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Examiners' Report/
Principal Examiner Feedback

Summer 2015

Pearson Edexcel International GCSE
Mathematics A (4MA0)
Paper 4H

Pearson Edexcel Certificate
Mathematics A (KMA0)
Paper 4H

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Introduction to Paper 4H

This paper was very accessible for the majority of students with the most able gaining very high marks. The majority of students presented their work clearly and appropriately with well-structured responses. The most challenging question was Question 22 with very few gaining full marks here, but a good number gaining some marks; this showed us that the students who took this paper generally had a 'can do' attitude and tried their best at everything rather than leaving a lot of blank responses. Mistakes on the early part of the paper occurred because students misread or didn't read the questions carefully. Some students lost marks because they didn't show the 'clear working' that was asked for or rounded answers prematurely and lost out on accuracy marks. Good use was made of calculators, but students must remember to still show adequate working so we can see they understand the method they are using.

Report on Individual Questions

Question 1

This question was answered very well by the majority of students. Those who did not gain full marks generally picked up one mark for either the number of red bricks (8) or the probability that a brick will be blue $\left(\frac{3}{5}\right)$. Some students who correctly found that there were 12 red bricks went on to give the answer $\frac{12}{20}$ and some even cancelled this down to $\frac{3}{5}$; such students were awarded 2 marks for a correct method with a misunderstanding of the question.

Question 2

This question was well done by the majority of the students. However a number either misunderstood or did not read the question carefully and thought that Sarah got \$15 and consequently lost all marks. Students must be reminded to read all the given information very carefully.

Question 3

(a)(i) & (ii) The majority of students were able to read the information from the distance-time graph. A few students gave the incorrect answer of 45 for (ii) as they gave the distance of the shopping centre from Lia's house rather than her friend's house.

(b) Generally students were able to complete the graph from the given information, but those who couldn't often picked up one mark for a graph showing Lia's arrival home at 16 30.

Question 4

(a) Many students were able to find the median correctly. A few made a list of the frequencies rather than a list of the scores.

(b) A good number of students gained full marks for finding the mean. Those who did not gain full marks could gain method marks for showing correct working – usually the products (score × frequency) and attempting to add. A few students simply added up the scores or the frequencies and divided by 6, showing a lack of understanding of the frequency table. Even though the total of the frequencies (25) was given, a few students arrived at a total other than 25 which, as long as they showed working, could still achieve the method marks.

Question 5

(a) Many students found it challenging to reflect a shape in the line $y = -x$, often reflecting it in the x or y axis or rotating it 180°. If students did not gain full marks, many achieved a method mark for drawing the line $y = -x$, or drawing a congruent shape with the correct orientation to the one required in the first quadrant.

(b) Students still give more than one transformation when the question clearly asks for a single transformation. It is vital that students recognise that if they give more than one transformation they lose all marks. Students were able to gain one mark for 'rotation' or a similar word such as rotate or rotational but not 'turn', one mark for the correct angle **and** direction, and one for the correct centre. It was common for one of the three aspects of the description to be missed or for a candidate to state 90° but not to give the direction.

Question 6

(a) Many students struggled with this question and many showed no working on the diagram; correctly labelling one of the angles *QMR* or *QRM* as x was worthy of a method mark.

(b) This was very well done by those students who knew that the angle sum of a hexagon is 720° or knew a method to find this. Those that did not lost all marks in this part. It was quite common to miss out the value of 90° when calculating k as this angle was given in the 'square' notation and not as a number; students should be reminded to look out for this.

Question 7

(a) The majority of students were able to correctly expand the bracket.
(b) The majority of students were able to correctly factorise this expression with just one factor being required outside the bracket.
(c) Many students successfully solved this linear equation; the majority of students showed clear algebraic working as requested; those who did not gained no marks even with a correct value for x.
(d) Most students were able to gain full marks for expanding and simplifying the correct quadratic expression. Those who did not were generally able to pick up a method mark for 3 out of 4 correct terms or 4 correct terms ignoring signs.
(e) Many students gained full marks for this 'factorise fully' question. Those who didn't, often gained one mark for an incomplete but correct factorised answer with a

minimum of 2 of the 3 common factors outside the bracket. A surprisingly large number found the common factor and stated this as the answer without the bracket.

Question 8

This question involving trigonometry was very well answered. A few students failed to observe the instruction 'give your answer to 2 decimal places', and only gave 1dp thus losing the accuracy mark. A few students failed to rearrange the equation correctly after a correct initial equation.

Question 9

(a) Those students who knew how to tackle this type of inequality usually gained full marks, otherwise they showed little working and were unable to gain any marks.
(b) The majority of students were able to list the correct integers for this inequality. If students missed out a value, it was often zero.

Question 10

(a) A correct answer was given by the majority of students for the Interquartile range.
(b) Many students gained full marks here but a few gave the percentage of films that lasted less than 125 minutes; achieving one mark. Students are often not annotating the diagram and are often inaccurate with their lines leading to the wrong answer.

Question 11

Few students were able to gain full marks for this question, but most picked up a method mark for writing one of 12 or 20 as a product of prime factors or listing multiples of 12 or factors of 120. A common incorrect answer was 20.

Question 12

Many students gained full marks here, a lot of them using the calculation 6500×0.84^3 but also using the method of finding 16% of the value and taking this off for each year. Unfortunately, some confused the question and found 16% of 6500 and multiplied this by 3 and subtracted. A few worked out the calculation for 2 years and a few for 4 years. These responses gained a method mark for a correct percentage of the amount.

Question 13

Students were clearly told to 'show your working clearly' for this question; the vast majority doing so. Any students who did not show working gained no marks. The majority of students were able to use the quadratic formula correctly and gain full marks. A few got mixed up with the values of *a* and *b*.

Question 14

The vast majority of students were able to use the linear scale factor and gain full marks for part (a). A good number also understood that they needed to use the scale factor cubed for part (b) but many just multiplied by the linear scale factor. Unfortunately those who had used the method of finding $\frac{3}{8}$ of 20 for part (a) had used $\frac{3}{8}$ cubed rather than 2.5^3 or 0.4^3.

Question 15
(a) The majority of students were able to correctly complete the probabilities on the tree diagram. A few forgot that the first chocolate had been eaten and some gave numbers rather than probabilities.

(b) Many students were able to give a correct solution for this part. Some incorrectly thought they needed to find the probability of 'plain chocolate, plain chocolate' rather than one of each type of chocolate. Many students only used one of the possible combinations of milk and plain; these students were able to gain 1 method mark.

Question 16
The majority of students recognised this question as one in which they had to use the sine rule and were able to gain full marks. A few failed to realise they could not use the trigonometry of a right angled triangle and some found the other unknown side, only to use this to find x, often falling on the way or rounding prematurely and so being unable to gain accuracy marks.

Question 17
Many correct answers were seen here with workings often seen on the diagram. Those that were not correct often added the given vectors together.

Question 18
This was quite well done for a question this late in the paper but many students clearly did not understand the concepts needed to complete the Venn diagram correctly. Those that got the Venn diagram correct were often able to continue and answer the two sets questions correctly.

Question 19
(a) This question could clearly be done on the calculator but students must be reminded that when they are told to 'show each stage of your working' this must be adhered to or marks will be lost. For full marks on this question we wanted to see some evidence that the student was aware of the root 8 and didn't simply arrive at 14 root 2. Many showed us this, but some had clearly used their calculator and therefore did not gain marks.
(b) Few students gained full marks here, although a good number gained a method mark for multiplying the numerator and denominator by root c.

Question 20
(a) The majority of students could explain why 2n + 1 is an odd number.
(b) This question was poorly done and most students did not see the link between it and part (a). Many students used x, x+2, x+4, x+6 or x+1, x+3, x+5, x+7 or similar. As long as x was defined as either odd or even and we had the sum of four consecutive odd numbers we could start awarding marks. Students should note that when asked to 'show, using algebra.' a purely numerical approach will not gain them any marks.

Question 21

(a) The majority of students gained full marks for differentiating the equation correctly, although a few forgot that the '5' should no longer be there.

(b) This part was done quite well, many students understanding that they had to equate $\mathrm{d}y/\mathrm{d}x$ to zero and find the values for x and then substitute to find y. A few used the undifferentiated equation and some failed to show their working clearly and therefore gained no marks.

Question 22

A minority of students answered this question well. Problems were caused by multiplying the wrong area by 3 or failing to multiply by 3 at all, expanding the brackets incorrectly, finding the wrong value of sin (150) and generally getting mixed up with algebra. It was noteable that some students who wrote $3 \times (0.5ab\sin(150))$ then expanded this incorrectly to $1.5a \times 3b \times 3 \sin(150)$. This question was obviously targeting students capable of the higher grades and some clearly enjoyed the challenge of the algebra involved. It was pleasing to see the majority of students at least attempting this; those who could not give a correct solution were often able to gain a method mark for the area of one of the triangles given correctly.

Question 23

Questions of this style appear frequently on IGCSE papers and many students are scoring well on them. Mistakes in this case were made in squaring $(10 - 2x)$, often gaining $-4x^2$ instead of $+4x^2$, or less frequently, $100 \pm 4x^2$. The majority of students did show clear algebraic working as requested but those who did not were unable to benefit from all the marks available.

Summary

Based on their performance of this paper, students are offered the following advice.

They should:

- Annotate diagrams carefully – method marks may often be gained for correctly labelling angles or for working on graphs such as cumulative frequency graphs.
- Show all the stages in working, realising that if the question states this then they may gain no marks unless they do so.
- Show clear algebraic working when required to do so and noting that if the quadratic equation is being used, merely stating the values of a, b and c does not amount to full and clear algebraic working.
- Read questions very carefully, ensuring they are giving the answer that has been asked for and also ensuring they are giving the degree of accuracy required.
- Check their own working to ensure they have not misread work and put a slightly different answer on the answer line than the one written in the body of the script.

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