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Principal Examiner Feedback

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Pearson Edexcel GCSE
In Mathematics Linear (1MA0)
Higher (Calculator) Paper 2H

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GCSE Mathematics 1MA0
Principal Examiner Feedback – Higher Paper 2

Introduction

The majority of candidates made an attempt to set out their working in a logical manner. When method was unclear or incomplete examiners find it difficult to award credit for working. Candidates using calculators remain too prone to rounding answers to calculations, sometimes inappropriately or prematurely. A greater proportion of candidates are taking insufficient care in writing figures which are ambiguous, which again prohibits the award of marks. The performance on starred questions remains good overall; weaknesses include those cases where comparisons are needed, supported by numerical evidence, or geometrical statements of rules and theorems are needed. Algebraic manipulation was flawed in the work of many candidates, who were not comfortable working with negative values and did not understand the concept of isolating terms.

Report on individual questions

Question 1

Most students answered part (a) of this question correctly, though the absence of working to accompany incorrect answers prohibited the award of method marks. In part (b) most rounded incorrectly, often rounding to decimal places rather than significant figures.

Question 2

Part (a) was usually well done but a significant minority divided 38 in the ratio 3:8 which resulted in answers of 8 or 9. The success rate of part (b) was higher. This is a calculator paper, and success rates were highest when candidates used direct methods to calculate the percentage. Build up (non-calculator) methods were less successful. Candidates who calculated 55% of 80 failed to earn any marks.

Question 3

Many correct answers. A few favoured investigation of equivalent fractions using 21 as a denominator, whilst some tried to add 3/10+5/10+2/7, or using tree diagrams.   Those who realised they had to use 4/14 as the equivalent to 2/7 usually went on to get the correct answer.

Question 4

Amongst the few that did not get full marks were those who produced a drawing of a 5 cm by 2cm rectangle or a 5 cm by 5 cm square (without a dividing line). No marks were awarded for a front elevation or a 3D diagram.

Question 5

Most candidates understood what they needed to do and marks were most frequently lost due to a lack of care and attention to detail. Monetary answers had to be shown with the correct currency units, and written correctly (eg £26.5 is not enough). There were also errors in undertaking subtraction, even neglecting to do it after a currency conversion.

Question 6

A common method that appeared to assist candidates was use of a 2-way table. Others chose to deal with the men and women separately, which again assisted in ordering the information sufficient that it usually led to a correct answer. Some spoiled their good work by giving a final answer of 7 which only represented the number of men who studied French. Weaker candidates often combined a variety of groups (men, women, adults) which could not help to solve the problem.

Question 7

The most common (and successful) approach was to divide the price by the number of plants and compare the resulting figures. The danger was to round answers sufficiently that they ended up being too similar! Many who divided the number of plants by the price interpreted the smaller value as the best (rather than the bigger). Another approach which was usually successful was choosing a common amount of plants and finding the total cost for each tray (eg 10, 50, 60, 100, etc.). Candidates need to understand that a comparison needs to be made using all three items, with comparable figures as evidence.

Question 8

In part (a) most candidates recognised that the coefficient of n was 7, but failed to identify the correct number term, with "+3" or "−3" as the most common incorrect term used. Some weaker candidates gave $n+7$ as their answer. In part (b) quite a few wrote out the full sequence or demonstrated that the 22nd term worked, which was quite adequate. An algebraic approach using $7n-4=150$ usually worked well. Some described the method they would use such as "adding on 7s" which received some credit. Vague responses included those that made some reference to dividing 150 by 7 or using 150 in some other way.

Question 9

Most found an acute angle of a rhombus by considering the angles around the point at the centre of the diagram. Some went no further but gained 2 marks credit to this point, having stated this angle as 65°. A few spoiled their working by using 180° as the sum of the angles of a quadrilateral. Some worked out 360/9 but in many cases the labelling and their explanations suggested that they thought that they were finding an exterior angle of a quadrilateral. It is particularly important for candidates to realise that the instruction "you must show your working" must be adhered to in order to gain full marks.

Question 10

Although many candidates jumped to a conclusion, in order to get full marks their reasoning had to be clear and complete, and it was here that marks were most frequently lost. Many did not convert to a percentage and left 62/80 as 0.775.

The % sign was often missing and just "77.5" stated. Some showed 62/80×100 but left their answer as 77%. Many candidates attempted to calculate the marks required at the boundaries of the given table and while a lot were successful, a lot only worked out one boundary. A common error was to misinterpret the figures and calculate 62% of 80 (giving 49.6).

Question 11

Parts (a) and (b) were usually answered correctly. The common error in (a) was to multiply the indices, whilst in part (b) it was to add them.
In part (c) many struggled with the negative index for a, with many stating it as a^4.

Question 12

Predictably the main error was in calculating the area rather than the circumference. And of those who were finding the circumference a significant number did so using 140 as the radius. Many candidates transferred accurate answers into grossly rounded answers for writing into the exam paper, which sometimes lost them a mark.

Question 13

Most made a first step of doing a distance /time calculation often getting as fat as 1.15… or an equivalent calculation, but then not knowing how to proceed. There were many correct answers from candidates who had a good understanding of what the question was asking and who could work confidently with compound measures and time. Failure to include correct units with their numerical answer was penalised. Errors were also caused by premature rounding, leaving final answers outside tolerance. A common error was to write 26 minutes as 0.26

Question 14

Part (a) was well answered, the most common error being in stating 4 or 21 as the answer, rather than the class interval.

Part (b) was a good discriminator with many getting the correct answer. Some used the lower or upper end of the class interval. Weaker candidates used the class interval width, 50÷5 (=10) or 90÷5 (=18). It was disappointing to see addition or multiplication errors in some work.

In part (c) many good attempts were spoiled by careless error. This could be a failure to use the scale to plot the points correctly, failure to plot at the midpoint, drawing free hand or curves, or joining first to last point. Some only drew the bar chart hey were perhaps hoping to use to draw the polygon.

Question 15

A well answered question. The main error was in premature rounding. Only a few spoilt their Pythagoras by subtracting, failure to take a square root, doubling rather than squaring, or by attempting to use trigonometrically methods.

Question 16

In part (a) there were many correct responses and the vast majority of candidates scored at least 1 mark for the intent to remove the brackets, which was often correctly done. The main error was in not processing both sides of the equation in the same way, perhaps with negative sign errors.

In part (b) there were some correct solutions, but many were unable to resolve the fractions in order to move towards a correct solution. Weaker candidates simplified the left hand side to $3h+6$ from which they could not proceed. Some found a common denominator, usually 6, but the numerator on the left hand side often contained errors, usually $3(h+7)+2(2h-1)$. A significant number of responses did not contain brackets. Generally it was found that most candidates did not clear the fractions as a first step, but worked with fractions until the very end of their solution. Again processing problems resulted in unforced errors.

Question 17

Many correct answers to this question. The only common error in completing the table was use of 15 instead of −15. Plotting was good, though an opportunity to correct errors in the table were lost due to the failure to anticipate the correct shape of the graph. There were many errors in joining the points, with many using straight line segments or curves which missed joining the points.

Question 18

This was the first question on the paper that was poorly attempted. The preferred route taken by candidates was to find either AB or AC, which was nearly always correctly done. Most of these candidates then went on to substitute their values into ½abSinC with just a few using the wrong value for the included angle. A few candidates, having found the slant height, used it as the perpendicular height of the triangle when calculating the area using ½ b×h, resulting in the loss of marks. It was rare to see the triangle split into two right angled triangles and tan54 used to find the height, though those who chose this route usually did it well.

Question 19

This was a well answered question. The only common error in either part was incorrectly placing the decimal point.

Question 20

The most common mistake was calculating 20% of 464 (=92.8) and then having variations of 464 ±92.8 Of those who correctly recognised that 464 was 80% on original price many incorrectly gave 580 as the final answer, even though many had correctly already calculated 116 as the reduction.

Question 21

In part (a) the answer had to be completely correct to get the single mark. Incorrect answers often included decimals and/or had 2 on the outside of the brackets. Others made the error of writing $(2x-3)^2$.   Part (b) was not well answered since most candidates could not isolate terms in m from the other terms. Of those who could, most could not then take out m as a factor. There were many who failed to attempt this part.

Question 22

In part (a) most used the formula for the area of a trapezium and gained the first mark for this; the second mark was more difficult to achieve as the processes used were either incomplete or unconvincing. In part (b) a surprising number of candidates made no attempt to use the quadratic formula to find the value of x. Of those who did, most were able to substitute the correct values into the formula and many were able to complete the process leading to the correct answer. A few candidates lost the accuracy mark by suggesting a negative value was acceptable for the value of x. In some cases answers to the two parts were mixed up or poorly organised. Resorting to trial and improvement did not always help.

Question 23

A well answered question. The most common errors seen were either calculations involving 246, taking the total number of Year 8 students 120, or the use of 531. Candidates need to think about whether their final answer makes sense; for example, answers greater than120 clearly make no sense given the context. Some lost the final mark since they failed to give the answer as a whole number of students.

Question 24

Most candidates took the first step of finding the volume of the large tin; it was encouraging that most were able to remember the volume for a cylinder correctly. Further, most were also able to substitute the correct values. A minority unfortunately spoilt their solution by not using division to find the height of the new tin. Some candidates chose to use similar figures as an alternative process, but this was less successful due to the fact they were unable to scale these up.

Question 25

There were many different approaches to this question, but equally many who chose not to attempt it. A significant number substituted (-1,2) and (2,8) in turn into the equation of line A, hoping to find the point of intersection. Some tried to draw sketches of the lines, but usually these were not sufficiently accurate, and needed to be supported with additional working. Few candidates were able to work out the gradient of the line B correctly. Some appeared to that the lines would only intersect if they were perpendicular. The best solutions came from using the equation of line B as $y=2x+4$ and equating the y-intercept on both lines. Some compared the gradient with equal success.

Question 26

Many candidates started off by using the Cosine Rule with the angle 136 or basic trigonometry, but alone this would not have led to a complete solution. It was rare to find Cosine Rule being used correctly as a first stage. In some cases a start using the Sine Rule was not developed, as a significant number of candidates did not know what to do with it once they had substituted the numbers. Those who did so successfully usually went on to use Cosine Rule or Sine Rule again to complete the solution. Premature rounding spoilt many solutions.

Question 27

The majority of candidates did not consider the areas of the rectangles in the histogram but only used the bar heights in their calculations. Those who showed an attempt to calculate the areas of the bars gained some credit, but some then lost a mark because they were unable to sum their areas correctly.

Question 28

Most candidates did not have the mathematical rigour to find the complete solution to this question. In the best attempts candidates could spot which sides and angles were equal but were either not able to associate them using correct mathematical language or were not able to give acceptable reasons. Some candidates did not focus on the triangles that were congruent and simply attempted to find any equal sides or angles (such as the triangles made using the radius) whether they related to the congruent triangles or not. Only a handful could find the necessary associations, give the reasons for congruency, and give the full reasons using correct language.

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