Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel Awards
In Algebra Level 3 (AAL30) Paper 01

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Edexcel Award in Algebra (AAL30)
Principal Examiner Feedback – Level 3

Introduction

This level 3 examination paper provided all students with the opportunity to succeed in this qualification. It was accessible to all students.

Students were given the opportunity to display a wide range of skills and techniques. These included graph sketching and algebraic manipulation. Good students displayed a full range of skills whilst students who are yet to reach the borderline often display stronger skills in either graph sketching or algebraic manipulation.

Students should be reminded that, in the general case, when the square root of a number is required, it will have both a positive and negative value.

Reports on Individual Questions

Question 1

This question was very well answered.
Part (a) if full marks were not awarded the main error made by students was in squaring the individual terms e.g. $(3d)^2$ was often incorrectly given as $3d^{2.}$
Few students recognised that the difference of two squares could be used to answer this question.

Part (b) was answered well by many students, but a few could not combine the indices fully.

Part (c) this part was not so well answered with many gaining only one mark. Many did not add initially and so tried to apply the power to an unsimplified expression.

Part (d) students often only scored one mark here as well. They could see that a common denominator was required but could not process this accurately.

Question 2

This question was very well answered with excellent understanding of the need for a circle centre (0,0) radius 5 to be drawn but there were too many candidates who were ill equipped and resorted to free hand attempts.

Question 3
This question was generally well answered. However, a minority of students stopped at the intermediate stage of $2w(t+3)$ and $-5(t+3)$ and others made errors with the negative signs often giving of $2w(t+3)$ and $-5(t - 3)$ and thus gaining no marks.

Question 4
Most students could draw the required lines for this region. However, some failed to realise that the region could be open and lost the accuracy marks for shading.
Whilst the other mistake seen was to draw $y = -1$ and $x = 2$ this was not seen too often.

Question 5
The question was generally not well answered with many making this question difficult for themselves by finding a common denominator and carrying it through the whole question and never forming an equation they could solve.
Of the students that merely "cross multiplied" many were able to manipulate the algebra to the point of $x^2 + 8x = 0$ but stopped here whilst others only gave one solution. Students should be reminded to ensure they consider two solutions for quadratic equations (even if one is repeated).

Question 6
On the whole part (a) of this question was well answered. A few students mixed up the order of the coordinates or inverted the gradient whilst others found dealing with negative numbers difficult. These are basic skills which are essential for anyone gaining a level 3 qualification in algebra.

Part (b) allowed follow through and so often 2 marks were scored for finding the value of c in the equation. Decimal or fractional answers were accepted for the accuracy mark.

Question 7
In part (a) many students stated 0 and gained the mark. A few went on to incorrectly intercept the zero which did mean their answer was not fully correct and so the mark was not awarded. Students should try to be succinct with their answers.

In part (b) the majority of the cohort the correct calculation of speed multiplied by time, but many used the incorrect units and gave a final answer of 120. This was given the method mark only.

It was very pleasing to see a good number of graphs of the correct layout, positive gradient through (0.0) however the scaling was not always correct, and some students went beyond the 20 minutes to reach their final distance of 2 km. Students are reminded to read the scales used carefully.

Question 8

Part (a) was generally well answered with the majority of students gaining full marks. However, students should be reminded that when asked for the value of something they should give their answer either as fully processed number e.g. 1/0.5 must be evaluated to give 2.

Part (b) by many students knew that equal roots came from looking at $b^2 - 4ac = 0$ and so were able to go on and score full marks. Unfortunately, there was a sizeable number who find the arithmetic of $\frac{1}{4} \div 4$ too difficult to evaluate and so lost the final mark for either an unevaluated answer or an arithmetic error.

Question 9

In part (a) the majority coped well with the inverse proportionality but were much less successful when required to find the product of 20 and 0.25 again a basic arithmetic using a decimal lead to the loss of the accuracy mark.
A few students tried to use direct proportion and gained no marks.

For part (b) most candidates gained the first mark for clearing the fraction either by getting $w(u - 2)^2 = 3$ or expanding the bracket whilst still in the denominator of the RHS then cross multiplying. Those that chose to expand the bracket were rarely successful and produced copious algebraic expressions and equations. The candidates who chose to progress by taking the square root at the unexpanded stage were much more successful though very few offered ± when taking a square root and lost the final mark. On a paper like this it should be stressed to students the need to consider both the positive and negative elements when square rooting.

Question 10

This question produced a good number of correct answers with students who attempted to factorise the quadratic more successful in finding the critical values than those who chose to use the quadratic formula. Where the critical values were found but the final mark was not awarded this was more often due to writing the critical values with an equals sign rather than an incorrect attempt at expressing the critical values in an inequality.

Question 11

Part (a) was well answered. It was pleasing to see the more common approach of using $a + (n - 1)d$ rather than finding the nth term and substituting in. In a few cases d was used as 4 not - 4 which could not be given any credit.

Part (b) was less well answered, often this was attributable to errors in arithmetic rather than conceptual understanding. Although errors in the recall of the sum of the terms formula were sometimes seen.

Those candidates who could recall the formula and substitute in the values were often hampered by arithmetic errors, it was not uncommon to see 51/2 = 20.5 or an incorrect answer to 25.5 × - 204. Few students looked for easy computation and carried out - 204 ÷ 2 = - 102 and then multiply by 51 but instead tried to multiply by 25.5 adding extra complexity to the question.

Question 12

In part (a) the *y*-coordinates were generally well calculated, difficulties arose in some cases in working out the values for $x = 1$ and $x = 3$ when a fraction had to be cubed.

In part (b) points were generally well plotted, candidates could consider more carefully their choice of scale to enable the plotting of non-integer values to be easier and more accurate. They should also note that scales must be linear.

Part (c) had more correct responses for part (i) than part (ii). In (i) a correct reading was seen in many cases, it was pleasing to note that very few candidates gave the answer as a co-ordinate as this could not be awarded the mark. In part (ii) it was evident that many students did not have the knowledge or skills to transform the given equation into the required format.

Question 13

This was a well answered question. There was clearly a good knowledge of the relationship between the gradient of the tangent and the gradient of the normal. Students were able to use a given coordinate to find the value of c and write the equation in the form $y = mx + c$. Unfortunately, difficulties were seen in rearranging $y = \frac{-1}{4}x + \frac{21}{4}$ into the required form meaning the final mark could not be awarded.

Question 14
A well answered question which demonstrated good use of the trapezium rule formula. As with some previous questions errors in arithmetic were seen meaning that the final accuracy was lost. In some cases, the height of the trapezium was taken as 1 not 0.5. Some students calculated the areas of 4 separate trapeziums which was acceptable and often led to a correct answer.

Question 15
In part (a) (i) correct responses were frequently seen, the expansion of the bracket and the rearrangement were clearly seen. Occasionally the coefficient of the x term was given a –8 as a result of the incorrect collation of the two terms achieved.
In (a)(ii) recall of the quadratic formula was good as was the manipulation of the surds which lead to a high number of fully correct responses. Completing the square to solve the equation was also seen and carried out with a high degree of success. Students could gain follow through marks on this question but when a student arrives at the square root of a negative number on this specification that should be an indicator to check previous working.

Part (b) was well answered, and it was evident that many candidates were familiar with the completed square form. The main error seen was in the arithmetic to evaluate the final value of n. Part (b) (ii) was less well answered. In part this was due to not using their answer to part (a) as the question stated “hence”. Starting again with an alternative method could not gain any credit. For many of those who did use their answer in part (a) only one solution was given as the negative root was not considered.

Question 16
This question was well attempted by most students, with many scoring 3 marks for either one set of solutions, usually forgetting the negative square root or for a full answer in only one variable. Some errors in substitution were seen which resulted in $3y^2$ being used not $(3y)^2$, this error in notation meant marks could not be awarded. Those who found all solutions tended to pair them clearly as required for full marks.

Question 17
In part (a) some clear and succinct solutions were seen. Where full marks were not awarded then often 1 mark was awarded most commonly for seeing $(\sqrt{3})^2 = 3$. The hardest term to convert appeared to be $(\sqrt{3})^4$. In some cases, the correct answer was seen but then this was divided by 4 losing the accuracy mark. Incorrect responses arose when addition was confused with multiplication for laws of indices, leading to $(\sqrt{3})^{10}$.

Some students found part (b) more challenging, but the most common approach used was to add the fractions with a common denominator and write as a single fraction for M1. This was often done well leading to the correct answer. Those who got to a single fraction dealt well with multiplying surds. Candidates would be encouraged to make sure that terms are bracketed for multiplication and to appreciate that $\frac{4}{-1}$ is not simplified fully.

Question 18

It was pleasing to see a good number of correct answers in this question with part (b) being better answered than part (a).

In part (a) some students had the correct shape and size in the wrong position often not moving the points (1, 2) and (5,2).

For part (b) students seemed to know that this was a translation. If 2 marks were not awarded, then 1 mark often was for a horizontal translation often 2 right.

Question 19

The majority of students recognised the fact that a hyperbola graph was required however only a small number of students scored full marks on this question. Many did correctly show the position of the 2 asymptotes but failed to fully label their sketch. Students should be reminded that to complete a sketch the asymptotes and the crossing point on the *x* axis should be labelled.

In summary centres are advised to:

practice papers without calculators to develop and practice arithmetic skills ensure students know to how to use the symbol ± when rooting algebraic terms insist on thorough labelling when sketching graphs.

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