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Principal Examiner Feedback

November 2013

Pearson Edexcel GCSE
In Mathematics Modular (2MB01)
Unit 2: (5MB2H_01) Higher (Non-Calculator)

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GCSE Mathematics 2MB01
Principal Examiner Feedback – Higher Paper Unit 2

Introduction
This paper was accessible to candidates of all abilities.There was no evidence to suggest that candidates had difficulty completing the paper in the given time. The vast majority of candidates answered the questions in the spaces provided and few asked for additional paper.
In most cases the diagrams and graphs were clearly presented and easy to read. Basic arithmetic was an issue for many candidates.

Candidates should be advised to use brackets when subtracting algebraic expressions.
Candidates should be advised to find estimates for calculations by rounding each number in the calculation to 1 significant figure.
Candidates should be reminded to identify the angles they are calculating by either an appropriate angle notation or by annotating the diagram.

Report on individual questions

Question 1
This question was done quite well. In part (a), most candidates were able to work out the number of white tiles in the Pattern. A common approach here was for candidates to draw a diagram to help them count the numbers of grey tiles and white tiles. Those candidates listing the numbers of grey tiles and white tiles in a table were less successful as they often made errors in extending the list beyond the tiles given in the paper. A common error here was to double both the numbers of grey tiles and the numbers of white tiles, eg (6 grey, 4 white) in the diagram was extended to (12 grey, 8 white) in their list (instead of 7 white). In part (b), most candidates were able to write down an expression for the total number of tiles. Some candidates gave their final answer in the form $2n + n + 1$, ie unsimplified. Common incorrect answers here $2n + 1$, $n + 3$ and $4n+1$.

Question 2
This question was done well. The vast majority of candidates were able to simplify the given calculations and give their answers in a suitable form. Common incorrect answer were 5^{24} and $7^{2.5}$.

Question 3
This question was done well. The vast majority of candidates were able to substitute the values for x and y into the formula and calculate the value of t correctly. A significant number of candidates were unable to deal with the x^2 term, evaluating 6^2 as 12 and sometimes as 35. A common incorrect answer was 56 obtained by adding the terms instead of subtracting them.

Question 4

Generally this question was done well. In part (i), most candidates were able to find the size of the required angle either directly or by initially finding some or all of the other angles in the diagram. A common incorrect answer here was 104. In part (ii), a significant number of candidates were unable to give a correct reason using the properties of parallel lines. A common incorrect answer was "opposite angle are equal".

Question 5

Part (a) was done well. The vast majority of candidates were able to work out the amount of milk needed to make 20 cherry scones. The most popular approach here was to add the quantities of milk 160 + 160 + 80 rather than to use proportions, eg $\frac{20}{8} \times 160$. A common incorrect answer here was 480 from finding 3 times the quantity of milk. Basic arithmetic proved an obstacle for some candidates. It was not uncommon to see calculations such as "160 + 160 + 80 = 420", "160 × 2 = 360" and "160 + 160 = 220".

In part (b), most candidates were able to find the greatest number of cherry scones that could be made with the given ingredients, but some omitted to show <u>both</u> the calculations needed to confirm their decision, usually the calculation for sugar was omitted. Although not penalised here, candidates should be reminded to identify their calculations with the particular aspects of the question they are considering, ie identifying the calculations for sugar with "sugar" and the calculations for flour with "flour".

Question 6

This question was done well. In part (a), the vast majority of candidates were able to use the isometric grid to draw the cuboid. In part (b), most candidates were able to work out the number of cubes that can fit in the box. A popular approach here was to compare the volume of the box with the volume of the cube, ie by calculating 48 ÷ 8. A surprising number of candidates were unable to do this calculation correctly. Some common incorrect calculations here were "2 × 2 × 2 = 6" and "6 × 8 = 56". Another common approach was for candidates to fit the cubes in the box by drawing them on the isometric grid. This approach was generally successful.

Question 7

Parts (a) and (b) of this question were done well. Common incorrect answers in part (a), were $3e + f$, $2 + 7f$ and $e + f$. A common incorrect answer in part (b) was $10c + 3d$. In part (c), most candidates were able to find an expression for the length of *AD* ($4x + 3$) and/or twice the length of *PQ* ($6x – 4$), but many were unable to find the difference in these expression correctly. The difference in the expressions was often written as $6x – 4 – 4x + 3$ rather than $6x – 4 – (4x + 3)$, generally leading to the popular incorrect answer $2x – 1$. Candidates should be advised to use brackets when subtracting algebraic expressions. A surprising number of candidates continued their calculations by putting their expressions for *DE* equal to 0 and solving them for x (this was condoned on this paper).

Question 8
Less than half the candidates were able to score full marks on this question. A common error here was to round 0.51 to 1 rather than 0.5. Some candidates rounded 89.3 to 89. This was condoned on this paper but candidates should be advised to find estimates for calculations by rounding each number in the calculation to 1 significant figure. A surprising number of candidates attempted to do this question by long hand calculations.

Question 9
This question was done quite well. In part (a), the majority of candidates were able to write the given number in standard form. A significant number of candidates simply wrote down the first stage in the answer 152×10^6, and did not attempt to change this to standard form. Common incorrect answers here were 1.52×10^4 and 1.52^8 (the later clearly from misinterpreting the answer given on their calculator displays). In general candidates did better in part (b) than they did in part (a). A common incorrect answer here was 0.024.

Question 10
This question was done quite well but it was evident that many candidates could not distinguish between the calculation needed for the interior angle and the calculation needed for the exterior angle. A very common incorrect answer here was 234. Usually obtained by calculating 360 ÷ 10 (=36), marking the *interior angle* on the diagram as 36 and then calculating angle *DCX* as
360 – 90 – 36 (=234).

Question 11
This question was not done well. Few candidates could work out the area of cross-section of the prism correctly. A significant number of candidates attempted to work out the area of the prisms by dividing them in to rectangles and triangles rather than use the area of trapezium formula. A common incorrect answer here was 68 × 30 × 200 (=408 000). Candidates often attempted this question without any obvious coherent strategy, resulting in poor presentation and an increase in the possibility of errors, eg by including too many or too few trapezia in their calculations.

Question 12
Part (a) was done well. Most candidates were able to extract at least one of the factors of the given expression, but a surprising number of candidates omitted to include the right hand bracket of the linear factor. In part (b), most candidates were able to expand the brackets to obtain 4 correct terms which most were then able to simplify correctly. Expansion of the constant term was an obstacle for some candidates. Common errors here were +2, −45 and –12. A popular incorrect answer involving the simplification of the term in *x* was $x^2 - 2x - 35$.
In part (c), the majority of candidates were able score at least 1 mark for simplifying the algebraic fraction. A popular form for the answer was $2m^{-2}t^4$, ie not expressed as a fraction.
In part (d), the majority of candidates were able to use the difference of two squares to factorise the quadratic expression. Common incorrect answers here were $y(y - 16)$, $(y - 4)^2$, $(y - 8)(y - 8)$ and $(y - 8)(y + 2)$. In part (e), most candidates were able to use the laws of indices to simplify the given expression. A common incorrect answer here was h^{-1}.

Question 13
This question was not done well. Few candidates could correctly write down the length of one side of the square, and many of those that could were unable to deal correctly with the subsequent calculations, often simplifying $\sqrt{120} \div 4$ to $\sqrt{30}$.

Question 14
Most candidates were able to score some marks in this question. Many were able to find the size of the angle *OBT*, but few were able to state <u>all</u> the reasons for their choice of calculations or state them correctly. Furthermore, it was often unclear as to how particular calculations were related to the overall solution of the problem. Candidates should be reminded to clearly identify the angles they are calculating by either an appropriate angle notation (three letter notation here) or by annotating the diagram. A popular incorrect answer involved the erroneous identification of angle *ABT* as 90^{o}, ie incorrectly interpreting *BT* as a tangent to the circle.

Question 15
Part (a) was done quite well. Many candidates were able to use the given gradient and the intercept on the y-axis to correctly write down the equation of the straight line. A common and perhaps surprising error was to omit "y" when writing down the equation of the straight line, eg $4x + 2$ or $L = 4x + 2$.
In part (b), many candidates were able to identify the need to use a gradient of 4 but few could use the given point (2, –6) correctly to find the constant c. A common incorrect answer here was $y = 4x - 6$, ie interpreting –6 as the intercept on the y-axis.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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