. It is important that centres illustrate the impact of premature rounding

on the accuracy of final answers and ensure that candidates use values that are rounded to at least three significant figures, where rounding is necessary.

When expressing the final answer to questions, candidates would often have achieved more credit if the full answer from their calculator display had been written out before truncating or rounding, as accuracy marks could then have been secured, even if any subsequent truncation of rounding was overly severe or incorrect.

Section A

As usual, Section A of this paper featured fifteen one-mark questions, each of which had 4 multiple-choice answers. All fifteen questions had three incorrect distractors and one correct answer. Each distractor was chosen as a potential answer that candidates may have found, based on different common misconceptions. The explanation behind each of the distractors can be found in the published mark scheme so centres can use these with their candidates, if necessary.

As is often the case, there was significantly less working shown in Section A. This means it is not possible to know for definite which correct answers were due to fortunate guesses, and which came from accurate methods. It also means that incorrect answers may have come from complete guesses, fundamental misconceptions or minor errors in otherwise correct methods. However, it is important that candidates do use written methods of working on these questions for their own benefit, rather than relying on mental methods or just calculators, as often seems to be the case currently.

The questions in this section are always organised so that the early questions are generally more accessible with more challenging questions towards the end. It is therefore unsurprising that more of the early questions were answered correctly, with more incorrect answers seen on the later questions. However, there were a number of exceptions to this, with Questions 1 and 6 appearing early in the section but being completed less well than most of the other Section A questions. Similarly, Questions 14 and 15 were the last two questions in this section but were completed more successfully than the majority of other multiple-choice questions.

Almost all candidates have clearly indicated their chosen answers to each question in an appropriate manner which enabled their answers to be marked by OMR. There were very few questions in Section A left blank and only a tiny minority of candidates selected more than one answer to any of the questions, which earns them no marks, even if the correct answer was one of those that they indicated.

Section B

The final section of this year's paper, Section B, contained a total of eighteen questions, including eight that had multiple parts to them. All of them were short, open questions which allowed candidates to achieve up to four marks out of the sixty-five marks that were available for this section in total. The marks were achieved for accurate answers, and for correct methods on each of the questions where more than one mark was available. Further details of candidates' performance on each of the question in Section B are below:

Question 16

Most candidates understood the concept of addition for perimeter in Part (a). The majority were able to identify the two missing lengths to give a correct answer of 36cm. The horizontal line caused some issues with candidates incorrectly identifying this as 3 or 4 cm, possibly due to its length relative to the given horizontal. Candidates should be reminded that in questions like this, diagram not drawn accurately reminds them to use their mathematical skills to identify the length.

Part (b) was generally answered very well, with candidates identifying that a kite has angle sum of 360 and one pair of opposite angles is equal. There were some instances where responses came from splitting the shape into two triangles, often through the vertical line of symmetry, sometimes horizontally, but rarely did this method lead to a correct final answer. Candidates seemed to struggle to undo the halving of angles or correctly identify what angles were being used.

Question 17

Part (a) was answered well by the majority of candidates. They wrote down and used the formula to work the gradient. Some gave a negative answer and didn't query it. Several wrote out the equation for the line. Many took advantage of the triangle formed by the straight line and the x-axis so evaluated (2-0)/(8-4). Candidates using the triangle formed by the axes and the straight line were less successful as they often failed to deal accurately with the signs.

Part (b) was also well answered with the majority of responses correct. Some candidates confused x=2 and y=2, but most seemed to understand the concept of the equation of lines parallel to the axes. Where this concept was not fully understood, a variety of diagonal lines were drawn, often going through (2,0) or (0,2). Candidates should be encouraged to draw lines fully on a coordinate grid making use of all the space available, rather than ending their lines prematurely.

Question 18

This question was completed largely successfully, with a majority able to share the quantity correctly using the given ratio. Some candidates didn't read, or misread, the final line of the question and hence gave the largest or smallest share, rather than the difference between the two shares. As always, it is important that candidates read questions carefully and check that their answers satisfy the requirements of the question asked.

Question 19

The vast majority of candidates were able to complete the two-way table in Part (a). There did not appear to be conceptual errors, rather arithmetic mistakes which could have been avoided if a calculator had been used. If not fully correct, candidates generally scored 1 mark for 3 or more values correctly identified.

Part (b) caused some issues though, with many candidates struggling to understand the reduced sample space of selecting a boy at random. Many responses of 9/36 were seen. Candidates should be reminded that simplification of probabilities is not required and also that probabilities must have a value less than 1

Only around a third of candidates managed a fully correct solution to Part (c) and, of those that didn't, about a half were left blank. Those who did attempt the question often showed an understanding of needing to multiply probabilities but either multiplied them incorrectly or multiplied the wrong probabilities. Some got mixed up between where to add and where to multiply whilst others gave answers that were greater than zero. A few candidates rounded their answer and/or gave it as a percentage. Some candidates just considered one possibility, not both, for some credit.

Question 20

Part (a) seemed to present a surprisingly high level of challenge to many candidates, with only just over half getting the mark that was on offer. Almost all candidates attempted the question with the most common wrong answer being -9 which was obtained by subtracting 4 five times. However, this obviously produces the sixth term of the sequence so it's important that candidates read the question carefully to understand that the first term is given so only the next four need to be found. Of the candidates who got the question correct, most just wrote the correct answer while a considerable proportion wrote out all of the first five terms of the sequence correctly. This approach would have helped those who gave an answer of -9

The majority of candidates scored full marks on Part (b) in this question and showed good methods for finding the first four terms. Some candidates are taught a method of looking for an imaginary zero term, which led to some responses of -7, -4, -1, 2, which is incorrect and scores 0. A smaller proportion of candidates struggled to cope with the negative signs on the first two values correctly, so scored only one mark for two correct values.

There were a lot of correct answers to Part (c) and several were with no working out shown. It was common to see both sequences listed, but some did not take the three-digit stipulation into account, so those who used this method often stopped prematurely at the term 31. Most candidates gained some credit in this question by either finding the expression 9n-5 or listing sufficient terms of the other sequence. Finding the nth term was the most common way of scoring one mark but was clear several candidates did not know what to do with it. Most candidates who found 103 identified it as the first common term over 100. A smaller minority of candidates seemed to have no idea how to attempt the questions and did not even continue the sequence that was already given.

Question 21

This question was answered well, although the use of a ruler would be recommended for many candidates who attempted to draw their answer freehand. This was condoned in this series, as long as their intention was clear, but candidates must appreciate that this is inaccurate and that they may lose marks in a similar question that involves reading off their graph. There were some responses that showed a positive gradient, which would have meant the bath filling, often from (0, 0) to (8, 300). Only a very small handful of candidates did not at least attempt this question at all.

Question 22

This was another question which was well-answered by the majority of candidates. Some candidates lost a mark for incorrect notation, often for writing 2,3,5,7 rather than giving their answer as a product. Candidates should be reminded that 1 is not prime so should not be seen in their final answer, even if the method they use terminates at 1

Question 23

Part (a) of this question was done well by a large majority of candidates, most of whom seemed to complete the question on their calculator and wrote just the answer on the line provided, with no working. In most cases this answer was given in standard form, but some wrote it as an ordinary number, and others gave both. In this instance, any format was acceptable to earn the one mark that was on offer.
The relatively small number of candidates who did not secure this mark often showed the most working and may have tried to attempt the question without a calculator. This included a small minority who added the values instead of subtracting.

Part (b) was answered successfully by most candidates. The ones who got it wrong generally saw the value that contained several nines and thought that should be largest. Most candidates who got the answer correct successfully converted all values to ordinary numbers, while those who answered incorrectly did not convert the two standard form numbers to ordinary numbers at all, let alone correctly.

Question 24

This question was done correctly by many candidates, but a significant number did not attempt it at all. Of those who did attempt it, several drew arcs on only one side of the line, and a minority drew arcs that did not meet. However, the vast majority drew perfect construction lines and a correct bisector. This was obviously understood by many candidates who scored full marks but there were several who clearly required further practice on this type of question.

Question 25

Part (a) was one of the most successful questions on the paper with the majority of candidates using an efficient method to get it completely correct. A few got it wrong by not using percentages correctly, often using 10 instead of 100, and a few attempted to calculate a percentage decrease. A small number found the 14% and then took it off, gaining one mark, whilst some candidates incorrectly interpreted it as a reverse percentage question. It would appear that some candidates who lost marks on this question attempted to use the percentage buttons on their calculator but were not able to do so effectively to find the value required.

Part (b) was answered less well, with just over half of the candidates getting it correct. Most responses showed excellent working out but there were others who had minimal working and still gave the correct answer. Some candidates seemed confused and used the increased amount as the denominator and some

left their answer as 119%. Dividing by 61.88 instead of 52 was a common error in working.

Part (c) proved to be more difficult for candidates. Many tried to use a formula but struggled to recall it correctly or made an error in calculation. Various approaches that showed a misunderstanding between compound interest and simple interest were used, with 2700 x 0.03 x 4 and 2700 x 1.03 x 4 being the most common. Several answers were given without any working and, in some cases, showing this working may well have earned the candidate partial credit.

Question 26

Most candidates drew Shape B in the right place in Part (a) of this question, which was answered better than Parts (b) and (c). There were several candidates who showed a lack of any understanding of how to reflect a shape in a given line though. However, there were no particularly common wrong answers.

In Part (b), Shape C was often given one unit further down than it should have been, but several candidates drew it in a seemingly random place that had no apparent link to the question. Some candidates had reflected in the x-axis instead of the line y=1 but there were no other common misconceptions amongst a relative high selection of incorrect answers.

A small number of responses in Part (c) demonstrated good understanding, with a relatively even split between those who described the transformation as a rotation or a reflection. The only common error in Part (c) was the occasional response which missed one of the three elements required in their descriptions. Many wrong answers contained multiple transformations which automatically scored no marks, as only a single transformation was accepted. Where candidates lost marks on Part (a) and/or (b), this question was often left blank and hence scored no marks as well. Many candidates who made mistakes in Part (a) and (b) did not gain any marks in this question even when their earlier mistakes presented them with an easier transformation to describe, such as a translation, which would still have scored full marks if completed correctly.

Question 27

Part (a) was a reasonably successful question that was done well by a majority of candidates. An answer of 0.8 or 800, with or without correct units, were equally acceptable for full marks on this occasion. However, some candidates should be reminded of the need for units with their answers in general. Of those that didn't get the question correct, it was largely because 1¾ was converted to 0.75 instead of 1.75 and very few had any problems in converting between the different units in the question.

There were very few fully correct responses to Part (b) which proved to be a challenging question. Some candidates were able to identify either the lower or upper bound to score 1 mark but, in general, the rounded value being two decimal places long seemed to cause issues for a large number of candidates. It was clear that a large proportion did not understand the concept of bounds so this may be an area of the curriculum that centres wish to spend more time on in future.

Question 28

Most candidates failed to identify the algebra required to answer this question successfully and several did not attempt it at all. Around a quarter of candidates gained full marks but many were confused as to how to form an equation. Several just added the 15 & 24 any further working. Some of those who did try to introduce algebra used different variables for each person and hence failed to formulate a correct expression. For those candidates who did produce an expression with one variable, $x + x+15 + x+24$ was a common error. Of those that did successfully identify a correct expression in one variable, the majority went on to score full marks. There were also a small proportion of candidates who managed to find the correct answer, and hence score full marks, using very length trial and improvement methods. This should not be encouraged as it is not an efficient way of working and it is important that candidates are able to attempt questions of this type algebraically.

Question 29

There were surprisingly few correct answers to Part (a) and a lot left the question completely blank. Many candidates knew they had to add then divide, so added the numbers of visitors or frequencies then divided by the number of columns. Some got the total number of visitors correct but then divided by the number of columns. Several candidates gave an answer that could not be possibly have been correct, so showed no sense of what the mean should look like. There were lots of answers where candidates seemed to be trying to use midpoints which suggests a confusion with estimating the mean of data in a grouped frequency table.

Answers to Part (b) were very varied with many giving written answers where it was difficult to determine their meaning. Most candidates attempted the question and a number mentioned sample size, but there were lots of irrelevant statements too. There were numerous vague comments about not being accurate or reliable, people having different opinions or wasting time. Some candidates earned partial credit for being able to identify that only 8 people were asked, or that people coming out of that cinema would choose that cinema. However, very few communicated effectively that the sample size was too small or that the location was inappropriate or meant this the sample was not representative of the population.

Question 30

Comparatively few candidates got this completely correct as there were many who draw a triangle the correct size but the same orientation as the original. There were very few examples where a candidate used construction lines to find the answer. Most candidates did not seem to understand how to use the centre of enlargement when working with negative scale factors although many earned one or two marks for the correct size and/or orientation.

Question 31

It appears that very few candidates were familiar with the word 'congruent' and failed to appreciate the simplicity of this question. Many gained one mark for the value 11 but, while there were some fully correct answers, there were many inappropriate calculations which unnecessarily involved trigonometry and Pythagoras. Several candidates were clearly unable to link the values to the line notation or make links between the two triangles in the diagram.

Question 32

It was pleasing to see several creditworthy attempts at this question, with many responses identifying trigonometry, selecting the correct trigonometric ratio and substituting correctly. Some were unable to rearrange the equation and so scored only 2 marks instead of 3 due to multiplying instead of dividing. A small proportion correctly identified the need to use sine but then went on to incorrectly use the sine rule. The main source of errors came from the incorrect use of tangent or cosine, although a small number of candidates found creative alternative approaches, such as using cosine on an angle of 42 or using tangent and then Pythagoras correctly. However, as this is not the most efficient method it is not to be encouraged, even though it did often earn some credit in this instance. This question is a good example to show to candidates that showing the working can be very important as those who only used their calculator and wrote their answer down almost always scored no marks, even though their answer suggested they may well have used a method that was almost fully correct.

Question 33

Candidates who were able to form simultaneous equations and use a correct process to eliminate one variable almost always went on to score full marks on this question. Others made good attempts at forming simultaneous equations but gained only the first mark as they did not know what to do from there, or because they tried to add or subtract the equations without multiplying first. However, there were many candidates who did not know how to begin this question. Several candidates had a conceptual understanding of what the question was asking them to do but attempted to use fractional or proportional reasoning when answering it.