Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 2F

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General Comments

Students who were well prepared for this paper were able to make a good attempt at most of the questions. It was encouraging to see good attempts on some of the problem solving questions and a good amount of working shown on many questions.
There were some instances where students failed to read the question carefully and for instance on question 8 worked with a method that showed they were only considering one of each of the pies rather than 3 of one and 5 of the other.
Some students used trial and improvement methods for questions such as 17(a) which is probably better than leaving the question out, but is a risky strategy as with no good method, marks cannot be awarded unless the answer is correct**.**

Question 1

All parts of this question were very well answered. The only error that recurred regularly was giving 8 as a square number rather than 36

Question 2

Mostly fully correct responses were seen for completing a frequency table and drawing a bar graph to represent the data. Occasionally only tallies were given in the table or the frequencies given as probabilities, each of which gained only 1 mark rather than 2. Sometimes students went on to give what might have been intended as cumulative frequency but if their frequencies were clear they were not denied the marks. Bar charts were almost always fully correct for 3 marks but sometimes the labelling was omitted or the scale did not start at zero, which lost these students 1 mark.

Question 3

Working with directed number in the context of positive and negative temperatures was familiar to students, who mostly responded with correct answers to both parts.

Question 4

In part (a), most students could find 30% of 30 and 1/3 of 30, add these and subtract from 30 to find the number of red tiles in a given diagram. This gained them 3 marks. The most common error was one of inaccurately working with 1/3 as 0.3, which lost students the mark both for the number of blue tiles and the number of red tiles. Reluctance to work directly with a fraction like 1/3 occurs quite regularly in these papers and students would benefit from realising that their unnecessary conversion to a decimal is likely to cost them accuracy marks. After finding 30%, some students found 1/3 of the *remaining* tiles. Part (b) did require conversion, either from percentage to decimal or from decimal to percentage, before putting five numbers in order of size. Many were able to do this correctly. The most common error was for 0.76 to be placed in the middle of the numbers rather than at the end; it seemed likely that this was often due to a misunderstanding of the requirement, with students putting the three decimal values in order of size followed by the two percentages. If only one error was made, students could score 1 mark.

Question 5

Many students performed well answering questions based on a number machine. Finding the output given an input was the most straightforward part and was rarely answered incorrectly. In part (b), when the output was given and students had to use the inverse operations, a noticeable number simply used the output value as another input. Around half of the students understood the concept of writing a formula for the output, although about half of these were unable to write the final division by two correctly, failing either to put the $3n + 5$ all over 2 or to put the $3n + 5$ in brackets. Thus $P = 3n + 5 \div 2$ was seen equally as often as a fully correct formula and gained a student 1 of the 2 marks.

Question 6

Many students understood the terms vertices and faces and could give the number of these for a hexagonal prism. Around three-quarters of the students drew a sufficiently accurate equilateral triangle in part (c); where the relevant construction arcs were seen, a student scored 2 marks, while a correct triangle with no arcs gained some 1 mark. There were very few who did not attempt to produce a triangle of some size.

Question 7

Parts (a) – (e) dealing with algebraic simplification and solving a simple equation were mostly correct. Part (f) where two squared numerical terms and one cubed term had to be evaluated and divided by 4 was also answered correctly by a good number of students. However, there was also confusion for a noticeable number, who added/subtracted the base numbers and then similarly the powers to give 28^1. Where students had correctly evaluated to give 424 for the value of $4n$, it was surprising how many then gave 24 as their answer, clearly misunderstanding the meaning of $4n$. In part (g), taking out the common factor 3 to factorise a simple expression was not well understood by around half the cohort, although for others this was straightforward.

Question 8

Metric conversions are often done incorrectly but here the majority of students were able to express 3 kg as 3000 g. Many went on to find the weight of flour needed to make different numbers of two different kinds of pie and subtract this from the 3000 g to find the amount of flour remaining. However, a common error was to ignore the number of each type of pie and work out the weight of flour needed for only one of each type of pie.

Question 9

Filling in scores when a spinner is spun and a dice is thrown was very well done by a very high number of students. While many could then proceed to use the table to find the probability of a score less than 6 and of a score of an odd number, there were a noticeable number of responses where it was difficult to see how a student had arrived at their wrong answers. For some, it appeared possible that they were basing their answers on the original numbers on the spinner and the dice, rather than on the scores in the table. There was also evidence that some did not read the question carefully enough; instead of considering scores of less than 6, they gave the probability of a score of 6 or the probability of a score greater than or equal to 6. In part (c), it seemed likely that a few students wrongly took zero to be an odd number.

Question 10
It was encouraging to see some correct responses to this question, which required the setting up of an equation (given information about the perimeter of a triangle), finding the solution of the equation, substituting the value of x to find the lengths of two sides of the triangle and using these to find the area of the triangle. Such students, around a fifth of the entrants, were rewarded with 4 marks. However, many students struggled at the first stage. Of those who recognised that an equation might be needed, a good number tried equating some combination of sides, perhaps with Pythagoras' theorem in mind but mostly without any intention to square. It was disappointing to see some students unable to find the area of the triangle when they had succeeded with the harder part of the question to find the value of x; they did at least gain 2 of the 4 marks. Blank responses began to appear and overall about two-thirds of the cohort were unable to gain any marks.

Question 11
An encouraging number of fully correct responses were seen here for finding the size of an angle, given a diagram involving triangles and parallel lines. It was also pleasing to see many students giving reasons for their working, although on this occasion it was not specifically asked for. Where full marks could not be given, many gained 1 mark for using the fact that angles on a straight line add up to 180^{o} and finding the size of one relevant angle. A few students were not able to gain this mark, as it was not clear which angle they were finding and did not mark it on the diagram. Marking found angles on a diagram is something students should be encouraged to do in such questions. It was noticeable that some students, with knowledge of angle facts relating to parallel lines, randomly assigned such facts to lines that were not parallel. $180^{o} – 76^{o}$ was regularly seen as a first step but even with 104^{o} shown on the diagram this was not sufficient for the method mark, as the angle found was not relevant for finding the required angle.

Question 12
A little under half of the students were able to deal correctly with this two-stage money conversion question, where one given value needed to be multiplied by the conversion factor and a second given value divided by a different conversion factor. Subtraction of one resulting cost from the other was the final step needed, when all 4 marks could be gained. However, as common as the correct method, was using either multiplication or division for both conversions, which resulted in only 1 mark being awarded.

Question 13
Bearings continues to be a poorly understood topic and many responses here produced hopeful but mostly meaningless attempts at incorporating the angles given on the diagram with 360 and 180, without knowing which angle was required to answer the questions. This was particularly true in part (b). The only north line given on the diagram was at R so drawing a north line at T for a question that asks for a bearing from T would have been a helpful first step for students to envisage which angle was needed. However, this was very rarely seen. Blank responses appeared noticeably often.

Question 14
In part (a) most students could correctly work out the area of a given trapezium. Almost all of these used the formula for the area of a trapezium; attempts to split the shape into a rectangle and

triangles were extremely rare. Some students were able to gain 1 mark for at least substituting the dimensions correctly, then evaluating wrongly, but some simply added the given values or multiplied them all, this despite the formula being one of those given on the paper. Part (b) was equally successfully answered, with most students being able to find the height of a cuboid, given its length, width, and volume. This was almost always done with some appropriate working, rather than by trial and improvement, though as always this was seen.

Question 15
Changing a time given in hours and minutes to a time in hours continues to be a concept that is challenging for students at this tier. Thus, 6 hours 39 minutes was more often seen as 6.39 hours than the correct 6.65 hours. Where students used the correct method with 6.39 hours to work out a speed, they were credited with 1 mark, while students who used 6.65 hours could virtually always go on to find the correct speed, for the award of 3 marks. Changing the time to 399 minutes for one mark was a more successful first step for a high number of students but the majority of these could not score the second mark for distance divided by time as they failed to realise that they needed to multiply by 60 as well as divide by 399.

Question 16
A high number of students gained the full 3 marks here for listing 5 numbers with a median of 7, a mode of 8 and range of 5 Some continue to muddle the three terms and use of the mean was sometimes incorporated. Other students were awarded 2 marks for 2 of these conditions being met and 1 mark for only one of the conditions, with a small number not being able to score any marks.

Question 17
In part (a), most students started off correctly by finding the actual profit of $55 when a table was sold and gained the first method mark. Expressing this as a percentage profit was not well understood, with students often dividing by the selling price rather than the original, subtracting 55 from the cost price, simply multiplying or dividing 55 by 100 or other seemingly random attempts. Trial and improvement methods to find an accurate percentage that resulted in $55 were noticed but were invariably unsuccessful. It was not uncommon for the question to be misunderstood and for the cost price to be found as a percentage of the selling price and subtracted from 100. Responses to part (b), working out a sale price where there is a 12% reduction, were mostly fully correct. Finding the $66 reduction was sufficient for the award of the first method mark, although very few who worked this out failed to proceed correctly; only a handful gave it as their answer and some added rather than subtracted.

Question 18
Responses to drawing 3 lines given the equation of each were very variable. $y = x$ was the most commonly correct line. $x = 1.5$ was also regularly seen, although $y = 1.5$ appeared only a little less often. $x + y = 6$ was the line fewest students were able to produce. Quite often, students instead drew the two lines $x = 6$ and $y = 6$. $x + y = 7$ appeared regularly, although this was not a required line. Some students plotted points instead of lines. Without the three correct lines, the required region could not be shown on the diagram; this needed to be fully correct for the mark to be awarded in part (b). A noticeable number of students left this question blank.

Question 19
Around half the students were not able to gain a mark in part (a) when asked to simplify the difference between two terms in a bracket multiplied by 4x and two terms in a second bracket multiplied by 3*x*. Addition was attempted instead of multiplication and the need to square x was ignored. Where students did understand what they needed to do, a common error was failing to realise that the final term should have come from multiplying two negative numbers and thus should have been positive. These students generally scored 1 of the 2 marks. In part (b), finding the value of an index number in an equation proved difficult for the majority, although just under a third gave the correct answer. Where students showed some understanding, the most commonly seen error was effectively to multiply y^5 by y^6 instead of dividing. Others who began by trying to multiply y^{13} by y^6 more often multiplied the index numbers rather than adding them, then dividing by 5. In trying to solve a linear inequality in part (c), it appeared to be the signs that caused most issues; thus inequalities involving $9t < 1$ (or -1) were seen more often than the correct $5t < 15$ When an inequality, correct or otherwise was given in part (i), most could not use conventional notation to represent this on a number line. There was confusion both over solid and open circles and with which way the arrow should point and a few non-responses.

Question 20
Part (a) asked for the value of y^o Only a minority knew the answer, with both *y* and 0 featuring regularly as incorrect responses. Part (b) proved inaccessible to all but a handful of students. Values were given in standard form with different powers of 10 but the implication of this was lost on most students. So a common approach was to add the 9.6 and 6.4 from the numerator and divide by 3.2 from the denominator, then add and subtract the powers of 10 in a way that made no mathematical sense. Many other equally invalid combinations of figures were also seen.

Question 21
Here students needed to multiply a mean weight by the number of cocoa pods to find the initial total weight and similarly, once an extra pod was added, to find the new total weight. Subtracting then gave them the weight of the extra pod. Just under a quarter of the students were able to do this for 3 marks. However, by far the most common working seen was to divide the mean weight by the number of pods and subtract these values; simply finding the difference between the mean weights also occurred regularly. Thus the majority gained no marks. This is a familiar style of question so it was a little surprising that so few students were able to access it successfully.

Question 22
Also perhaps surprisingly, but encouragingly, was the relatively high numbers of students who made good progress with finding the area of a circle not covered by a triangle drawn inside it. There was no guidance as to where to start but many recognised that Pythagoras' theorem was needed to find the diameter of the circle. This gained the first two method marks. Finding the area of the circle or the triangle gave the opportunity for another mark, the latter providing some students with their only mark. Those who calculated both these areas invariably went on to subtract and to give the correct answer. Inevitably at this stage of the paper there were some blank responses and also somewhat random working using the numbers on the diagram and sometimes incorporating 90^o

Question 23
This was the second question where many students were unable to gain any marks. *A* and *B* were each given as a product of prime factors and students were asked for the LCM of *A* and *B*, with their answer to be given as a product of powers of prime factors. It was disconcerting to see large amounts of working, often multiplying out the given products; sometimes working stopped there but sometimes sadly followed by an attempt to write the resulting values as a product of primes! Other incoherent working showed that most students had no real grasp of what this question required, as did the non-responses.

Question 24
A little more understanding by students was apparent in some of the working seen here; although the large majority could not gain any marks, the full 3 marks were awarded occasionally. The ratio of the number of people working for a company in Teams *A* and *B* was 3:4 and students needed to find 4/5 of 3/7 and 24% of 4/7 and add these values to find the fraction of people working full time. Where students chose a 'real' number of people to work with, it was pleasing that they realised that a multiple of 7 was helpful; thus 70 and 49 were the numbers most often seen. Of these, some progressed as far as finding 4/5 and 24% of their numbers for 1 mark, while others were able to give, for example, 33.6/70 for the second method mark. Noticeably, many could not then convert this to a fraction in its simplest form so could not gain the final accuracy mark.

Summary

Based on their performance in this paper, students should:

- Know how to work with time in hours, for example 6 hours 39 mins = 6.65 hours
- Take care with signs when using the formula to solve a quadratic equation
- read the question carefully and review their answer to ensure that the question set is the one that has been answered
- make sure that their working is to a sufficient degree of accuracy that does not affect the required accuracy of the answer.
- Use correct notation when showing the range of values for an inequality on a number line
- Know circle formulae and in particular not get mixed up with the formula for area and the formula for circumference

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