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Principal Examiner Feedback

January 2015

Pearson Edexcel Level 3 Award in Algebra (AAL30)

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January 2015
Publications Code EA040356

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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 students.

Whilst many students were well prepared for this examination others indicated by leaving whole questions blank a lack of knowledge of certain content areas. Centres are advised to ensure all students are fully prepared for this level 3 examination.

Good students were able to display a wide range of skills and techniques. However weaker performances were characterised by poor graph sketching, incomplete arithmetic and failure to answer the question asked.

Students should expect to be tested on all areas of the specification and will be at a disadvantage if they do not have experience of all topics stated in the specification.

Reports on Individual Questions

Question 1

Many students demonstrated a good understanding of what was required in this question. The first three parts were well answered, although some students changed the letters used in the question. However in part d, many students had difficulty in finding the value of *b* and some even multiplied by $(\frac{w}{w})$.

Question 2

A significant number of students were able to gain marks on this question. Parts (a) and (c) were well answered. Occasional sign errors were seen in part (c). Students did not always score full marks on part (b) because they did not simplify fully. For this qualification, and at this level, students are expected to always simplify fully. Far too many students just removed a constant from the expression given and this is not a level 3 skill.

Question 3

In part (a) many students were able to give the gradient as $6 \div 8$ but they often did not consider the negative nature of the slope and left the gradient as a positive number.

Most were able to then use the coordinates given to find a value of *c* in the equation. Some had difficulties dealing with fractional values and others ignored the format in which the answer was required.

In part (b), the mark for finding the perpendicular gradient was sometimes awarded but the mark for the use of the point $(0,-5)$ was the most commonly awarded mark. Not all the students that did nothing wrong were awarded full marks, this was because the final answer was not always given in the correct form. Centres should be aware that equations in different forms are required in this specification and so students must read the final form requirements carefully and adhere to them.

Question 4

The majority of students scored full marks on part (a) of this question. However in part (b), the majority of students gave an incorrect answer. Most misinterpreted the question and gave an answer of 2 or above.

For part (c) accurate readings from the graph were required and most were able to do this. A sizeable minority however thought this was the trapezium rule question and proceeded to calculate the area under the curve.

Question 5

In part (a) the vast majority of students gained the first M mark for either arriving at $5-n>18$ or finding the critical value of -13. However getting the inequality the correct way round proved difficult complicated by the fact that many couldn't convert from $-n>13$.

For part (b) many students complicated matters by expanding the brackets to a quadratic and then factorising again ...often not to the original. The majority of students were unable to find the 2 critical values many only offering 4 or even -4 and losing the critical value of 0 by dividing throughout by x. Even with those students that did find the 0 and 4 many then struggled to deal with the inequalities. Some drew a sketch to aid their answer but too many tried to give the answer as a closed interval.

Question 6

Initially this was very well answered with nearly all students scoring full marks in part (a). There was an occasional error with the sign of the last term.
Many students did not see the connection between parts (a) and (b). On the whole the factorisation of the denominator was successfully achieved although some did lose a factor of 2. The main errors were, not to simplify fully leaving the answer in the form $\frac{2}{2x-4}$ and thus the final mark was lost or, having cancelled correctly, giving the answer as $x-2$ and not as a fraction.

Question 7

On the whole the first part of this question was well done by most, though some did find some of the lines difficult to draw correctly. Centres should ensure that students use rulers to draw straight lines. The major error seen was to try to use an axis as one of the boundary lines.

For the second part many were unable to meet the requirement for integer co-ordinates and gave decimal answers mainly from the corners of the region. Others did not seem to understand the question as there were many blank responses.

Question 8

Part (a) was well answered. A few students left incomplete answers ie $9 = 20\,\text{s}$, others found the fraction difficult to deal with and gave $\frac{20}{9}$ as the final answer. Centres should check that students write $(-4)^2$ or at least evaluate $(-4)^2$ to ensure method marks can be awarded.

The second part was not so well answered. Most students scored some marks for the initial squaring but then failed to deal with clearing the fraction and rearranging to isolate *g*.

Question 9

Part (a) was not well answered. Many students were confused as to which result should be used to give the sum and which to give the product. Even when $\frac{8}{16}$ was seen far too many students gave a final answer of 2 rather than 0.5.

Almost no one tried to use part (a) to aid part (b) and many solved the question from scratch.

A correct factorisation was often seen but then incorrect values of x were given with the misuse of negative signs in the answers.

The use of the quadratic formula was not always successful, again confusion with negative signs was seen and sometimes errors in arithmetic led to incorrect final answers.

Question 10

For part (a) most students drew a periodic trigonometric curve, unfortunately some students felt the need for the graph to pass through each point labelled on the x axis and others drew a sine curve. Of those that drew the correct curve not all labelled the y axis with 1 and –1.

Part (b) was not a well answered question. Some tried to plot calculated points for the curve and others just drew the curve for positive values of y.

For part (c) a circle was drawn by most students, the centre was usually correct but the radius was not always indicated.

Question 11

This was a well answered question. Most students were successful in part (a). There were some who could not give the turning point and the main error seen was again around the sign of the numbers given.

Question 12

At this level students ought to be able to recognise a cubic equation and know the basic shape of the curve but many produced a parabola or tried to make their graph have rotational symmetrical.

If no table outline is given in the question students should be encouraged to draw their own; many presented scribbled calculations all over the page, difficult for students and examiners alike to follow. Those calculations that could be followed often gave at least 4 correct evaluations thus gaining the method mark. However the negative values of x did produce rather a large number of errors. Most students chose a sensible scale but a very small number gave no scale at all, the axes must always be labelled to achieve full marks.

Part (b) was less successfully answered but those who appreciated that $y=1$ were usually successful in reading the points from the graph, although a minority only gave two values of x.

Question 13

Not a lot of working was seen for this question but those who realised the need to use the discriminant were very successful. The majority of students scored marks on this question.

Question 14

Part (a) was well answered by most students.

In part b most students were able to produce the required formulae but $n=40$ was only obtained by a minority, many assumed that n was 100.5, obviously not understanding what n represented and so not being able to use the formula correctly.

Question 15

This was not a well answered question, whilst many were able to subtract the fractions not all could then clear the resulting fraction. Of those that achieved the correct quadratic many students were unable to use the formula correctly, many tried to use completing the square unfortunately this was often incorrect. Final answers were often not simplified to the required form.

Question 16

There were some very good answers to this question. Reading from the graph and use of the trapezium formula was often seen. Occasional mistakes in the arithmetic led to incorrect final answers but the correct method was usually seen. Part (b) was well answered.

Question 17

This question was better answered than in previous sessions. Although a small minority used direct instead of indirect variation. Students were often able to set up a proportionality statement and then use *k* as a constant, substitution to evaluate k was also often seen. Again poor arithmetic led to incorrect evaluation of k.

In part (b) a basic lack of knowledge was seen with many straight lines and exponential curves drawn.

Question 18

Both parts were quite well answered by the majority. Common errors were inevitably reflecting in the wrong axis for (a) or translating 2 units right instead of left in (b).

Question 19

This question was either blank or exceptionally well answered.
Centres should ensure that all of the specification is covered by all students and that at this level students must be made aware that final answers should be given in their simplest form.
Students who stated the correct multiplying factor usually accurately multiplied the brackets out. However the final format of the question was not always achieved.

Question 20

Pleasingly the question was well answered with many gaining full marks.
Careless errors in expanding the brackets and 'forgetting' the 8 were seen, but the concept was well understood by many.

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
- make sure you can manipulate algebraic expressions with skills in standard factorisation and multiplying out brackets.
- practise your skills at curve sketching stating key points.
- ensure that the answers given match the form required in the question and are fully simplified

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