Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

June 2023

Pearson Edexcel Awards
In Algebra (AAL20)

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

Introduction

All questions on this paper were accessible and provided students with the chance to show the relevant skills required by the specification.

Many displayed good skills but some found the use of powers with algebraic expressions difficult to factorise.

The use of negative x coordinates in graphs still leads to many errors. A sense check of the shape expected and then drawn may help with this problem.

Reports on Individual Questions

Question 1

Part (a) over half of students gave the correct answer, unfortunately many students did not see m and m^2 as different terms. $5\,m^2$ and $6\,m^2$ were incorrect answers often seen.

Part (b) was well answered with almost 80% of students giving the correct answer.

Part (c) was very well answered and only a few incorrect answers were seen.

Part (d) was again well answered, with most candidates scoring full marks.

When only one mark was awarded, it was usually for an incorrect term in r, often not writing any term at all, so it was assumed that students were incorrectly thinking $r^1 = 1$.

Question 2

Part (a) was very well answered, and the mark was sometimes lost if an expression was not used or the expression was reversed i.e. 35-h being written as the answer.

Part (b) Another well answered question with most students gaining full marks. The most common error seen was to not interact with the numbers 50 and 200 and merely give the answer as $x + y$.

Question 3

Part (a) was well answered with only a few incorrect answers seen.

In part (b) many correct answers were seen. Of the students who did not score full marks the vast majority gained 1 mark on this item for a correct partial factorisation.

In the final part of the question the answers were very mixed. A popular incorrect factorisation was $ab(ab^2 - 2b)$ which scored no marks.

Question 4

Most students were awarded this mark.

Question 5

Part (a) most students scored full the mark. A few drew $x = 4$ and some just plotted (0,4) but this question was well answered.

In part (b) many correct answers were seen and others drew the correct line for the positive x values. Students are advised to look at their final answer and see if their line looks sensible.

Although a table was not asked for many use this method to plot the line. This is a sensible approach when asked to draw a line of the form $y = mx + c$

Question 6

Parts (a) was very well answered. Of the few incorrect answers seen, most scored at least one mark for one correct end. The common misconception seemed to be an arrowhead being drawn at one of the two ends.

Part (b) was not as well answered, and the incorrect answers were very varied. The inequality used was incorrect or the answer written with the inequality reversed.

Part (c) was well answered but 4 was a popular incorrect answer.

Part (d) was generally well answered. Most students started correctly obtaining $4y = -4$ but some then went on to give y as 0 or –16.

Others went on to find the critical value of –1 and correctly give the answer with the correct inequality. It is worth noting that a few students reversed the final inequality, probably due to the final answer being a negative number. This would appear to reflect a misconception of if there is any negative number in an equality, the inequality must be reversed.

Question 7

Almost every student scored at least one mark for Part (a) of this question. Any error seen was usually in the second term; sometimes 6 was seen instead of 9, or 3 instead of 2 as the power.

The answers to part (c) were more varied. A significant proportion gave the answer as $10x$ only, the error being down to manipulation of the negative sign in front of the second bracket.

Question 8

Part (a) was again well answered. In Part (b) many correct answers were seen, with evidence showing the skill of finding a gradient was well understood.

In part(c) some students did not fully understand what the gradient represented. Incorrect answers such as; steepness of curve, cost of lengths of material were given whereas students do need to refer to 'cost per metre' in some way. Centres should encourage the use of the word 'per' when describing gradients.

Question 9

This question produced a range of marks but was well received by many. The table was usually correct, but a few arithmetic errors were seen.

For those that had a correct table most but not all plotted correctly. Centres should give students opportunity to work with a variety of scales on each axis.

Only a few students joined the point with line segments, if a curve is required then this is not an acceptable approach, and the accuracy mark will be lost.

Some blank responses were seen for part (c) whilst others read off the points when $y = 0$. When the line y = 5 was drawn most students gave both answers accurately but a few did just give one of the two possible answers and hence did not gain the final accuracy mark.

Question 10

Part (a) was well answered with almost all students able to give the correct answer.

Part (b) was also very well received with almost all students gaining at least one mark and most gaining both marks. The most popular incorrect answer was 1.5.

In part (c) over three quarters of the cohort gave the correct answer of those that did not some scored the mark for $3n$. On the rare occasions when the answer was incorrect the most popular incorrect answer was to write n + 3.

Part (d) was answered well but some students multiplied the 4 by 12 and then did not know whether to add to the 80 or subtract. Occasionally 80 was multiplied by 4. Some students used the continuous subtraction of 4 but did not realise that the first term was in fact 76 not 80 and hence had the incorrect answer. Some arithmetic errors were seen in this question even though the arithmetic required was simple.

Question 11

Parts (a), (b) and (d) were well answered. If full marks were not awarded in part (d) then often part marks were awarded. However, in part (c) the main error was in multiplying out the bracket correctly, $3g – 12 – 12$ is not correct or manipulating the right-hand side accurately. For example, $3g – 12 – 4$ was often simplified to $3g – 8$. Another mistake was to give the final answer as –16 due to errors when dealing with negative signs.

Question 12

For part (a) the first two sections of the graph from (0,0) to (60,40) and then along for two and a half squares was well done. However, the latter stage of the graph was not so well done with the final point often incorrectly found and not at (110,78), many felt the need to end at (120, 80).

In part (b) the conversion of minutes to hours was the most popular loss of a mark in part (b). Many had a correct triangle to find the gradient, obtaining 30 ÷ 20 or stating 1.5 but then failing to multiply this by 60.

Several students tried to convert to hours initially and obtained a third of an hour but then incorrectly calculated 30 divided by a third often giving 10 as the final answer.
Centres are advised to practice non calculator arithmetic with simple fractions.

Part (c) was usually correctly answered.

In part (d) a variety of answers were seen. Some students misread the graph or missed out one part of the journey whilst others gave an answer of 80 which was the two 30's plus 20. The 20 coming from reading of the graph but not realising the distance travelled back towards the station was indeed 40 not 20.

Question 13

Overall this question was well answered. Part (a) was generally answered correctly but most students. One error seen was where the student wrote the numerator as 465 and divided this by 3 giving an incorrect answer of 155.

Part (b), the correct substitution into the equation was usually seen for a mark but the students then failed to manipulate these to gain the correct answer. One noticeable error was inaccurate arithmetic where the students were not able to multiply 15 by 3 correctly.

Part (c) was also well answered. The most common errors noted were in the expansion of the brackets where $10t + 1$ was often seen, or the incorrect initial step where the student subtracted to 1 first to obtain $w - 1 = 10t$.

Question 14

Students found this question challenging. Part (a)(i) was reasonably well answered however (ii) was significantly challenging. Some students gained the answer of 3 from a correct method whilst others found 3 but from incorrect working and hence gained no marks for this part. These students incorrectly "expanded" the brackets to give $x^2 - 9$, then $x^2=9$ and then $x = 3$.

In part (c) few fully correct diagrams were seen. Most students gained at least one mark for a parabola in the correct orientation or a curve crossing the vertical axis at 9 or following through their answer to (a)

A few gained two marks for a correct orientated parabola crossing the vertical axis at 9 of following through their part (a) but very few were able to draw a parabola 'sitting' at the point (3,0).

Question 15

This question was generally well answered with any students able to gain full marks. When full marks were not awarded it generally arose when calculating the gradient, a common incorrect answer was 4/3 or – ¾. Even with this error students could still go on to gain a mark for an equation in the form $y = mx + 3$.

Summary

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

- ensure you can carry out basic arithemetic accurately, particularly when dealing with negative numbers
- work more with negative numbers and fractions in algebraic manipulation
- sketch graphs when asked to and do not relay on plotting values
- remember to use the scale correctly on given graphs.

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