Examiners' Report/ Principal Examiner Feedback

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Introduction

This paper allowed students to demonstrate their ability across the assessment criteria. Many students found the end of the paper, which contained the more challenging questions, very difficult, but it was good to see many of them giving them an attempt. It was evident that some students got mixed up with the terminology used in Mathematics, e.g. area and perimeter or mean, median and mode. We also saw evidence of students measuring angles in diagrams where the clause ‘Diagram **NOT** accurately drawn’ was clearly stated and where they were asked to ‘calculate’ the angle. We saw a lot of students showing their working out but there are still some that need to show their method as in many cases they could pick up extra marks if they have made an arithmetic error and got an answer that is ‘not quite’ correct.

Report on Individual Questions

Question 1

(ai) & (aii)The majority of students were able to give the two coordinates correctly but quite a few unfortunately gave the coordinates as (y, x) rather than (x, y)

(b) The majority of students were able to give a correct answer, often showing no working. Some got mixed up with area and perimeter and a few who tried to use the formula given for the area for a trapezium did not have all the lengths in the formula correct. Those that split the shape into a rectangle and a triangle often forgot to divide by 2 after multiplying the base and height of the triangle.

Question 2

(a, b) Most students were correctly able to find 10% of 180 and ¼ of 160. A number gave the answer to (a) as 18 percent instead of just 18.

(c) Most students were able to shade 5/6 of the given shape. Those who were incorrect often shaded 5 of the 12 squares or left 1 square unshaded showing a lack of understanding of what 5/6 of 12 squares meant.

Question 3

(a) Many students knew what a right angle looked like, but some labelled a vertex rather than an angle showing a lack of understanding of what was required.

(b) We saw many correct answers of 60°, but a number read the protractor the wrong way and incorrectly gave 120° as their answer.

(c) We saw a good number of fully correct answers for this part of the question but some seemed to be measuring the vertical line from B rather than the line AB.

Question 4

(i) Nearly all students knew to label the probability that when a fair coin is thrown it will land heads as ½

(ii) A good number of students realised that when an ordinary dice is thrown, the probability of it landing on 7 is zero, though a significant number did not. It was surprising how many students marked a cross at around 0.7 on the probability scale.

(iii) While some students clearly realised they needed to put a cross about $1/6^{th}$ of the way along the line, many put a cross at 0.5 or 1, with some at 0.6. It was clear that many students had little understanding of this type of question.

Question 5

Most students were able to correctly identify the congruent shapes, the shape similar to B and the shape with one line of symmetry.

Question 6

(a) The majority of students were able to write the ages in order of size.

(b) Almost all students were able to find the difference between the ages of the two items requested.

(c) Again, almost all students knew what was required here.

(d) Many students did not realise the significance of the term 'how many whole centuries...' and gave the incorrect answer of 22.36.

Question 7

This question was very well answered by the majority of students taking this paper. However there were a number of students who did not realise that 1.25 euros and 2.90 euros were the cost of one item only and they would need to multiply by the number of items bought before subtracting from 20 euros.

Question 8

(a) Although many students realise that $x + 2x$ equals $3x$ there were a significant number who thought it was $2x^2$

(b)The correct answer of y^3 was frequently seen, but so was the incorrect answer of $3y$.

(c) A good number of students correctly multiplied the product correctly but there was a good number of thought it was $2x3y$, where they failed to multiply the numbers together.

(d) Finding what must be subtracted from $6t + 3t$ to make t produced some interesting responses. Many students thought it was 9 or $9t$ or just 8 with not too many correct answers.

Question 9

(a) The majority of students could work out the area of the given rectangle, although some calculated the perimeter.

(b) Finding the perimeter of the two rectangles placed together was very challenging for the majority of students who took this paper. Those who were calculating the perimeter often included the internal line of just doubled the perimeter of one rectangle. Some did not realise there was a side of 2cm to be added and others did not seem to realise that the rectangles were the same as the rectangles in part (a) and so were using sides of 5 cm and 3 cm found by measuring; students must be warned against measuring sides or angles when the clause 'Diagram **NOT** accurately drawn' is found next to a diagram.

Question 10

About half of the students gained full marks on this angle question. Many had little or no working and those showing working generally wrote down their calculations without saying which angle they were finding. The most convincing solutions were those where the sizes of the angles were written on the diagram. Some students were obviously measuring, even though 'Diagram Not accurately drawn' was stated next to the diagram. On angle questions students would be strongly advised to write down any angles they find in the correct place on the diagram as some credit is often given for these.

Question 11

(a) The majority of students gained full marks for this part of the question; those that did not often read the scale incorrectly and showed the sum 4 – 0.4 and a few tried to convert to millions by adding the incorrect number of zeros.

(b) It was pleasing to see the majority of students being able to find 60% of 1400000. A few who did not give the correct answer were able to gain a mark for showing a correct method, but often got mixed up with the number of zero's in the answer.

(c) A good number of correct answers were seen and some gaining a method mark for showing 0.6/4. A few incorrect answers were seen to be giving the fraction upside down and some left this part of the question blank. The question referred to giving 'your fraction in its simplest form 'implying that the decimal equivalent of 0.15 was not the answer required.

Question 12

(a) Nearly all students gained the correct answer of 13. The few incorrect responses used $20 - -7$ instead of $20 - 7$.

(b) We saw many correct answers for the mean of the numbers and if the mean was incorrect the student often picked up a mark for a correct method. Those gaining no marks generally got the 'mean' mixed up with the 'median' or 'mode'.

(c) While there were many correct answers, some students used the first and last numbers in the list to find the range and gained the incorrect answer of 10. A few found the median or mode.

Question 13

(a) While a good number of students were able to gain the correct answer of 11.35, there were a large number who, after writing the correct calculation used the order of operations incorrectly and added the 'standing charge' to the cost per kilometre and then multiplied by the number of kilometres. If the student had shown the correct calculation they were awarded a method mark, but those who showed no working and gave an incorrect answer, scored zero.

(b) Most students did not understand what was required to find the number of kilometres of the taxi ride. Many added 2.95 and 2.5 and then did $\frac{26.10}{5.45}$ which showed they did not understand the nature of the 2.50 'standing charge'. Very few attempted to use their answer to (a) which could have been a valid method, but most of those who used this alternative were unsuccessful.

Question 14

(a) A large number of students gave a fully correct answer here, with those that didn't usually being able to pick up a method mark for the numbers in the correct descending order, rather than ascending, or for 3 numbers in the correct order. Those that gained no marks generally seemed to be using fractions and ordering according to the size of their numerator, even though the denominators were not equal. There were a few who failed to produce a correct list but converted each of the fractions into decimals; this gained them B1.

(b)Many students did not read this question carefully enough and gave the answer of 45, i.e. the number of male teachers at the school; this gained 1 method mark. Of those who realised what was needed, most were able to gain full marks.

Question 15

(a) Most students were able to enlarge the given shape by a Scale Factor of 2, but were not able to correctly use the centre of enlargement, so the shape was in an incorrect place; this attempt was awarded 1 mark. Some thought that the centre of enlargement of (1, 1) meant that one of the vertices of the shape had to be at (1, 1). A few used a wrong scale factor of 3 and gained 1 mark for this.

(b) Hardly any students were able to give a fully correct response for the transformation that mapped shape **T** on to shape **S**. A few gave a partial answer and many talked about 'shrinking' or 'reducing' the shape and some used −2 instead of ½ or 0.5

Question 16

About half of the students were able to correctly show how to add the fractions to gain the result given. Some tried various methods but failed to put both fractions correctly over a common denominator and this lost them both marks. A small number of students tried a decimal approach but as the fractions had been carefully selected to be recurring decimals this method failed.

Question 17

(a) This question was very well done and it was pleasing to see, in most cases, that the correct answer came from a fully correct algebraic method.

(b) This question was generally well answered, with correct algebraic working. A few gained method marks for $4t = 14$ but then gave $t = 14 - 4$. Any attempts at trial and improvement gained no marks here as the clause 'show clear algebraic working' was given. A significant number made sign errors in separating the t-terms from the non-t-terms; $6t + 2t = -5 + 9$ was often seen.

(c) Most students were able to multiply out the brackets successfully but many made errors in combining the terms; these student were able to gain a method mark for at least 3 correct terms seen. A common error was to multiply the y terms but not the numbers. Some put in an equals sign and solved an equation.

(d) There were very few correct answers for this algebraic division. There were many blank responses, with common incorrect responses being $0.5wxy$, $0.5\ wx^2y^2$, $2wxy$, $2wx^2y^2$ where students had done a combination of multiplying and dividing.

Question 18

(a) Students struggled with this question with many different methods being attempted. The most common incorrect approach was to subtract and then to multiply by 100 rather than to divide one value by the other and multiply by 100. The correct answer of 83.3 or better was required, since the students were asked to give their answer correct to 1 decimal place; those that gave 83 generally gained a method mark. Students must be advised to read the rounding information given in any question. Many wrote 1.75 x 2.1 ÷ 100 instead of 1.75 ÷ 2.1 x 100.

(b) This question was done reasonably well but premature rounding often cost students the final accuracy mark. Some students did a correct conversion and stopped there, not finding how much more expensive the running shoes were in Dubai. A few worked in pounds, not necessarily realising or understanding that they should be working in Dirham; these students could gain a maximum of 2 marks. As with (a), the order of operations was sometimes confused.

(c) Most students knew they needed to divide 'distance' by 'time' but few were able to get the correct answer. Those who tried to write 7 hours 24 minutes as hours often used 7.24 which gained one method mark only. Some changed the time to 444 minutes but then failed to multiply by 60 to get the speed in kilometres per hour. A few ignored the minutes and just did 5522 divide by 7.

Question 19

(a) We saw a good number of correct answers here, but it was quite common to see students subtracting only 90 and 111 (the angles labelled on the diagram) from 360 and therefore obtaining the total of the two remaining angles, rather than angle *ABC;* this approach gained no method marks since the student showed no knowledge of the properties of angles in a kite.

(b) Quite a lot of correct answers, but many did not seem to realise that the kite was the same as the one in part (a) on the left hand page. It is likely that some measured the angle and gave this as the answer.

(c) Few had any idea on how to start this part. The most popular and the most successful was to use the sum of the angles in a pentagon. Again, some probably measured the angle.

Question 20

Many students had 3 correct values out of 4 in the table; the one incorrect value was without exception when $x = -1$, the incorrect answer being $y = 5$; this is putting -1^2 into the calculator rather than $(-1)^2$. Many were able to gain a method mark for plotting at least 6 points correctly but then often joined them with line segments rather than a curve. Very few students understood what was required in part (c) with 2 being an common incorrect response; others misread the horizontal scale, judging each small square = 0.1 not 0.2; there were also many blank responses for this part.

Question 21

This question was quite well attempted although there were many students who when told that the median was 8 thought that 8 had to be one of the numbers. Many students were able to recognise that the total of the numbers was 44 and even with 2 incorrect values this could gain them a method mark provided we saw evidence of 44 or $x + y = 25$.

Question 22

Nearly half of the students were able to pick up full marks or part marks for some working for this question. The most common errors were $\pi(5 - 3)^2 = \pi \times 2^2$ or $\pi \times 3^2 - \pi \times 2^2$ instead of $\pi \times 5^2 - \pi \times 3^2$. A few got mixed up with the formula for the area and the circumference and some used Area = $2\pi r^2$.

Question 23

This question was very challenging for all but a minority of students taking this paper.

There were a good deal of blank responses. Generally there was a lack of understanding of the need to change units to the same and so a common incorrect answer for (a) was 1.6 gained from dividing 80 (metres) by 50 (centimetres). In part (b) some just changed the 72 metres into centimetres and there were a few students knowing that conversion was needed used 1 metre = 10 centimetres.

Summary

Based on their performance on this paper, students should:

- Read questions carefully
- Practice work on mean, median, mode and range and know the difference between them.
- Have more practice on manipulating algebraic expressions and equations where there are positive and negative terms
- Ensure full working is shown
- Do more work on the terminology of probability and especially questions which relate to the probability scale from 0 to 1.
- Ensure they are fully aware of the difference between area and perimeter.

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