Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2019

Pearson Edexcel International GCSE
Mathematics A (4MA1) Paper 1H

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by 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

Grade Boundaries

Grade boundaries for all papers can be found on the website at:
https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

January 2019
Publications Code 4MA1_1H_1901_ER

Students who were well prepared for this paper were able to make a good attempt at all questions. It was encouraging to see some good attempts at topics new to this specification; the transformation of graphs and arithmetic sequences.

On the whole, working was shown and easy to follow through although there were some instances when it was very difficult to follow through working due to the seemingly random placing of expressions and equations on the page. It is in students' interests to ensure that working is clearly laid out and flows logically down the page. Some students did seem to rely too much on the formulae given at the start of the examination paper; for example, attempting to use $\frac{1}{2}ab\sin C$ rather than the simpler $\frac{1}{2}bh$.

Premature rounding continues to cause some students to lose accuracy in their final answers and thus the associated accuracy mark; the need to maintain accuracy throughout a solution continues to be something that needs emphasising in teaching.

1 Part (a) was generally well answered although the expression was occasionally partially rather than fully simplified. Part (b) was also well answered although the answer $e^2 - 2 - 15$ rather than the correct $e^2 - 2e - 15$ was sometimes seen. Other errors were usually down to poor arithmetic skills when dealing with negative numbers. Those who realised that the correct first step in (c) was to multiply both sides by 5 generally went on to score full marks although there were some students who, having reached the correct $3y = 1$ then gave their answer as 3 rather than $\frac{1}{3}$. Most who decided to give the answer as a decimal were successful but 0.3 and 0.33 were seen occasionally and were not acceptable.

2 Common errors in part (a) were to omit one or more of the vital components from the description or to write the centre using vector notation rather than coordinates or to give more than one transformation – usually combining a translation with a rotation. There was a varying degree in success in part (b); it was clear that some students did not read the question carefully enough and attempted to translate triangle B rather than triangle A. Despite the scale factor of 0.5 in part (c) it was very common to see students draw a triangle bigger in size than triangle D.

3 Whilst many correct answers were seen it was clear that a good number of students struggled with this question. The need to add the given probabilities and then subtract from 1 as the first step was usually realised but, having reached 0.26, some students were then unable to use a correct method to use the information in the question correctly to find that the probability of the spinner landing on yellow was 0.1. A common incorrect approach was to simply divide 0.26 by 2 or else to subtract 0.06 from 0.26

4 One common error was to use the price in March rather than February as the denominator. 109 and 1.09 were sometimes seen as the answer from those candidates who reached 109.76% or 1.0976 and failed to realise the necessity to subtract 100% or 1 from their answer. Some students opted to use trial and improvement, this was rarely successful. There was generally more success in part (b) than in part (a) with a

good number of correct answers seen although there were a surprising number of blank responses. Those who failed to gain full marks sometimes gained one mark for a correct method to find 19%.

5 A significant number of students failed to heed the instruction given in the question to “Give reasons for your working” and thus failed to gain full marks for this question. the majority of students who were able to make some headway into a solution realised the need to form an equation. Following the successful solution of their equation some simply substituted values back into the expressions used to form their equation and thus ended with a circular argument. It was vital to either substitute into the expression not used to form the initial equation or to form and solve a second equation. Students should be reminded that phrases such as ‘Z angles’ are not acceptable.

6 Whilst the majority of students were able to complete the table in part (a) correctly it was somewhat surprising to see a reasonable number of incorrect tables. Those who completed the table correctly generally then went onto score at least one mark in part (b). Some students joined the points with line segments rather than a smooth curve and so lost one mark in part (b) as did those who drew a straight line between (2, 0) and (3, 0) rather than showing a minimum. The instruction in part (c) was to find estimates for the solution of the given equation by drawing an appropriate straight line on the graph. Those students who ignored this instruction and either used the quadratic formula or drew a parabola therefore failed to gain any marks in part (c). If there is an instruction within the question to use a particular method then this instruction must be heeded.

7 It was rare to see an incorrect answer for part (a). In part (b), students who chose to write all the number in ordinary form before adding frequently made at least one error thus gaining the method mark only. Occasionally, numbers were multiplied rather than added. Whilst part (c) was more often answered correctly than not, a minority of candidates appeared to believe that only one decimal place should be included in their number when written in standard form and thus gave 9.8×10^6 as their answer; this was an incorrect answer and therefore could not be awarded the mark.

8 It was disappointing to see a number of students fail to gain full marks in this question due to not reading the question carefully enough; the answer given was sometimes 5.41 cm (the length of one of the equal sides of the triangle) rather than 15.8 cm, the perimeter asked for in the question. A significant number of students failed at the first hurdle as they were unable to use the information given about the area along with the length of the base of the triangle to find the height of the triangle. Some, having found the correct height (4.8 cm) of the triangle then used this as the length of the equal sides of the triangle. Further problems occurred when using Pythagoras’s Theorem as students did not always remember to halve the base when forming a right-angled triangle by drawing in the height.

9 The table and graph were usually correct. There was however, less success with finding the interquartile range in part (c). One error was to use 15 and 45 on the speed axis rather than on the cumulative frequency axis. Some worked out the median instead of the interquartile range, others added the lower quartile and upper quartile instead of subtracting them.

10 There were a variety of different methods that could be used to calculate the size of angle *BAC*. Some students presented their work in a logical, easy to follow manner whilst others had work scattered all over the place which made it difficult to follow their train of thought and award marks. It was disappointing to see a significant number of those who got as far as working out the size of angle *BAD* then give this as the answer rather than subtracting 20^o to give the size of the angle required by the question. Many did not read the question thoroughly to start and thought that *BD* was 8 cm and then went on to wrongly work out angle *BAD* from tan*BAD* = 8/13

11 Failure to deal with the negative sign outside the bracket correctly frequently led to the common incorrect answer of $\frac{7x+6}{6x}$ and the award of one mark only. There was evidence of incorrect cancelling; for example, having reached the correct answer of $\frac{7x-6}{6x}$ occasionally this was then spoiled by cancelling 6s and *x*s to reach a final answer of $\frac{7}{1}$ or 7.

12 Part (a) was generally awarded full marks or no marks. In part (b) few candidates wrote down the initial inequality, $x^2 - 9 < 0$ despite the fact that subsequent working suggested that they were trying to solve the correct inequality. Students would be well advised in future to write down the inequality in this type of question in order to secure a mark. They were a good number of correct solutions seen but, too often, only one critical value was given or the inequality given in the answer was incorrect.

13 For those that failed to score full marks, the most common numbers to be correct in the Venn diagram were the 18 for those studying just Religious Studies and the 15 for those studying all three subjects. It was clear from the answers given in part (b) that many students failed to realise that the answer for this part could be extracted from the Venn diagram. Many of the fractions given as the answer had a denominator of 65 rather than 18.

14 Those students who were able to write down a correct equation in part (a) generally gained full marks. Those who ignored the cube and write down $T = kr$ as their initial equation scored no marks as the question had been simplified.

15 A significant number of students who made a start to the question failed to realise that the hemisphere was solid and so had two surface areas to be considered – the curved surface and a flat surface in the shape of a circle. Another common error was to use r as the radius of both shapes rather than r and $2r$ for the radii of the hemisphere and cylinder respectively. For those who got as far as the volumes, a common error here was to forget to use brackets and use $2r^2$ rather than $(2r)^2$ within the formula for the volume of the cylinder. Some, but not many, fully correct solutions were seen to this question.

16 Many students were able to gain the first mark by multiplying the numerator and denominator by $(a+\sqrt{4b})$, this frequently led to the award of the second mark for the

correct simplification of the denominator. The third mark proved more difficult as many failed to realise that the term $2\sqrt{4b}$ could be simplified further. There were a good number of correct answers seen in part (b); common incorrect answers included 5 and −2.5.

17 Students who recognised the need to start by using the Cosine Rule generally gained at least two marks. Following this, substitution into the Sine Rule was the next step but after correct substitution this was sometimes rearranged incorrectly. Sometimes, the final accuracy mark was lost due to interim values being rounded; students are advised to maintain accuracy throughout their working and only round as a final step.

18 The most common score in both parts was no marks. Some fully correct solutions were seen and one mark was sometimes awarded in part (a) to students who had a partially correct curve; it was often the minimum that was in the wrong position.

19 It was extremely rare to see a correct answer to part (a). More correct answers were seen to part (b) but these were few and far between. Some candidates gained 3 rather than 4 marks in part (b) from giving the answer as $-3\pm\sqrt{x+9}$ rather than the correct $-3+\sqrt{x+9}$

20 The instructions contained in this question were to 'Show your working clearly.' Thus, a correct answer without any correct supporting working scored no marks. Some of those students who formed the correct equation of $\frac{n-4}{n}\times\frac{n-5}{n-1}=\frac{1}{3}$ were then unable to rearrange this correctly into a quadratic equation without fractions that could easily solved.

21 It was pleasing to see a good number of correct solutions to this question which assessed a topic new to this specification. A number of different approaches were seen. Some candidates, having solved an appropriate equation using just two of the terms and getting to the value $x = 5.5$ then failed to substitute this back in to show that the second difference was also 12.

Summary

Based on their performance in this paper, students should:

- practice using a calculator to carry out calculations with numbers in standard form
- ensure that working is laid out logically and clearly, especially when tackling longer problem solving questions
- read the question carefully and review their answer to ensure that the question set is the one that has been answered
- maintain accuracy throughout the solution to a question, only rounding the final answer
- ensure that a final conclusion is given when proving a given result

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom