Examiners' Report
Principal Examiner Feedback

Summer 2017

Pearson Edexcel International GCSE
In Mathematics A (4MA0) Paper 2F

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In general, students found the majority of this paper accessible, with those questions at the end of the paper proving to be quite challenging for several students, as one would expect.

Students performed very well on the questions involving number at the beginnning of the paper as well as some of the basic algebra and the bar chart. Questions involving terminology of shape or probability were often less well done with students getting mixed up with terms such as 'edeges', 'vertices' and 'faces' as well as the probability terms of 'certain', 'likely', etc. It was good to see the vast majority of students showing clear working and maximising their mark potential; this is still an area that a few students should work on.

The paper provided a good range of questions which gave students the opportunity to show their skills across a variety of different topics.

Report on individual questions

Question 1

(a) Most students were able to put the given integers in order of size. Some separated them with less than signs (<) and some commas – these were not necessary, but the students gained full marks anyway.

(b) The majority of students were able to arrange the given decimal in order of size, but some students thought 0.407 was greater than 0.8

(c) Several students were able to write $\frac{3}{5}$ as a decimal; a common incorrect answer was 3.5

(d) 0.9 written as a percentage was often well done. Some students thought that it was 9% rather than 90%

(e) many correct answers were seen for the number halfway between 0.3 and 0.4 but some students left the answer blank and a variety of incorrect responses such as 0.1, 0.03 and 5.3 were seen. Most students showed no working but a few gave $\frac{0.3+0.4}{2}$

Question 2

(a) The correct answer 'cone' was frequently seen. We also awarded full marks to 'circular based pyramid' which was seen sporadically.

(bi) The correct answer of 'prism' was given by the majority of students. We also awarded full marks for 'triangular prism', but 'rectangular prism' scored no marks. Regular incorrect answers were 'trapezium' and 'polygon'.

(bii) Many students were able to give the correct number of vertices for the shape, but sometimes they gave the correct number of faces (5) or edges (9) instead and gained no marks.

(biii) The majority of students knew there were 9 edges and gained the mark. A few gave the correct number of vertices (6) or faces (5) and lost the mark.

(c) Many students were able to give the correct answer of 12 and if they did not give this they were frequently awarded a mark for 6, 8 or 10 for a partial method. The mark for units was an independent mark, and although a fair few gave cm^3, there were a lot of responses giving no units at all and many giving cm^2.

Question 3

On the whole, this question had a high success rate with many students gaining all 5 marks. For parts (ci) and (cii) a few students gave the number of symbols rather than the number of goals scored.

Question 4

(a) Although 1 mark for the award of 'pentagon' was the modal mark, other commonly seen answers were 'hexagon', 'heptagon' and 'octagon'.

(b) The majority of students were able to mark a pair of parallel lines on the diagram. A few also put arrows on the two left hand sides of the polygon and lost themselves the mark.

(c) Many students were able to draw a triangle congruent to the one given – we saw reflections, rotations and translations with some students drawing in the line of reflection; any of these gained the mark. A few showed an enlargement and gained no marks.

Question 5

(a) The correct answer of \$11.28 was often seen, but the next popular answer was \$17.11 where students had calculated the change from buying only one of each item; we awarded a special case of 1 mark for such students. Students must be reminded that we rarely set 'shopping bill' questions requiring just one of each item and they must read carefully. A few students made a single error in the number of items and could pick up 2 method marks if their working was clear.

(b) Most students knew that this calculation meant they needed to divide 50 by 2.40 and gave the correct answer of 20 but some did not realise the significance of the answer and gave either 20.83.. or 21 as their answer. Some worked out multiples of 2.40 and got to the sum $20 \times 2.40 = 48$ and gave 48 as their answer. As long as they had clearly shown their working we could award a method mark, but if they had a range of trials with nothing chosen, no marks were awarded.

Question 6

While a good number can convert units in the metric system, many struggle to remember the conversions needed. For 4.5 metres written as centimetres, frequently occurring wrong answers were 45, 4500, 0.45 and even 405. 8900 grams changed into kilograms was seen as 89, 890 and 0.89, however a good number wrote the correct value of 8.9.

Question 7

(a) The correct answer was generally given, but we saw all the other fractions given as the answer in equal measure.

(b) The majority of students know how to find a fraction of an amount, so the correct answer was seen in most cases.

(c) If students did not pick up both marks for simplifying the fraction of red cars in the car park, they were mostly able to pick up a mark for an unsimplified fraction. A few thought we were trying to catch them out and gave the fraction 'not red' and must remember to read questions carefully. Some students also mixed up the numerator and denominator and gave an answer of $\frac{240}{96}$ or $\frac{5}{2}$

(d) The majority of students were not able to find the number such that 8 was $\frac{2}{9}$ of it. Many just found $\frac{2}{9}$ of 8, giving 1.77...as their answer. Many responses were blank as students knew what was asked,

but did not know the calculation required. A few gained the correct answer from trial and improvement.

Question 8

(a)(i)(ii) The majority of students were able to pick out the correct word to describe the likelihood of each event.

(b)(i)(ii)(ii) The majority of students were able to gain full marks for the probabilities of the 3 events required. A few thought they had to give the correct word, but must realise that when we ask for a probability we are requiring a number (fraction, decimal or percentage) whereas when we require a word, we ask for a 'word that best describes the likelihood of each outcome' or similar.

Question 9

(a) Most students were correctly able to work out the cost of a taxi journey of 12 km by following the instructions given in the rule.

(b) Using the reverse of the rule was more challenging for some students. Some students were awarded one method mark only for knowing that reverse operations needed to be used, but not knowing the correct order in which they needed to be applied. Two marks were awarded for the student who knew the correct reverse operations and also the order. Full marks were awarded to the student who could follow the reverse operations through and gain a fully correct answer. The working needed was $(13.45 – 1.45) \div 0.6$ but those who did not use brackets or did not calculate the values as they went through gave the incorrect answer because of BIDMAS rules. Working with the 20 embedded was also seen quite frequently, i.e. $20 \times 0.6 + 1.45$, and as long as the correct answer was selected full marks could be awarded. However when students used this method they frequently gave the answer as 13.45 the cost given in the question; they were able to gain the method marks.

Question 10

Several students were able to gain the correct answer to this angles around a point question. Many showed unorganised working and few put the values into an equation. Some did not realise that both angles marked 'x' should be the same value and gave them values that amounted to the total for $2x$, but not the same value each. Incorrect solutions often used 180° around a point rather than 360°.

Question 11

(a) Most students were able to write down the correct coordinates for A with just a handful writing the coordinates the wrong way round.

(b) Most students could plot $(-4, -3)$ with just a few plotting $(-3, -4)$.

(c) Many students could not draw the line $x = 3$, with many showing a line segment, a dot or a cross at $x = 3$ and some drawing $y = 3$.

Question 12

(a) Some students managed to gain full marks on this question, with most gaining at least 1 mark for a correct method to find an area of a rectangle. Of those that gained no marks, the most common incorrect solution was to multiply or add all 4 lengths given in the question together. A number of students struggled to divide the shape up correctly with the correct measurements, some thinking that the 18 was divided into 9 + 9 was common.

(b) This question puzzled many students, with 45, the length × width of the cuboid often being given as the answer; this was awarded 1 mark. A few knew they had to divide the volume by something and

360 ÷ 9 or 360 ÷ 5 gained a method mark also. The correct answer often came from working that showed length × width × height = 360 and students working from that, rather than height = volume ÷ (length × width)

Question 13

(a) Many students struggled with the pie chart and finding the number of people who had come to Dubai on business. Students thought they should be using 100% rather than 360°. Other incorrect responses just gave 105, the angle on the pie chart for business. 60 was also frequently seen where student divided 240 people by 4. Some students started with a correct calculation such as 360 ÷ 240 = 1.5 and continued with 105 × 1.5 rather than 105 ÷ 1.5 and gained no marks. Clearly this topic is one where many students lack understanding.

(b) It was rare to find a correct answer for the angle in the pie chart for the 120 out of 300 people who said they had come to Sri Lanka for a holiday. There were several blank response and many who had little idea of what to do, such as subtracting the 120 people from 360°. Some used the correct numbers but in the incorrect order, e.g. 300 ÷ 360 × 120. Occasionally a partial calculation was shown, such as $\frac{120}{300}$, with nothing else.

Question 14

(a) For those who knew the meaning of the intersection and union symbols this question was quite straightforward, but many got them the wrong way round and some did not have a correct understanding of the symbols.

(b) Some students clearly had no idea of what was required here and often left the answer space blank or gave a vague meaningless response. A significant number did not recognise the notation, particularly the empty set symbol.

Question 15

(a) Students at this level often struggle with a negative number to substitute for a squared term. This question was no exception, with many incorrect solutions and many not gaining a method mark as they did not show the substitution $(-3)^2$. A few knew they had to put brackets, but incorrectly showed (-3^2) with the squared inside the bracket. The few that did include brackets generally went on to gain 2 marks.

(b) Some students were able to see this equation correctly through to the end, but some were only able to gain 1 mark for either expanding the bracket correctly or using a correct method to solve the equation from an incorrectly expanded bracket. 2 marks were rare as the students who were able to get so far through the problem were able to get to the correct answer. Working such as $13x = 2$ was common where students just added the $\underline{x}$ terms and the numerical terms in front of them, disregarding the equals sign.

(c) Many students were able to correctly give the correct possible values for y. Those that did not gain 2 marks, were frequently able to gain 1 mark for a list with one error or omission, or for misunderstanding the signs and giving a list including −2 but not 3.

Question 16

(a) Most students were able to use a correct method to find the number of rupees that Lyn will get when exchanging her money. A few, unused to dealing with such large values for money, incorrectly

inserted a decimal point; these students were awarded a method mark for the correct digits 24250 or seeing 250 × 97

(b) Most students realised the need to divide the rupees that Lyn had by 93.5, but some failed to read carefully and only divided 500 rupees by 93.5, rather than (4 × 500) ÷ 93.5; these students were able to benefit from a method mark. Others managed to get as far as 4 × 500 (=2000) to gain 1 mark, but did not managed to go any further.

Question 17

Many students do not know how to find the midpoint between two given coordinates and we saw several different incorrect attempts, e.g. summing the x coordinates and y coordinates, subtracting the *x* coordinates and *y* coordinates, summing the *x* and *y* coordinate together and a few inaccurate diagrams trying to plot the points A and B. If students picked up a mark, it was generally for the *y* coordinate being correctly given as 7; the *x* coordinate of −1.5 seemed harder to find.

Question 18

(a) This was quite a familiar question for this award, and several students were able to give the correct answer of 6. A few gained just M1 for giving the answer as $\frac{6}{20}$ and students must note when a number is required and when a probability is asked for.

(b) This part of the question was quite challenging for students at this level and many, after being told the probability that she will lose is three times the probability that she will win, just divided the probability of the remaining games (0.7) by 3, rather than by 4. Some who were able to get the correct probability continued to multiply by 20 and gave the number of times she would expect to lose; again reading the question carefully is essential.

Question 19

There were 3 marks available for the writing of the formula for this question. The vast majority of students knew enough to gain at least 1 mark and this was frequently for $T=m+g$. Many gained 3 which was a very pleasing response.

Question 20

(a) Showing the adding of fractions is frequently seen as a question on this award, and many were well versed in the steps that needed to be taken and shown in order to gain full marks. A few seemed to have little idea and tried to pretend to us that they could 'show that' without adequate working for the award of the marks. The use of decimals was sometimes seen but was awarded no marks.

(b) We saw several good attempts worthy of full marks, but certainly less than for part (a). The added complication of the fractions being mixed numbers confused some students who did not know where to start. Sometimes we saw the correct improper fractions but then they gave $\frac{5}{3}\times\frac{31}{15}=\frac{31}{9}$ without showing the cancelling or intermediate step of $\frac{155}{45}$; these students were awarded 1 method mark. Some candidates tried to find the common denominator, bur failed to follow this with a correct multiplication. It was essential that students showed all steps, rather than what the calculator gave, in order to be awarded full marks.

Question 21

Students invariably struggle with angles in polygons and all but a handful failed to gain full marks. A few were able to benefit from a method mark, usually for showing the method to find the exterior angle or giving 24 as the exterior angle. Several who had got this far failed to know how to continue. The majority of the few successful students used 360/24 to find the correct answer.

Question 22

Students gaining full marks for this question was quite unusual, although there were a number. For students who had some idea what was involved, 2 marks was quite common and this was for finding the amount of money Ned originally had from the sharing. Finding the percentage was then the more challenging part. A significant number of students tried, with varying success, to use the 'build up' method to work out the percentage. Sometimes this led to an acceptable answer. A few students failed to divide the money into the 12 shares, but instead divided 420 by 4, then 420 by 5 and then 420 by 3, the share that each got, rather than dividing 420 by (4 + 5 + 3).

Question 23

Students found this question very difficult and all but a few failed to gain marks. Many did not realise that adding the two equations would result in the terms in *y* being eliminated and tried to multiply the equations unnecessarily, but often got into confusion and didn't know whether to add or subtract. Dealing with negative signs often caused problems.

Summary

Based on this paper, students should;

- Learn mathemtical vocabulary, for example, edges, faces, vertices
- Read questions carefully
- Learn symbols linked to sets, e.g. union, intersection & empty set
- Learn metric conversion
- Ensure clear working is shown for questions worth more than 1 mark

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