Examiner's Report

Principal Examiner Feedback

Summer 2018

Pearson Edexcel International GCSE

In Mathematics A (4MA0) Paper 2F

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Introduction

Many students appeared unprepared for this examination. Significant weaknesses were displayed in many areas, although algebraic manipulation still appears to be a strength. There were some questions on the paper (6, 7(c), 11(b), 12(c) and 13) which, although not mathematically demanding, required students to reason, so it was pleasing to see some correct answers to these. Students were not strong on writing one number as a percentage of another (Q17), nor were they very clear on how to tackle the different variations of ratio problems (Q20).

Question 1

Students were able to extract and apply information from the table. Parts (a) and (b) were very well answered, although the expected answer to part (b) of '3 hundred' rather than 'hundreds' was not always seen. In part (c) working out the distance was not a problem for most, although a few extracted wrong data or found the sum of correct data. In part (d), there were a few students who probably thought that 100 metres make a kilometre.

Question 2

It was surprising to see so many wrong answers to parts (a) and (b). Some students drew arrows on each side of the quadrilateral or on the two perpendicular sides. The obtuse angle was often misidentified with either the acute angle or even the reflex angle. The answer to part (c) could be found just by counting squares and half squares, but many just gave the answer as 9, presumably from 3×3. In part (d) many students confused the x and y coordinates and so plotted in the wrong place.

Question 3

Most students made good replies to parts (a) and (b). Part (c) proved to be a little more of a challenge as they had to interpret the full pictogram. Most tried to do this day by day to produce a list which was 24, 20, 4, 18 and the given 16, followed by addition. The main error was with counting the partial icons with 20 (from Tuesday) misread as 18 and 18 (from Thursday) misread as 17. The alternative method of finding the total number of icons and then multiplying by 8 was rarely seen and when it was, proved to be less successful.

Question 4

All parts were usually answered correctly. Some thought the answer to part (a) was 0.75, or at least put their cross there. On part (c) some put their cross at 0.5, presumably not understanding the meaning of the phrase 'either…or' in this probability context.

Question 5

Part (a) was almost always correctly answered although a few were penalised when they added 'pm' to their 15 20. Similarly, the success rate on part (b) was very high. Part (c) proved to be quite a challenge. Although many students got the correct answer of 2 hr 40 min, there were a variety of many other answers. Most common amongst these were 3 hr 20 min and 2 hr 20 min. Many students worked out $0915 - 0635$ and got 280 which was then transformed into 2 hr 80 min and so 3hr 20 min. Alternatively, some students clearly used the difference between 9 hours and 6 hours is 3 hours and the difference between 35 min and 15 min is 20 min. The 2 hr 20 min response came from adding two hours to get to 0835, but then thinking there were 20 mins between the 35 and the 15.

Question 6

Part (a) was a counting exercise, but many students turned it into a calculation; wrong forms included $2 \times 3 \times 3$ to give 18 and $3 \times 3 \times 3$ to give 27. 6 was also a common answer. It was nice to see some foundation level students being able to reason about how they could answer part (b). They saw that they needed to 'make' a cube with edges of length 3 cm and so worked out $3 \times 3 \times 3$ and then subtracted 12. Some students were able to show a full understanding of part (b) even though they were unable to find the volume in part (a). Correct answers to part (c) varied in quality. A common error was to name the shape as a rectangle.

Question 7

Most students were able to answer parts (a) and (b) successfully. They were able to draw a clear diagram to show pattern number 4, including the black and white dots and were able to complete the table – either by counting in pattern number 4 or by adding on 4 directly from the table.

Part (c) required students to show some understanding of the relationship between the number of black dots and the total number of dots. The most straightforward way of doing this is to notice that the number of black dots is always one fewer than the number of white dots and so the total number is $20 + 21 = 41$.

Question 8

Many students showed the correct method for part (a), showing knowledge of 360° in a full turn and that the two angles with x in them were the same size. Incorrect answers came from using 180° instead of 360° or using two lots of 100°.

The accuracy of drawing in part (b) left much to be desired. Many students were unable to produce both a correct angle and a correct length. Some students just drew what looked like an isosceles triangle with equal sides of length 5.5 cm. Generally, if they did draw a fairly accurate diagram they were able to measure the length of the third side successfully. In general, measurement of the length of a line was well done.

Question 9

All parts of this question were well answered. In part (a), 81 was the overwhelmingly common answer with only a few giving 12. In part (b), as well as the correct 16, 128 was commonly seen. This could have come from half of 258 or more likely misusing the calculatotr so that $\sqrt{4} \times 64$ was worked out. Most students got the correct answer to part (c) mainly by using $0.95 \div 4$ rather than 0.95×0.25, although this was also seen. A few students worked out $0.95 \div \frac{1}{4}$.

Question 10

Most students were able to give correct answers to parts (a) and (b). In part (a), the most common incorrect answers involved x^2, such as $2x^2$ or $3x^2$. Some students wrote $8\times ky$ in (b) and were awarded the mark. Part (c) proved to be challenging. Many students gained the first mark by substituting into the given formula and showing 3×2 or 6. The next step was found a problem for many students as they went from $22 = 4f - 6$ to $22 - 6 = 4f$ and so lost the two remaining marks.

Question 11

Parts (a) and (b) were fairly well answered. Students could pick out numbers from the list that satisfied the criteria for each particular part. It was pleasing to see that many students were able to combine two properties and give the correct answer, for example in (a)(ii). Success on part (b) was more limited than in (a) as it was clear that students did not have a simple method of multiplying a whole number by $1\frac{1}{2}$, such as adding half the number to the number itself.

Question 12

Parts (a) and (b) were generally accurately answered with many students drawing appropriate lines on the conversion graph. Part (c) was answered quite well. Many successful students used their answer to part (a) and worked out

$160 + 160 + 80$ to get 400. Others used the conversion of 1 litre followed by multiplying by 25 but tended not to get both marks because they read the corresponding distance as 18 or even 19 kilometres, instead of the correct 16.

Question 13

It was pleasing to see that alert students realised that just dividing by 2 or 4 was not going to get them the correct answer immediately. The most successful strategy came from those who realised that the two child tickets were equivalent to an adult ticket, so the correct strategy was to divide the total cost by 3. Nevertheless, some students who did divide by 2 were able to realise they had to split 108 into two amounts with one twice the size of the other.

Question 14

Most students were able to complete the table correctly although a few did not engage with what was being described and appeared to put random numbers in the cells or there were some attempts at multiplication tables.

Answers to the probability questions was very varied with some students seeming to have no idea what a probability was. Those that did generally scored on parts (b) and (c). Part (d) was often wrongly answered with $\frac{1}{2}$ or equivalently $\frac{12}{24}$ being common.

Question 15

Many students understood what an enlargement was and were familiar with the term 'scale factor'. They were able to answer parts (a) and (b) quite well. Part (c) required students to be a little more alert as the required length was not just 3×7 but $3 \times 7 - 7$. So many students overlooked this that the most common response was 21.

A few students did not appear to understand the concept of enlargement/similarity and generally decided to add lengths rather than use a scale factor.

Question 16

Many students had little idea how to go about answering this question. As the word 'volume' was not used many were unsure of what to do with the given dimensions. Common choices included ignoring the 1.8 and just using 12×8 or ignoring these dimensions and working out, for example 1.8^3. Without a meaningful volume calculation, students could not score any marks. Trying to do something with 1.8, 3000 and 1000 was common.

Those that did work out the volume correctly, generally went on to score full marks.

Question 17

(a)There was a lot of confusion about which fraction or fractions to use with the 120 in part (a). It was rare to see a cascade of operations such as $\frac{7}{8} \times 120 = 105$ followed by $\frac{2}{3} \times 105$. Many students did just one fraction calculation with 80 being a common answer from two thirds of 120. Others, who realised they should be using both fractions subtracted them, or even added them before doing something with the 120.

(b) Many students were unable to provide a correct answer to this standard calculation. Some resorted to multiplying the two numbers together, not noticing the enormous size of the number they got. Others worked out the difference as a percentage of the 42000. A few gave the answer as a fraction.

Part (c) was comparatively better answered with students taking advantage of the trapezium area formula at the front of the question paper. Some students substituted the numbers into the correct formula but then performed the calculation incorrectly, either ignoring the brackets or adding the 110.A few, once getting to the correct answer of 11000 then went on to do the bizarre 11000^2 or the even more bizarre $\sqrt{11\,000}$.

Question 18

Responses to part (a) showed a lack of understanding of what the table represents and what calculations need to be done. There is also an issue over students lack awareness of the significance of the size of their answer. Common incorrect approaches included

- Adding up the numbers from 1 to 6 and dividing by 6
- Adding the frequencies and dividing by 6 or 7
- Calculating the correct ∑fx but then dividing by 6 or by $(1+2+3+4+5+6)$

When a calculation produces a value for the mean which is outside the interval containing the given values, a student should realise that something has gone wrong.

Answers to part (b) were much better, with many students giving the correct answer as a fraction or even a decimal. The most common error was to ignore the frequencies and give an answer like 1/7.

Question 19

It was disappointing to see that so many students did not know that the internal angle of an equilateral triangle is 60°. Some students who did know were also able to apply an appropriate strategy by using alternate angles to get from the top of the diagram to the bottom. This was rare, however, as many students simply assumed the answer was the same as the given angle. Many students managed to find angle CBE, but then went on to assume that this was equal to BEF, or to x. Of those few students who correctly calculated x, hardly any were able to provide the correct reasons. Full marks on this question were rare.

Question 20

In part (a) many students found the correct answer of 1.25. However, many others had little idea on what to do. A common approach was simply to multiply 0.5 by 5 to get 2.5 or to confuse the approach to assume that the amount of salad dressing was 0.5 litres. This may explain why the performance on part (b) was a little better as this was, in fact, sharing 630 millilitres in the ratio 2:5.

Part (c) required students to coordinate the ratio with unit costs. This proved to be a challenge and many students fell back on trying to express 13.50 to 18 as a ratio in its simplest form. Of those who did manage to multiply 13.5 and 18 by 2 and 5 respectively, many were unable to reduce the ratio to its simplest form.

Question 21

Many students were successful in scoring marks on this standard question. Generally, they showed an algorithm that was convincing and so were awarded at least one of the method marks. The methods used were split between those who use a factor tree approach and those who used a repeated division method. Most students who did then picked off their factors and wrote their final answer as a product. This question clearly stated that working must be shown and students who did not do this were awarded no marks.

Question 22

All sections of parts (a) and (b) were well answered. Students showed a good standard of algebra in all parts. There were a variety of answers to (b)(iii) where, as well as the correct one, there were many occurrences of t^7 as well as $4t$ and $12t^4$ as well as various other powers. Students were much less successful when trying to set up an algebraic expression based on given information. Some misunderstood completely and thought they had to find an actual sum of money showing that they did not understand the implications of 'Write an expression…'. Others who did try to do some algebra often thought that 4 dollars more (than x) meant $4x$ rather than $x + 4$.

Question 23

Many students were able to make at least a partial success of completing the table. The most common error was to evaluate the value of the quadratic at

$x = -2$ as 1. This most likely came from their calculator evaluating -2^2 as -4. Points were usually plotted fairly accurately but some students drew their curve going through the origin. Some students who were able to score 1 or 2 marks in section (a) but then lost marks in section (b) because of inaccurate plotting. It was pleasing to see that few used line segments but surprisingly some did not join their points at all. For part (c) most students did not understand that all they needed to do was find the minimum value of y on the curve.

Summary

Based on their performance in the examination students should:

- learn how to express one number as a percentage of another
- solve a variety of types of ratio problems
- learn how to calculate the volume of a cuboid in practical situations
- learn to look at an answer as decide whether it is reasonable or not
- learn how to use their calculator to evaluate squares of negative numbers