Examiners' Report

Principal Examiner Feedback

January 2018

Pearson Edexcel International GCSE

In Mathematics A (4MA0) Paper 2F

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Overall this was a very accessible paper for most students.

There were fewer blanks than have been seen in the past.

Students generally showed a satisfactory amount of working, although lack of this in some places caused a number of students to lose marks.

Working with a fraction of $\frac{1}{3}$ is confusing for some students where they get it mixed up with 30% and time calculations continue to be a big problem to some where they use 100 minutes in an hour.

Report on individual questions

Question 1a

This presented few problems, with most students gaining both marks for a simplified fraction and some gaining one mark for a correct fraction left unsimplified.

Question 1b

Most gave the correct answer for the fraction of the triangle not shaded, although $\frac{1}{7}$ was seen on a few occasions rather than $\frac{7}{10}$

Question 1c

Most could give this decimal correctly as a fraction.

Question 1d

Most students could write $3\frac{1}{4}$ as a decimal; 3.4 was occasionally seen.

Question 2a

Students mostly gained the mark for this question.

Question 2b

Almost all responses were awarded both marks for correctly interpreting two values from a pictogram and going on to find the difference between them.

Question 2c

While the large majority of students in part (c) were able to find the sale price of a television which was reduced by $\frac{1}{3}$, mostly by finding $\frac{1}{3}$ and then subtracting from the original price, a noticeable number started by incorrectly equating $\frac{1}{3}$ to 30% or 0.3 and so were not able to gain any marks. Of those who began correctly, a significant number gave $\frac{1}{3}$ of £549 as their final answer, gaining them only one mark. A few students simply subtracted 0.3 or 0.33 from 549

Question 3ab

Most students could find the area and perimeter of the shape drawn on a grid, although it was not uncommon for either to be just 1 out or to have got the two concepts the wrong way round.

Question 3c

Most students knew the shape had one line of symmetry.

Question 3d

Most students know that a hexagon is a 6-sided shape and were able to sketch one, although octagons and pentagons were regularly seen.

Question 4i

Most students correctly picked out unlikely as the correct word.

Question 4ii and 4iii

It was rare to see an incorrect response in (ii) for marking a probability line at 0 for an impossible event. Where the line required a cross at ½ in part (iii), there were slightly more errors but again this was rare.

Question 5a

Accurate measurement of a line of 5.5 cm for one mark was well done and most were able to give cm as the unit of measurement to gain the second mark. A handful worked in mm. Where the measurement was not sufficiently accurate to gain a mark, a number of students were able to gain one mark for stating the appropriate unit of measurement.

Question 5b

Students find terminology linked to the circle difficult to remember and on this paper the responses were no exception. ‘Diameter’ was often correct, but ‘chord’ and ‘segment’ were generally not.

Question 6abc

In part (a) the majority of students could correctly state the mode, although a few other statistical calculations were seen.

In (b), finding the range from a set of 7 numbers was correctly done by most, with only a few students attempting to find a different statistical value or working with incorrect values.

Knowing in part (c) how to find the mean of these 7 numbers was also well understood and again only a few responses showed the calculation of a different statistical value, usually the median. Using a calculator to add the values from the list and then dividing by 7 produced a few wrong answers as students failed to consider that the total of the 7 numbers needed to be worked out before dividing or to use brackets around the 7 numbers. The majority, however, showed the total in their working and went on to find the correct answer.

Question 7abc

In (a), finding the cooking time for a 1500 gram piece of meat that required 40 minutes for every 500 grams plus an extra 15 minutes produced many correct responses, although a common error was to include 15 minutes for every 500 grams. When they did this, students could still gain the first method mark for understanding that they had to divide 1500 by 500.

In (b), given the cooking time and working back to the weight of the piece of meat proved much more problematical. Conversion of 3 ¼ hours into minutes was an initial stumbling block for some, who interpreted 3.25 hours as 3 hours and 25 minutes, and then needing to deal with the extra 15 minutes was a further hurdle. Much seemingly random working appeared. However, a pleasing number showed a clear and correct method and were able to gain full marks.

In (c), working out the time 1 hour and 50 minutes before 13 30 produced a variety of times but many correct ones. A common error was to go back 2 hours to 11 30 but then to subtract rather than add the ‘extra’ 10 minutes, hence answers of 11 20 were seen regularly. This did gain one of the two marks, as did an incorrect hours value seen with 40 minutes.

Question 8

Given the cost of one adult ticket and the total cost for 2 adults and 3 children, and asked for the cost of one child ticket, was a well done question and many students were rewarded with full marks. A regularly seen error was to find the total cost for the children’s tickets, for one method mark, but then to divide this by 2 instead of 3.

Question 9

In (a), finding two common factors of 12 and 18 produced mostly correct responses, with occasionally multiples shown rather than factors. A handful of students could only give one correct and one incorrect value.

Part (b), where a common multiple was required, was much less successful, with more students giving another factor rather than a multiple.

Question 10

Subtracting the value of the two given numerical angles in a quadrilateral from 360 (to equal 245) gave many students the first method mark, although subtraction from 180 or other incorrect values was seen. The other two angles in the quadrilateral were given algebraically as $2x$ and $3x$ and a pleasing number of students were able to divide 245 by 5 to find the value of x and gain full marks. Many, however, simply divided 245 by 2 or used a copious variety of invariably unsuccessful trial and improvement approaches.

Question 11

Finding the volume of a triangular prism produced a good number of correct answers but seen equally often was the volume of a cuboid of the same length, width and height. Sometimes dimensions were added, usually with some multiplication following. Attempts at calculating surface area were not given any credit.

Question 12abcde

Part (a) had a high success rate, with students able to substitute values into the given expression and evaluate it correctly. A small number do not understand that $3d$ means $3 \times d$; some simply wrote the value of d alongside the 3 to produce a 2-digit number or used $3 + d$

In part (b) simplifying an expression with two terms in x and 2 terms in y was straightforward for many students. Where errors were made, this was almost always with the positive and negative signs, allocating these incorrectly to the terms.

The majority of students in part (c) successfully solved a two-step linear equation. The most common error was to take $4t$ as $4 + t$.

In (d) many students were successful; most understood the need for brackets, but not always with the correct factor outside.

Most students successfully gained the mark for part (e) but a few got confused by the squared term, often putting $3p - 3p$ rather than $2p^2 - 3p$.

Question 13

In part (a), writing the ratio of the weight of two ingredients from a recipe was well done, with a small number of students losing a mark for not giving the ratio in its simplest form or for writing the values the wrong way round. This question was assessing ratio so working in fractions was not given any credit.

The problem of having a limited amount of two ingredients and working out the greatest number of cakes that could be made was done successfully by a high number of students. Others only considered one of these ingredients but were able to gain a method mark for their calculation. One surprisingly seen error was to equate 1½ to 0.5 and so divide the 8 lemons by ½ instead of by 1½ Some students added the results of their two calculations rather than choosing between them for the greatest number of cakes.

Question 14

Many correct responses were seen in part (a) where the given fractions needed to be written in order of size. Where a method was shown, which was frequent, this was almost always to convert the fractions to decimals rather than changing them to fractions with a common denominator. Often this was sufficient to gain one mark when the fractions had not been written in the correct order.

Division of two fractions in part (b) was well known by many, both by multiplying by the reciprocal and by writing the fractions with a common denominator and showing division of the numerators. Where one of these methods was applied, a mark was sometimes lost by not showing the interim fraction.

Overall students in part (c) found the subtraction of two mixed numbers more challenging than the division but a pleasing number of correctly worked responses was seen. Where full marks were not scored, one mark was often awarded for the initial step, most often which was converting both mixed numbers to an improper fraction. Using a common denominator could gain credit either for the first method mark or the second. As with part (b), a mark was sometimes lost by not showing sufficient working and interim fractions.

Question 15

A good number of students could write an algebraic formula for the cost of buying c pens at 24 cents each and r rulers at 37 cents each and gained three marks. Some omitted the T = and lost one of the marks. Equally frequently as the correct answer, T = c + r was seen, which was awarded one mark. A few students lost the final mark for incorrectly combining the terms in their expression. While most understood what was required here, some students attempted to use numerical values to try to work out an actual cost.

Question 16

While a very high number of students could work out a time given a distance and a speed, and thus gained one mark, very few knew how to convert 0.3 hours into minutes. This was regularly interpreted as 30 minutes, 3 minutes or 20 minutes (from assuming that 0.3 equals 1/3). Those who did realise it was 18 minutes were able to score a further method mark and the accuracy mark.

Question 17

Finding the position of a point on a scale drawing given the distance from one point and the bearing from another proved challenging for a number of students, although correct responses were seen regularly. Working out the required distance from the scale given was the best attempted part, with a mark awarded either for seeing the correct measurement written or from evidence on the scale drawing of the correct distance. There were fewer successful attempts at showing the direction of the required point, some it would seem from not understanding the concept of bearings and probably some from not working sufficiently accurately, possibly due to not having a protractor. A few students correctly indicated both a distance of 5.5 cm from *B* and a bearing of 220° from *C*, gaining the two method marks, but were unable to combine this into a final correct position for *D*. A high number of apparently randomly placed points was also seen and blank responses were not uncommon.

Question 18

Given the diameter of a circle, students were asked to work out the circumference and the majority were able to do so. Common errors were to calculate $\pi \times$ radius or $2 \times \pi \times$ diameter or to find the area of the circle.

Question 19

The responses here showed a good knowledge of rotation, with many images rotated correctly for both marks. One mark was scored regularly for an image rotated about the wrong centre and sometimes for an anticlockwise rotation. Those students who did not understand rotation often drew a randomly orientated congruent image – blank responses were quite rare.

Question 20

Given that the probability of taking a red counter from a bag was $\frac{1}{12}$, a fair number could work out that the probability of taking a blue or white counter was $\frac{11}{12}$ – this could be expressed in this form, as a decimal or by two fractions that added $\frac{11}{12}$ to and gained the first method mark. However, this was as far as many could progress, other than assorted attempts using trial and improvement. Few realised that this value needed to be divided by 4 to find the probability of taking a blue counter, given that the probability of white was three times that of blue. However, there were students able to work this through, giving either a fully correct answer written in an acceptable form for three marks or arriving at $\frac{2.75}{12}$, which gained both the method marks.

Question 21

Part (a) required students to reduce 62 million by 14.5%, which many were able to do. A common error was simply to find 14.5% of 62 million and give this as their answer. Too many students assumed they needed to write 62 million out in full before starting the percentage calculations and made their working unnecessarily complicated, and sometimes incorrect due to the wrong number of zeros. If they were consistent with this error, their final answer was often able to gain two of the three marks. A variety of other errors appeared, including subtraction of 14.5 from 62

Part (b) asked for a percentage decrease and many students began by working out the difference between the values for one mark. Where this was then used with the original value and changed into a percentage, further marks could be gained. A high number of students, however, simply divided their difference by 100 and gave this as the answer. Others used a trial and improvement approach, invariably unsuccessful, and working that seemed quite random also appeared. A surprising number of students added the two values and divided by two, apparently calculating the mean of the two values, perhaps simply because these values were themselves the mean number of texts sent in each of two years.

Far more correct answers were seen in part (c), for the total number of minutes calculated from grouped data given in a table. Correct use of the midpoints and the sum of the products led often to the correct total, although a noticeable number of students penalised themselves by going on to calculate the mean. Using a point within the class intervals other than the midpoint allowed some students to gain one method mark. Giving the sum of the frequencies and the sum of the midpoints were regularly seen errors.

Question 22abc

Many students could correctly list the set required but some were clearly confused between the intersection and union of sets.

Asked in part (b) if 20 was a member of set A, the majority of students wrongly stated that it was, because it was an even number and set A was even numbers; the error here was failing to recognise that the universal set contained only the numbers 1 – 12. A variety of explanations that did indicate why 20 could not be in set A gained credit.

Finding exactly three correct members for a set C, given various conditions, was more successfully answered, although many responses could only gain one of the two marks available; this occurred where they gave more than three values, all of which were potentially acceptable, or they omitted the essential 7 or they gave two correct values with one incorrect.

Question 23ab

In part (a), the simplification of an expression with indices produced a good number of fully correct solutions for two marks and partly simplified expressions for one mark. The main error seen very regularly was the multiplication and division of the indices, rather than the correct addition and subtraction.

Expanding two brackets and simplifying the expression is clearly a familiar topic for a number of students, who scored either both marks or one mark for the expansion without correct simplification. Most often it was the positive and negative signs that was the problem but incorrect combining of the terms also occurred. The other error that was particularly noted was an expansion that produced only two terms.

Summary

Based on this paper, students should:

- carefully learn terminology linked to the circle
- know the difference between mean, mode, median and range
- know the difference between the intersection and union of sets
- practice more carefully algebraic techniques using negative signs
- practice work on fractions, especially showing every stage of working