Examiners' Report
Principal Examiner Feedback

Summer 2017

Pearson Edexcel Award
In Algebra (AAL20)

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Edexcel Award in Algebra (AAL20)
Principal Examiner Feedback – Level 2

Introduction

This level 2 examination paper provided all students with the chance to show what they knew and what they could do in Algebra.

Whilst some students were well prepared others seemed less so. Centres are advised to ensure all students are fully prepared for this level 2 algebra award examination which does include curve sketching.

Good students were able to display a range of skills and techniques, whilst weaker performances were often characterised by inaccurate arithmetic.

Report on individual questions

Question 1

Part (a) saw a variety of answers. A number of students tried to combine the terms in m and t. Many left a multiplication sign in their final answer and this could not score full marks.

Part (b) was well answered, however part (c) was not so well answered with p^6 seen as the common incorrect answer. Many students were able to simplify correctly the given expression in part (d). When a correct simplification was not arrived at, 1 mark was frequently awarded usually for dealing with the coefficients in the question. A common answer for 1 mark was $10r^2u$.

Question 2

Part (a) was generally well done with most students gaining full marks. Part (b) was not answered so well, the division by 2.5 caused a few problems. Many students reached the stage $2.5t = 10$ but then failed to solve it correctly. A popular incorrect answer was $t = 0.25$

Question 3

Students were generally successful in plotting the given points and gaining 2 marks in part (a). It was pleasing to see that the points were usually joined using a ruler rather than a freehand line. The accurate straight line seen allowed a good number of students to correctly answer both questions in part (b). In part 3(c)(i) many correct answers were seen, often using the plotted points to find the gradient.

In other cases the full method used was unclear; triangles were seen drawn against the line but were not labelled with the height and base. Therefore a method mark could not be awarded if the measurements used for the height and the base were incorrect and not marked on the triangle. A

common error was to count squares for the height of the rectangle as opposed to reading the scale.

Interpreting the gradient in part 3(c)(ii) was answered with varied success. Many students simply referred to gradient as being the steepness of the line rather than interpreting in terms of the given variables, hence not scoring the mark. The key was identifying that the gradient represents "the rate of change between pints and litres", often students who recognised this related the variables incorrectly eg number of litres in a pint. Incorrect references to correlation or the difference between the variables were seen but given no marks.

Question 4

A well answered question. The majority of students gained full marks on this question. The main error was where students failed to deal with the negative values of x correctly. However, they still gained two marks for a correct part line segment. The most successful approach seen was for students to set up their own tables and generate points to plot.

Question 5

Part (a) was a confidently answered question, the most common error, leading to the loss of a mark, was to not multiply the second term in the brackets leading to an answer of $3m^2 - 6$

In part (b) it was common for students to deal with the indices incorrectly by multiplying the indices together rather than by adding them leading to the incorrect response of $n^8 - n^6$. Some correct answers were seen but were subsequently incorrectly simplified to an answer of n, therefore leading to the loss of a mark.

Part (c) was a generally well answered question. If full marks were not achieved then a mark was frequently awarded for expanding one bracket correctly or for one correct term from 2 terms, most commonly $5q$. If a correct expansion of both brackets was seen then where errors were made in collecting terms it was often in dealing with the negative sign.

Question 6

Part (a) received a mixed response. Some students went on to calculate the 4th term. Many could use the rule effectively but some arithmetic errors were seen. The common error seen in part (b)(i) was in the arithmetic but most answers were correct. For part (b)(ii) a good number of correct answers was seen. However the series decreasing caused some problems and a minority of students gave the value of "$9n$" instead of "$-9n$". The most common incorrect answer was "$-9n + 91$". In part (c) as expected many students tried to work out 40^2

Question 7

Most students were confident with the concept of factorising an expression. Part (a) was very well answered. However students should be reminded of the need to close off brackets in algebra. Part (b) was also well answered. Students who did not identify the highest common factor of the 2 terms were often successful in a giving a correct partial factorisation for 1 mark. For part (c) many fully correct factorisations were seen. The most frequently seen correct partial factorisation was to remove r as the common factor and write $r(t - rt)$.

Question 8

Over half the students gained full marks on this question. In both parts of this question the students who lost marks often included the types A and B in their answers. Incorrect answers such as $5Ax + 8By$ and $6Ax + 5By$ were seen. Other students ignored the number of components and gave answers such as $5A + 8B$, the role of x and y was pivotal in this question.

Question 9

The majority of students seemed familiar with the general shape of the parabola and knew that the given equation would have the y-axis as the line of symmetry. It is important that students mark on the value of the y-intercept as this was missing in many cases. Some students drew a parabola which was the wrong way up, ie for the graph of $y = -x^2$. There was a significant minority who did not score on this question and centres are advised to ensure coverage of this topic within the specification as curve sketching is one of the skills students seem to continue to find difficult.

Question 10

Part (a)(i) was well answered by most students with many gaining full marks but a minority having obtained 12 – 15 correctly then gave 3 as the answer, not dealing with the negative answer correctly. In part (a)(ii) some students failed to deal with the double negative when substituting. All too often the substitution gave rise to the equation $20 = 2s - 12$. Hence the most popular incorrect answer was $s = 16$. A few students ignored the 2 as the coefficient of s and solved $20 = s - 12$ instead. Students are reminded to read the question carefully.

For part (a)(iii) many correct answers were seen. Students who lost marks typically made one of two errors either rearranging to get $m - 2s = 3t$ or from the correct rearrangement of $-3t = m - 2s$ they then failed to divide by −3 and just divided by 3

Two thirds of the students scored full marks in part (b). In part (b)(i) poor arithmetic skills were displayed by some students. Having obtained 100/4 as the correct substitution, several students could not do the division correctly, often obtaining 20 as the answer. In part (b)(ii) marks were often

lost when students failed to isolate the final answer. It was not uncommon to see correct working with "8" identified in the working but "64" given as the final answer. A common incorrect answer was 32 when students divided 64 by 2 instead of finding the square root.

Question 11

Overall this question was well answered. In part (a) over three quarters of the answers seen were correct. In part (b) the majority of students gave a fully correct response. However a number of students were confused by the use of inequality notation and tried to make this a finite inequality.
Part (c) was answered well with the vast majority of students able to represent this inequality pictorially. Where a correct solution was not seen, 1 mark was frequently awarded for having a line from -3 to 0 with incorrect end point notation.

Solving the inequality in part (d) was done correctly by the majority of students and when not fully correct 1 mark was often awarded for arriving at -1 as the critical value or subtracting 9 from both sides. Progressing from $4d > -4$ was where any difficulties encountered occurred. Some students thought they needed to reverse the inequality sign due to the negative constant term. More rigour in the algebraic solving of inequalities, including keeping track of the inequality sign rather than replacing it with an equals sign, is advised.

Question 12

Almost all students scored some marks on this question. However of the errors seen a failure to understand the horizontal time scale was the main cause of a few problems. Some students used one square to represent 5 minutes but then often recovered by joining "their" end point to (11:00, 3) thus being awarded 1 mark for part (a).

In part (b) the majority of students who used a "build up" method usually gained full marks on this question. However those that chose the standard approach of "speed = distance/time" failed to obtain the correct answer due to the units being in minutes. However, where students knew that speed was distance/time and wrote 1/15 they were awarded a method mark.
It is important that students are taught the understanding of gradients to allow them to use appropriate methods which do not depend on tricky arithmetic.

Question 13

Both parts of this question were well answered. In part (a) students who used the approach of reversing the operations ie $5 \times 2 = 10$ followed by $10 - 4 = 6$ were invariably successful. A common misunderstanding of the algebraic process required was to start by subtracting 4 from both sides of the equation. A few students tried to use flow diagrams but these rarely worked, especially in part (b).

Part (b) saw students usually employing their algebraic skills. Many correct solutions were seen; if not 1 mark was often rewarded for a correct expansion of the brackets. From here some students were able to demonstrate a method to isolate terms in y for a second mark but then made an error in the final step.

Question 14

In line with previous series, dealing with the negative values of x caused problems in this question, resulting in the loss of marks. Where the table was correct then the graph was often drawn correctly although some students lost a mark for drawing the graph with a line segment between $x = 2$ and $x = 4$

For part (b) many students drew the correct line with equation $y = 14$ but lost the accuracy mark as they did not read the horizontal scale correctly, often giving two positive values although they were usually reading from the x-axis on opposites of the origin.

Question 15

Part (a) was answered with mixed success. When students are drawing a triangle onto the line so that they can work out the gradient, they should be advised to mark on it the height and the base of the triangle. They should also be clear about the order of their division; 4 ÷ 2 was not always correctly processed. Students are reminded to look closely at the scale on all graphs.

Good progression from part (a) to part (b) was seen. Those who were awarded full marks in part (a) were usually able to progress to full marks in part (b), demonstrating good knowledge of the general equation of a straight line. It is important, however, that a full equation is given including the $y =$. Students whose answers to part (a) were incorrect could gain full marks in part (b) following through their gradient; again this was often done successfully.

Summary

Based on their performance on this paper, students are offered the following advice:

- Ensure you have a good understanding of all topics in the specification
- Ensure you can deal with negative signs in both numerical and algebraic manipulation
- Be able to recognise the type of graph required from the equation given
- Carefully read and interpret the scales on given graph questions
- Show clearly all stages in working out a gradient

Grade Boundaries

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