Principal Examiner Feedback

Summer 2013

GCSE Mathematics (Linear) 1MA0

Higher (Calculator)

Paper 2H

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2013
Publications Code UG036348

GCSE Mathematics 1MA0
Principal Examiner Feedback – Higher Paper 2

Introduction

This is a calculator paper; however there appeared to be some candidates who tried to attempt the paper without the aid of a calculator. This is not advisable, since calculation errors will cost marks.

Many candidates were able to make inroads into some of the unstructured questions, whilst still gaining marks on questions which had a more traditional style.

Many able candidates lost marks in the easier questions in the first half of the paper, such as misuse of scales in question 3(a). To gain the highest marks candidates had to demonstrate high order thinking skills in a range of questions, not just in those questions towards the second half of the paper.

Failure to show working to support answers is still a major issue and this does prevent candidates gaining the marks their understanding probably deserves.

Report on individual questions

Question 1

There was evidence that some candidates did not read the question with enough care with many calculating the volume instead of the surface area. Of those who worked with area, common errors included poor arithmetic, adding together edges instead of areas, and a failure to include all 6 sides.

Question 2

Candidates employed a variety of methods to solve this question. One method involved finding the scale factor (2.5) and scaling up the ingredients, a second involved finding the number of pies one ingredient could produce, whilst a third method involved finding the number of times batches of 18 could be produced (ie $2\frac{1}{2}$)

Question 3

Surprisingly a significant number of candidates plotted the first point at (1,8400) thereby losing the first mark.

A correct relationship was stated by most candidates, who should also be reminded that if a statement of correlation is chosen as an alternative this should include the word “correlation”.

Part (c) was also well answered. Some wrote the answer incorrectly as 660 but as long as some method was given (such as drawing lines on the graph) a method mark could be awarded; candidates should be encouraged to draw lines of best fit when making estimates such as this.

Question 4

A high proportion of candidates gained full marks for this question; however there was a significant minority that lost marks through poor arithmetic.

The most common approach was to add the given probabilities and subtract these from 1. Some stopped at 0.63, but the majority then multiplied by 200.

A less successful method was to find estimates for the individual or combined probabilities of losing or drawing the game; some stopped there, whilst some went on to subtract from 200. Giving the answer inappropriately as $\frac{126}{200}$ was penalised by 1 mark.

Question 5

There were many good answers to this question. In part (a) many made mention of overlapping boxes, missing time frames or failure to accommodate values greater than 12, however stating ‘no option for those who did not buy magazines’ did not attract credit.

In part (b) most candidates incorporated their suggestions from part (a), though not always. The most common loss of marks was through the failure to include a time frame. Those who used inequality symbols were presenting a question that was not fit for purpose.

The most common correct answer in (c) related to ‘his friends being the same age as him’, and the biased nature of the sample. Others referred to the need to have a larger sample.

Question 6

Too many candidates failed to show the fact that $60 \times 60 = 3600$, with many incorrectly using just 60 throughout their calculations.

Most candidates showed $15000 \div 20$ (=750) but often failed to continue correctly after this point. Some tried to calculate by constant reduction eg repeated divisions by 10 or by halving.

A common error was to reach 4.1666 but then multiply by 20, and some calculations suffered from premature approximation which then rendered the final answer incorrect.

The main problem was that very few candidates included units at each stage, probably because they did not understand what their numbers represented.

Question 7

Many candidates were troubled with the combination of ratio and fractions. Many went straight to $\frac{2}{10}$ and $\frac{3}{10}$ as they centred on the ratio rather than the fact they were working with $\frac{7}{10}$ of the money.

Others started with $\frac{7}{10}$ but then failed to include the division by a ratio, some dividing by 2 or 3 rather than 5.

Some made up an amount of money which they then used in calculation, which frequently gained full marks however leaving an answer in a form such as $\frac{2.8}{10}$ was insufficient.

Question 8

Candidates frequently realised that they had to either divide the shape into manageable areas, or take the triangle away from a whole rectangle.

There were a variety of approaches used in this question. In general triangles and rectangles appears to have been more successful than introducing a trapezium, although failure to include the "$\frac{1}{2}$" in triangle calculations cause problems for some candidates.

Weaker candidates chose incorrect dimensions for shapes they had chosen to work with. Most realised it was easiest to calculate the area and then multiply by £2.56; those who introduced this earlier usually lost their way in poorly presented workings.

In presenting answers some candidates did not have sufficient confidence in their own answers and divided by 100, thinking that the final amount was too much for resurfacing the playground, and that it could be done for $\frac{1}{100}$ of the cost.

Question 9

Nearly all candidates worked within the right angled triangle to find angle ABQ, and most then went on to give angle x as 55°

The mark for giving an appropriate reason within the context of the question was not always earned since a geometrical reference had to be precise such as "alternative" or "corresponding". Hence merely stating "parallel lines" or "Z angles" was insufficient. It is always useful to show the angles on the diagram as well as in working.

Question 10

Candidates are now aware that they need to show all their working, and the answers to their trials

Most candidates were able to score either 3 or 4 marks for this question. Common errors included evaluating 4.6 and 4.7 and then to look at differences from 110 rather than evaluate a 2dp answer (eg 4.65), or giving a solution to more than 1dp, or rounding incorrectly to 4.6

Question 11

The only major error was in subtracting rather than adding; however the majority of candidates recalled Pythagoras' correctly, although some failed to perform a square root at the end.

Those attempting trigonometry frequently found this approach difficult and invariably were unable to complete the solution.

Question 12

In part (a) most candidates were able to gain a mark for either multiplying out the brackets or dividing through by 3. Too many then had problems isolating terms.

In part (b) a minority of candidates identified multiplication by 5 as the first step. The difficulty in dealing with a negative y term was evident, with many choosing to ignore the negative sign.

Question 13

In part (a) most understood that they needed to find halfway between the coordinates. Some found half of the difference between the co-ordinates rather than the mean. Most candidates found at least one value.

Responses to part (b) were disappointing. Common errors included confused signs and incorrect division, and even mixing x and y coordinates.

Question 14

The more successful candidates set out their work in a clear manner for each bank, showing calculations from year one and year two. Some candidates failed to realise this was compound interest or added the interest rates before using them. Most candidates made a recommendation of bank at the end of their calculations.

Question 15

The only x value candidates had any difficulty with was x = -2, which usually led to an incorrect 0 for plotting. Though this was clearly wrong on the graph candidates still plotted this incorrect value.

A common error in part (b) was to leave the points unjoined, or to join them with straight line segments.

In part (c) few candidates realised the significance of the graph for finding the solutions, instead most preferred to solve them by either factorising or by using the formula method.

Question 16

Most candidates identified angle OTP as 90°, either in working or on the diagram. Many also went on to give POT as 58°. The majority also recognised triangle SOT as isosceles and were therefore able to move to give the correct answer.

The reasons however were often poorly expressed and candidates need to spend time learning these geometrical rules in order to quote them accurately.

Frequently candidates attempted a description that linked tangent with circle or circumference (rather than radius); a second reason was also needed for full marks, which was again frequently misquoted, or was unrelated to their working.

Candidates who merely listed verbatim lots of rules were penalised unless those rules related to their working.

Question 17

In part (a) most scored full marks.

In part (b) there were some trivial comparisons, but most candidates were able to gain a single mark from comparing the median or IQR. To gain full marks at least one of these needed to be expressed in terms of the context of the question, making reference to the money. Simply listing the values for the measures is not comparative and should be discouraged.

Question 18

Many candidates showed poor understanding of the order of the steps required and misplaced signs or lost terms caused errors. The most common first step appeared to be showing an intention to add 4 to both sides. There were some candidates that tried dividing through by 3, however this was far less successful.

Most candidates realised they had to find a square root somewhere, but frequently this was done too early in the process, before an equation of the form $p^2 =$ had been formed.

A significant minority found the square root of the numerator only, but of concern are those candidates whose presentation of the answer was ambiguous: it was not clear whether the square root was intended to go over the entire fraction or not; some missed off the "$p =$" from their final answer. Full marks could not be awarded in these cases. The use of flow diagrams rarely led to any marks.

Question 19

Part (a) was usually answered correctly.

In part (b) candidates either recognised the link to difference of two squares and were able to give the answer, or failed to recognise it and attempted other forms of manipulation which failed to attract any credit.

In part (c) candidates appeared to find it difficult to recognise that this was a quadratic that would factorise into two brackets. Many flawed attempts at factorising into a single bracket were seen.

Question 20

Many correctly identified Cosine as the method of solution, found the angle and wrote an appropriate statement to go with it. Some candidates however tried Pythagoras with either the Sine or Cosine Rule with varying degrees of success.

Question 21

There were many successful answers to this question. Sometimes a correctly stated process was incorrectly calculated, or a sample size for the wrong key stage was worked out.

Question 22

This was not answered well, with many non-attempts. The biggest problem was an inability to write proportionality statements or equations, especially involving inverse proportion.

The value for r was not squared in many cases; nor were they able to use the reciprocal of r^2

A common incorrect answer was 5.44 (from a direct proportion solution).

Question 23

Many candidates were able to identify at least one bound, but very few correctly paired the upper and lower bounds. Weaker candidates just calculated $170 \div 54$

The most successful candidates used the standard 54.5 and 53.5 rather than attempting to use recurring decimals.

Question 24

Whether candidates gained any marks was dependent on whether they chose the correct formula from the formula page.

They then had to substitute the correct values. Candidates need to be reminded that Pythagoras cannot be used in a non-right angled triangle, and that setting calculators for use of degrees (rather than rad or grad) is also vital to gaining full marks.

There were many correct answers in part (a), though weaker candidates multiplied 6×7, showed $(6 \times 7) \div 2 = 21$ or $0.5 \times 6 + 7\sin 60$

In part (b) many failed to apply the correct order of operations, or failed to take a square root.

Question 25

Those that understood the method usually applied it and gained marks, but for many haphazard or trial and improvement methods resulted in zero marks.

Too many candidates attempted to create a second equation in order to use the elimination method of solving simultaneous equations and it was not uncommon to see $x+y=2$ squared to give $x^2 + y^2=4$.

Expansions of $(2-x)^2$ was also sometimes done poorly, leaving incorrect quadratic equations for solution.

Sketch graphs always failed to deliver the accurate required for the solutions.

Summary

- All candidates should ensure that they have all necessary equipment, particularly a calculator when sitting a calculator paper

- Candidates should remember to show all their working in order to support their answers.

- Centres need to continue practicing the solutions to unstructured questions. Many candidates were able to make inroads into some of the unstructured questions, whilst still gaining marks on questions which had a more traditional style

- Centres need to be aware that many able candidates lost marks in the easier questions in the first half of the paper, such as misuse of scales in question 3(a). To gain the highest marks candidates had to demonstrate high order thinking skills in a range of questions, not just in those questions towards the second half of the paper. Centres need to emphasise easier questions as much as the harder ones.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE