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Principal Examiner Feedback

Summer 2013

GCSE Mathematics (2MB01)
Paper 5MB2H_01 (Non-Calculator)

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

Introduction

Candidates appeared to be able to complete the paper in the allotted time.
Candidates were showing their working out well. In starred questions most candidates realised that they needed to show numerical working and very rarely offered unsupported worded responses.
Candidates were, in most cases, showing their working out well but, given this was a non calculator paper , were frequently making arithmetic errors which lead to incorrect answers and lost marks.
Candidates were generally attempting all questions so it was rare to see blank responses.

Report on individual questions

Question 1

This question was well attempted by almost all candidates. Of those that failed to score full marks, most were making basic arithmetic errors or incorrectly calculating 10%. The most common repeated error was to only calculate 20% of 35 giving £7.00 as their final answer. It was rare to see answers of £28 where students had incorrectly subtracted the 20%.

Question 2

Part (a) was well attempted by almost all candidates; however, more candidates made errors in this part than in parts (b) and (c). The most common repeated error was $5a - 3b$. It was rare to see candidates incorrectly simplify answers to $8ab$ and similar, though various other incorrect simplifications were seen such as $9a - b$. Part (b) was well attempted and it was rare to see incorrect responses. The only repeated errors were to add 5 and 2 leading to $5m + 7$ and failing to multiply both terms leading to $5m + 2$
Part (c) was well attempted and it was rare to see incorrect responses. The only repeated errors were a^{20} and less common a^{1}

Question 3
This question was well attempted by most candidates with the majority scoring full marks. Most candidates chose to calculate 35% of 200 and $\frac{1}{5}$ of 200 rather than converting 35% to a fraction or $\frac{1}{5}$ to a percentage. The most common repeated error was to calculate 35% of 200, subtract this from 200 and then do $\frac{1}{5}$ of 130. More candidates made errors calculating $\frac{1}{5}$ of 200 than 35% of 200 usually because they incorrectly converted $\frac{1}{5}$ to 5%, 50% or other. Another common error was to leave the answer as $\frac{9}{20}$ or 45%. Computational errors were frequently seen.

Question 4
Part (a) was well attempted by most candidates with many scoring full marks. In most cases those who didn't score full marks either wrote an expression containing 4n scoring B1 or wrote n+4 scoring B0. There were very few responses seen with other coefficients of n.
Part (b) was well attempted by most candidates though more candidates were successful in part (a). The most common incorrect response was 907, however, those candidates who presented full working out and initially wrote $3\times10^2+7$ followed by 30^2+7 did earn at least M1, unfortunately in most cases candidates wrote $3\times10=30$, $30^2 = 900$, $900+7 = 907$. Candidates who tried to generate all the terms of the sequence were usually unsuccessful.

Question 5
This question was well attempted by most candidates with many scoring full marks. The most common error was 32 where candidates did 2×16 rather than 2.5×16. Other candidates calculated the amount of biscuits that could be made from each ingredient then either chose the wrong answer, made a computational error or added all their answers together. A few candidates tried to calculate the ingredients needed for one biscuit but, for almost all, the calculations proved too difficult. Computational errors were common on this question.

Question 6
This question was well attempted by most candidates with many scoring full marks. Candidates who drew a table for their co-ordinate values were the most successful. The most common error was to incorrectly calculate the *y* co-ordinates for -1 and -2 resulting in a V shaped graph or stepped line. Very few candidates tried to draw the line without drawing a table or plotting points and those that did, if they did not score full marks, scored a point for a line drawn through $y = -1$with positive gradient.

Question 7
This question was well attempted by most candidate, though poor arithmetic lead to many candidates scoring M2A0. Most candidates attempted to solve the problem by calculating the volumes but a very common error was to incorrectly calculate the volume of the carton as 9000, instead of 90000, leading incorrectly to the answer 9. Where candidates chose to solve the problem by calculating the number of boxes that would fit along each edge, the most common error was to simply state the values 5, 6 and 3 and not calculate $5\times6\times3$. Other repeated errors were to calculate the surface areas or to divide by 10 instead of 1000. Weaker candidates added dimensions showing no understanding of volume.

Question 8
This question was well attempted by most candidates, though poor arithmetic when calculating the area did prevent some candidates from achieving full marks. Most candidates opted to cut the shape into two rectangles adding the areas to get 15 then diving by 2.25 and most chose to use repeated adding to find $15\div2.25$. These candidates were the most successful. A few candidates chose to divide the individual areas by 2.25 and then add the areas. This usually worked unless candidates rounded before adding, which in some cases, led to incorrect answers. Candidates who decided to calculate the area of the shape using subtraction of areas were less successful. Weaker candidates calculated the perimeter. Virtually all candidates remembered to finish their answer which a short sentence stating the number of packs required.

Question 9
This question was well attempted by most candidates but as many candidates achieve M1A1 as achieved M0A0. The most common error was to do $5\times12\times10$ and forget to divide by 2. Another repeated error was to calculate the surface area of the shape. Weaker candidates simply added all the dimensions.

Question 10
This question was well attempted by most candidates but many only achieved M2 for correcting calculating the interior angle of a pentagon as 108^{o}. More candidates chose use the quadrilateral *ABCH* to work out the size of angle *EAH* and they were the most successful. Others used the pentagon *AHCDE* and provided they calculated the reflex angle at *H* correctly usually achieved at least M3. Candidates who chose to use the hexagon *AFGCDE* were the least successful, often failing to realise that the hexagon was not regular. Several weaker candidates assumed the internal angles to be 120^{0} or split the diagram into triangles and labelled their angles 60^{o} assuming them to be equilateral. A common error was to divide 108 by 3 or 72 by 2 which led to the correct answer but was incorrect method so did not achieve full marks.

Question 11
This question was well attempted but few achieved full marks. The majority of candidates either scored M2A1 or M0A0, with more candidates failing to realise the significance of the different speeds and the need to calculate the time of the journey first. Some achieved M1 for $45\div30$ or $20\div40$ but then reverted back to an incorrect method.

Question 12
This question was well attempted by almost all candidates with most opting to multiply out the brackets though errors in signs were frequent so few correctly arrived at 20*x* to gain M1A1. Very few candidates recognised that they could use the difference of two squares to simplify the expression. The weaker candidates incorrectly expanded the brackets as $x^2 + 25$ or $x^2 - 25$.

Question 13
This question was well attempted but very few candidates achieved M2C2. Common errors were to describe the method rather than state the reasons. Although many candidates knew that the angles at *A* and *B* were 90^o most could not state the reason and often used circumference or circle instead of tangent in their reason. A common error was to assume angle *AOB* was double angle *BCA*. Computational errors were also common in this question.

Question 14
This question was well attempted by almost all candidates and many gained at least M1. The most common error was to half all three values and write (2.5, 1.5, 1) for M1. Very few candidates showed their method. Weaker candidates just rewrote the given co-ordinate.

Question 15
This question was well attempted by most candidates but few achieved full marks. Common repeated errors included writing 0.750750.... instead of 0.75050..., not multiplying 0.75050... so that the when the two recurring decimals were subtracted a terminating decimal was left or not being able to subtract their, often correct, decimal values. The weaker candidates saw 0.750 and wrote $\frac{3}{4}$ as their answer.

Question 16
Part (a) was well attempted with candidates on the whole writing an equation of the form y = 3*x* + c. A few candidates over complicated the question writing $y = \frac{1}{3}x + c$ or $y = \frac{-1}{3}x$ + c. A few careless candidates wrote an expression of the form 3*x* + c. Weaker candidates usually wrote an equation of a straight line but with a coefficient of $x \neq 3$.
Part (b) was attempted by most candidates but few achieved full marks. A common approach, that virtually always led to B0M0A0, was to attempt to draw the graph of $y = 3x + 5$ draw a line perpendicular to it and then attempt to find it's equation. Another common error was to either use 3 or $\frac{1}{3}$ for the gradient. Those that did realise that $\frac{-1}{3}$ was the gradient were often unable to correctly substitute (6,5) into the general equation of a straight line and arrive at the correct answer.

Question 17

Part (a) was well attempted but as many candidates scored B1 as scored B0. Common errors included rewriting the value in the question or writing 0.01.

Part (b) was well attempted but few gained M1A1. Those that gained M1 usually earned the mark for $\sqrt[3]{27} = 3$. Other common errors included $27 \div 3 \times 2$ or writing $\frac{1}{\sqrt[3]{27}}$, $\frac{1}{\sqrt{27}}$ or $\frac{1}{\sqrt[3]{27^2}}$. Part (c) was well attempted by most candidates but few achieved full marks. Many split 75 correctly as 25×3 but did not write the square root sign or often wrote $25\sqrt{3}$ so achieved M0A0. A few candidates split 75 as 15×5.

Question 18

This question was well attempted by most candidates who usually tried to factorise the expressions and often scored at least B1. Candidates were more successful at factorising the denominator than the numerator. A repeated error was to factorise the denominator as $(x + 5)(x - 3)$. Candidates also tried to factorise the numerator into two brackets. A few candidates obtained the correct answer and then equated it to a value and tried to solve their equation. Others obtained the correct answer then continued to incorrectly cancel these values. The weaker candidates incorrectly cancelled values and letters without any attempt at factorising.

Grade Boundaries

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