Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2024

Pearson Edexcel Level 3 Award
In Algebra (AAL30)

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Introduction

This paper provided students a good opportunity to show what they knew and display a variety of skills.

All questions were attempted by the majority of students and from the standard of answers seen students appeared well prepared. It was pleasing to see many correct answers and a good range of knowledge displayed by the cohort.

Also, a good amount of clear working out was shown.

Although a few arithmetic errors were seen these were not a dominate feature on anyone question.

Reports on Individual Questions

Question 1

This question provided a good start to the paper and was accessible to all students, part (a) was very well done, very few mistakes were seen but the most common error seen was to give +4 instead of -4 as the constant.
In part (b) there were very few incorrect answers seen. Of those answers that were incorrect most just squared the 2y and the 5 but forgot to find the cross terms.
Although part (c) was still well answered, some errors were seen. These errors were fairly evenly spread between a wrong coefficient (18, and 36 being the common wrong answers) and the wrong *t* term (powers of 7 and 6 were common). If only one error was seen, then students were awarded 1 mark for a correct term.
In part (d) many correct answers were seen. $-3\frac{1}{4}$ was seen in different equivalent forms and $-\frac{13}{4}$ was often seen as the index. Some students only gave the index and no letter, this is not correct, and a full expression was required.

Question 2

A well answered question with many candidates able to make a good rearrangement as far as $m^2 = \frac{-3}{d-6}$ or $m^2 = \frac{3}{6-d}$ for 2 out of the 3 marks. The accuracy mark was often not awarded due to omitting the sign ± on the final answer and only giving the positive root.
When the first step to rearrange the formula was to multiply throughout by m^2, a common
error was to not multiply all terms, sometimes resulting in $dm^2 = 6 - 3$, this was not awarded any of the marks.

Question 3

The use of the quadratic formula was well presented. Most students gave both correct answers. Where errors were seen it was often using the incorrect formula rather than arithmetic errors that prevented marks from being awarded.

Question 4

Many fully correct responses were seen with the correct region identified and accurate lines drawn.
It was pleasing to see many candidates rearranging the equation $y - x = 6$ into the form $y = x + 6$ to draw this correctly. The line that proved most challenging to draw was $3x + 5y = 15$. Students are often given lines in different formats in this question and centres are advised to practise drawing lines with all possible formats.

Question 5

Part (a) was well answered with the correct graph of a circle centre origin radius 4 usually drawn accurately. Some students drew freehand circles and centres should encourage students to use the correct equipment in the examination.
Part (b) was not well answered, the modal wrong answer was $y = 4$ and some students just gave coordinates rather than an equation.

Question 6

There were a good number of correct responses in part (a) which resulted from accurately isolating terms in x and giving the correct value with the correct inequality sign as the final answer. The common error seen was a difficulty with the negative signs, $-7x - 3x = -4x$ was commonly noted. Errors in arithmetic, such as 47 + 13 = 50 were more common than expected at this level. In a few cases a correct isolation of $-x > -6$ was followed by an answer of $x > 6$, demonstrating a lack of understanding of the effect on multiplying or dividing an inequality by a negative value.

In part (b)(i) most students gave a correct factorisation. In a very few cases the signs in the brackets were reversed. The factorisation was well used in (b)(ii) with many candidates giving a fully correct solution. These were often aided by a sketch of a parabola to ensure the correct inequality signs were given. In some cases, only the critical values were identified. The final answer being given with either equal signs or both given as less than, following the sign in the original inequality, thus not reflecting the properties of the quadratic inequality.

Question 7

The first part of this question was well answered. Sometimes the gradient was not isolated entirely and $\frac{3}{4}x$ was stated as the gradient. Students should give the numerical value only for the gradient.
In part (b) most students gave the correct answer. Of the few incorrect answers given because the most common error was to give the reciprocal but not the negative for the gradient.

Question 8

This question was well answered.
There were many convincing uses of the discriminant to establish that the given equation had no real roots. Unfortunately, in some cases, arithmetic errors such as 25 – 32 = −13 led to a loss of the accuracy mark. If students substituted into the full quadratic formula, rather than just the discriminant, the examiner needed to be convinced that the discriminant was being used to make the decision, fortunately this was rarely seen.

Question 9

A lot of fully correct solutions were given in part (a) and the common errors seen were to only partially factorise or to attempt to add the original components.
In part (b) some complete factorisations were given but many students scored only 1 mark for a partial factorisation with at least 3 factors such as $q^2(p^2 - 1)$.

Question 10

A well answered question, when full marks were not awarded in part (a) one mark was often given for $(x + 4)^2$ or $a = 4$ on the answerline. A common partially correct response seen was $(x + 4)^2 + 11$
In part (b) most students knew the connection between the completed square form and the turning point and gave a correct co-ordinate.

Question 11

This question was well answered with virtually all students scoring at least 1 mark here and the vast majority scored 2. One mark was scored by those who gave an answer of $5n+c$, where c was not 1, this was usually because of an arithmetic error.
In part (b) most answers were correct but there were some arithmetic errors seen when dividing 120 by 5.
In line with other series the least well answered part of this question was working with the brackets in the expression $\frac{1}{2}\, n(2a+(n-1)d)$, a full substitution was often seen but the final mark was often not given because of an arithmetic error in calculating 50.5 × 512.

Question 12

A high number of correct responses were seen to all parts of the question. In part (a) some students were unable to be awarded any marks as they confused direct and inverse proportion, starting with $t = kv$ or $t = \frac{v}{k}$.
Those students who got part (a) correct tended to score full marks in part (b). Some students who had failed to score in part (a), started again in part (b), using a numerical, rather than algebraic approach and arrived at a correct answer.
In part (c) many correct sketches were seen but the most common incorrect answers were either a straight line with a negative gradient or a line equivalent to $y = x$

Question 13

This question was answered by some students, but many confuse the equation for the product of the roots with that of the sum of the roots. This was the main error seen.

Question 14

A good proportion of students were able to gain at least one method mark on this question, usually for substitution.
The most common errors occurred when students tried to rearrange the formula to isolate term in c. Students working at level 3 should feel confident when re arranging a formula involving a simple fraction.

Question 15

It was pleasing to see so many students were successful when sketching the graph and many were able to draw the asymptotes and general shape. A few students drew asymptotes at
$x = 0$ and $y = 1$ instead of $x = 1$ and $y = 0$. Another common occurrence was to not label the point of intersection of the graph with the y-axis. Students should read the question carefully as it clearly asks for labels.

A few students drew a quadratic cure and clearly had not read the instruction 'show clearly any asymptotes'.

Careful reading of the question and checking you have done everything requested would help students to gain all the marks available in a question.

Question 16

Many students solved this set of simultaneous equations correctly.
Some students only solved for values of x or only gave one pair of answers, whilst a small number did not pair up their solutions.
Students would benefit from further practice factorising non-monic quadratics.

Question 17

This question was not answered as well as other questions on this paper with some students finding surd manipulation challenging.

In part (a) many students were able to gain one method mark for a partial expansion and simplification, but not all students could work with the brackets to obtain a fully correct expansion and some multiplied by an extra term of $\sqrt{5}$.
Some students obtained the correct answer but then decided to divide throughout by 2 which was incorrect, and the final accuracy mark was not awarded.

In part (b) some fully correct answers were seen but others were unable to score as they could not make a start to rationalise the denominator other errors occurred when students tried to manipulate the surds using multiplication.

Question 18

Many correct answers were given however some students were unable to find the correct gradient usually because the incorrect formula was stated, or they made an arithmetic error dealing with negative numbers.
Almost all students were able to substitute appropriately however errors were again seen when dealing with negative numbers. There were a few students who found the correct values for gradient and intercept but did not read the question stem which stated 'Give your answer in the form $y = mx + c$' so did not gain the accuracy as their answer was not given in the form required.

Question 19

Part (a) was very well answered. If full marks were not given this was due to plotting points inaccurately with only a few forgetting to draw a curve through the points.

However, part (b) was not well answered. Some fully correct answers were seen but many students just read off at $y = 3$ and did not manipulate the expression given to tie in with the graph drawn.
Some translated graphs were drawn, and this was a popular way to achieve the correct answer.

The trapezium rule was usually given and used correctly. However, some used the incorrect value of h whilst others gave an answer of 6.25 due to an arithmetic error.

Question 20

Both parts of this question were well answered, and many students got at least one part fully correct. In part (a) the common errors seen were to reflect in the y-axis or to reflect in the line $x = 0.5$ whilst in part (b) the common error seen was to translate in the wrong direction.

Question 21

This question was very well answered.
Part (a) and part (b) were usually fully correct.
Part (c) was a little more challenging and some students did not recognise that area represented distance whilst others may have realised this but incorrectly evaluated the area, usually finding it for a different time period.
There were a few blank responses for this part of the question.

Question 22

The first part was well answered, usually fully correct. Some students could not factorise the two expressions correctly, but this was very rarely seen.

In part (b) a pleasing number of students gained full marks. However, when full marks were not awarded, there were errors in writing this as a single fraction or errors when expanding brackets. Also, some students were able to do this correctly but then were not always able to then solve their quadratic and some students only gave one solution.

Centres are advised to practise algebraic manipulation with fractions to ensure success at this level 3 qualification.

Summary

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

practise giving the equation of straight lines in all formats

remember the formulae required for this specification

take care when manipulating artimetic particularly with fractions and neagtive numbers

check that your final answer, answers the question asked and is in the required format.

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