Examiners' Report/
Principal Examiner Feedback

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Pearson Edexcel International GCSE
Mathematics A(4MA0)

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Paper 4H

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Grade Boundaries

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There were a significant number of blank responses seen throughout the paper suggesting that some students had either been entered for the wrong tier or had not been taught the complete specification. The standard of algebra seen in question 12 was particularly disappointing with many students unable to take out a common factor in part (a) or show an awareness of the correct technique to factorise a quadratic expression.

Students should be reminded to retain full accuracy when working through calculations. There were a number of inaccuracies seen in basic arithmetic; students should check their work carefully.

When questions require that students 'show clear algebraic working' or 'show each stage of working clearly' it is essential that these instructions are adhered to. Failure to do so can result in no marks being awarded even when a correct answer is given.

Question 1
As ever, the most common incorrect answer was to add the frequency column and then divide by 6. Some candidates made a correct start to the method by finding the total number of matches but then divided by 6

Question 2
Those students who knew how to find both the area of a rectangle and the area of a circle generally went on to gain full marks. Students should be reminded to retain full accuracy when working through calculations as some lost the accuracy mark due to premature rounding. The most common error was to use the wrong formula for the area of a circle. A number of students halved the given radius, assuming it was the diameter. Occasionally, having found the two correct individual areas, these were then added or divided rather than subtracted.

Question 3
This question was well answered. However, the answer to $0.7 \div 2$ was given as 0.45 on a number of occasions. Some students misunderstood the question and so subtracted 2×0.3 from 1 giving an incorrect answer of 0.4

Question 4
Many fully correct graphs were seen. Those students who understood how to move from the given equation to a graph generally gained full marks. Occasionally, all the integer coordinates were plotted but then not joined. Similarly, sometimes one point was incorrect – when this happened some students realised the error and were able to correct their line but, more often, a series of line segments were drawn rather than a single straight line. Although several students failed to recognise that the form of the equation indicated a straight line and joined incorrect points with a curve. Some candidates demonstrated an awareness of the use of $y = mx + c$ but then failed to read the scale on the x axis correctly and so ended up with a gradient of 1.5 rather than 3. Some students did not draw the complete line for values of x from -2 to 3.

Question 5
The main errors in part (a) were to use vector notation rather than coordinate notation when giving the centre, to omit the centre altogether or to write (3, 4) for the centre rather than (1, 3). A significant number of students gave two transformations in part (a), usually an enlargement and a translation, and therefore failed to gain any marks. In part (b) the translation of $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$ rather than $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ was sometimes used. Some miscounted and moved the triangle down 3 rather than 2.

Question 6
Part (a) was well answered although some candidates failed to understand that numbers given in their answer had to be less than 19 as some gave additional multiples of 5. In part (b) there were a significant number of either completely blank responses or 'No' ticked without any further explanation. Some students did not quite go far enough in their explanations. For example, responses along the lines of 'there are prime numbers in B' gained no credit; to gain the mark it was necessary to refer explicitly to the number 5. Some students gave the correct explanation but then ticked the 'yes' box.

Question 7
Those students who knew how to divide a number into a given ratio generally went on to gain full marks. The majority of those who gained full marks found both shares and then subtracted. Others showed a slightly more sophisticated approach by working out that the difference equated to 5 shares and so went on to find $\frac{5}{15}$ of 240. Some candidates added rather than subtracted the relevant shares to get an answer of £176. A large number of students struggled to find basic ratios; there were a fair number of completely incorrect responses.

Question 8
The instructions with this question were to 'show clear algebraic working'. Many students ignored this instruction and frequently gave an answer of 6.5 without showing any algebraic working. Students who took this approach and showed by substitution that $x = 6.5$ gave a perimeter of 62 cm were awarded only two of the available four marks. Those that did follow the instructions in the question and so wrote down and solved an equation were able to access all four marks. It should be noted by centres that, in future sessions, the failure to provide algebraic working could mean that all available marks will be forfeited. Several candidates tried to multiply the given expressions revealing confusion between perimeter and area.

Question 9
Students who realised that the three numbers had to sum to 18 gained at least one mark. A common error was to write down 3 numbers with 8 as the middle number rather than the median number, for example 4, 8, 6. Some failed to read the question properly and so gave 2, 8, 8 as the answer which failed to satisfy the condition of three different numbers.

Question 10
The most common error in part (a) was to fail to give the answer as an inequality; very frequently the answer was given as 9 or $x = 9$ rather than the correct $x < 9$. Some students stopped before they got to the answer; $3x < 27$ was sometimes seen on the answer line. In part (b), statements were often written down that included -2 and 4 along with one or more inequality sign but these frequently did not include a variable; in such circumstances no marks could be awarded.

Question 11
In part (a) a number of candidates did not use the word radius in their attempts to justify the angle formed with the tangent , using imprecise terms such as a line drawn from the centre. In part (b) an angle of 44^o was often calculated but, unless this was linked with angle *TOP* then no mark could be awarded. Indeed, a significant number of students showed the angle *OTP* on the diagram as 44^o despite being told in part (a) that this was 90^o. It was clear from this error and others that many students are unable to use the standard three letter angle notation. In part (a) many candidates failed to give an explanation that included both "radius" and "tangent" as well as the 90^o.

Question 12
Students tended to either score full marks or no marks in part (a). Where an incorrect answer was seen in part (b), this was usually d^{35}. d^{13} appeared occasionally, suggesting an arithmetic error from the addition of 5 and 7. It was clear that many students had not had any practice of factorising quadratic expressions. Those that knew how to factorise a quadratic expression usually gained full marks.

Similarly, students tended to score either full marks or no marks in parts (d) and (e). In part (d) several candidates did not extend their square root sign to include their divisor. The common error in part (e) was to fail to multiply all terms in the equation by 6 especially the 4 on the right-hand side of the equation.

Question 13
The common incorrect answer in part (a) was 7.6×10^5. Students had more success in part (b); 128 and 0.000000016 were both common incorrect answers. The most common error in part (c) was to subtract rather than divide the areas. Other students incorrectly divided 1.4×10^7 by 1.6×10^8. A significant number of students did not give their answer as an integer as required by the question.

Question 14
Some candidates gave the interest only for their answer rather than the value of the investment as asked for and therefore failed to gain the final accuracy mark. However, the most common error was to use simple rather than compound interest. In a calculator paper students should avoid using non-calculator build up methods, these often contained errors or premature approximation.

Question 15
This question had many blank responses. In part (a) it was common to see students using a trial and improvement approach to get to one of the solutions; such an approach gained no marks. Having got as far as finding both solutions, some students then discarded the negative solution. Several candidates ignored the instruction to “use the graph” and immediately attempted an algebraic approach to find the solutions. In In part (b) it was rare to see a correct solution. Some students gave answers of 7 and −6 rather than −7 and 6 for which one mark was awarded.

Question 16
It was extremely common, in part (a), to see an incomplete tree diagram. Many students only drew in one rather than two extra set of branches. This error meant that only one mark could be awarded in part (a). Part (b) was completed more successfully with many who failed to gain full marks in part (a) going on to gain full marks in part (b). Some students failed to read the demand carefully enough and so worked out the probability that at least one of the boys passes the test rather than exactly one of the boys.

Question 17
The majority of students showed all necessary working in both parts of the question. However several candidates ignored the instruction in part (a) and moved directly to solve the given equation using the formula. In part (b) not all realised that only the positive solution to the equation gave a correct value for x; those who gave both solutions failed to gain the final accuracy mark. Some candidates lost marks by not extending the division line under all the terms or extending the square root sign over the whole expression.

Question 18
The two most common errors were to either just use the values given in the question or to divide by 50.25 rather than 50.15.

Question 19
Candidates who showed some understanding of vectors generally coped well with parts (a) and (b) but were unable to offer a correct method for part (c) – possibly due to some unfamiliarity with the word 'magnitude'. It was disappointing to see many students make an arithmetic error in part (b) with $7 - -3$ frequently evaluated as -4.

Question 20
Many correct answers were seen from those students who appreciated that the area of each bar is proportional to the frequency in histograms. It was disappointing that a significant number of students made an error when using the width of the final bar – this was seen as 20 or 25 on a number of occasions. Several candidates used the vertical scale as a frequency scale thereby ignoring the column width.

Question 21
From this point onwards in the paper there were a significant number of blank responses. Those who tried putting in values for the radii gained no credit. The common errors from those who worked algebraically were to forget to use brackets when cubing $2r$, thus working with $2r^3$ rather than $8r^3$ or to use $4/3\pi r^3$ rather than $4/3\pi(2r)^3$ when simplifying their expression. A number of those who got as far as writing down the correct equation then failed to fully simplify their expression for h.

Question 22
In part (a), those who understood the demand of the question usually went on to gain full marks. Only very occasionally was the answer given as $\frac{1}{2^5}$ rather than 2^{-5}. In part (b) those who used their calculators to change the surds to decimals gained no marks – this was a very common incorrect method. Those who expanded the brackets correctly sometimes failed to show sufficient stages in their working. Students should be reminded to show all steps in working.

Question 23
A common error in this question was to attempt to divide $(5 - (x + 2))$ rather than $(x + 2)$ by the given fraction. There was an independent mark for the correct factorisation of $(x^2 - 4)$; a significant number of students gained this mark only. Full marks were very rare in this question.

Question 24
Students who were able to use the given information to find the angle of the sector frequently went on to gain full marks. However, some did not read the question carefully enough and, having found the sector angle, went on to find the area of the shaded segment rather than the perimeter.

Summary
Based on their performance on this paper, students should:

- take care with basic arithmetic and ensure that accuracy is retained until the final stage of a question

- ensure that they explicitly name any found angles or mark these on the diagram and link any calculations to angles when answering geometry questions.

- give just a single transformation when asked to describe a transformation.

- show clear algebraic working when this requirement is included in the demand for a question; the presence of this statement is likely to indicate that an equation will need solving (and possibly forming).

- take care when substituting values into an equation; use brackets when a variable such as $2r$ has to be squared or cubed.

- Ensure that all necessary branches are drawn when completing a tree diagram.

- Read the question carefully and use the instructions given.

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