Principal Examiner Feedback

January 2016

Pearson Edexcel Level 3 Award in Algebra (AAL30)

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Introduction

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

Good students were able to display a wide range of skills and techniques. However many students failed to consider both negative and positive square roots for numbers and expressions.

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.

The design of this paper and the performance of students on this paper were consistent with previous papers so allowing a pass mark of about 66% of the total mark to be considered as showing proficiency in Algebra at Level 3.

Reports on Individual Questions

Question 1

(a) Students performed well on this question and were able to gain the mark available.
(b) Most students simplified their expansion correctly but unfortunately not all were able to expand correctly. $2q^2$ was often seen and -1 was seen as the result of $(-1)^2$
In part (c) most students scored 1 mark, usually for -6. For the other value 125 was the most popular incorrect answer.
(d) . Here students did not seem to be able to cope with the different techniques for taking the square root of a number and an algebraic power and often got one or other right but not both.
In part (e) $(x + 8)(x - 1)$ was often correctly seen and then the correct answer followed. However, far too many students cancelled arbitrary terms in the expressions given without factorising at all.

Question 2

A significant number of students were able to gain marks on this question. In part (a) many students were able to quote the quadratic formula but then could not calculate correctly with negative numbers. For part (b) few students saw the connection with (a) and often solved this equation in its own right. The mark could be achieved this way but it was more time consuming.

Question 3

The majority of students were able to factorise correctly for this question. Occasionally in part (c) the 3 was not given in the final answer. This was not correct did not gain marks.

Question 4

The majority of students scored full marks on this question. The most frequently seen error was to use $y > 0$ instead of $x > 0$, this produced an incorrect region and often lost both accuracy marks.

Question 5

In part (a) rearrangement was required but this proved difficult for some students with
$2y = x+5$ often seen.
However many students went on to score well in part (b). They were able to give the correct gradients and also calculate the value of c in the equation.

Question 6

Part (a) was only partly answered by most students. Centres should remind students that if
$x^2 = 16$ then $x = \pm 4$ and interpretation of both parts was required for the single mark available.
Whilst part (b) was set up to allow easy access to the factors and thus the critical values, far too many students expanded what they were given and then re-factorised, often incorrectly, and so arrived at incorrect critical values.

Question 7

The majority of students gained full marks in part (a) and almost all students scored marks in part (b). On the whole this was a well answered question.
The most common error seen was in part (b) where students did not use area to find the distance run by the runner.

Question 8

Part (a) was well answered. A few students found the squaring of a negative difficult and lost accuracy in their final answer. Centres should check that students write $(-10)^2$ or at least evaluate $(-10)^2$ to ensure method marks can be awarded.

The second part was reasonably well answered. Many students gave a sensible comment to describe the roots.

The final part of this question was also well answered although some students did reverse the answers.

Question 9

Part (a) was well answered. Most students were able to do the substitution but not all could manipulate the fractions correctly to gain an acceptable final answer. The most common error seen was to square root too early in the process. Other students failed to realise that 0.25 is a fifth of 1.25.

In part (b) some students, even after correctly answering part (a), chose as their first step to square root everything; this could be given no marks. The majority of students made a good attempt to rearrange the equation but 3 marks were very rarely awarded as the vast majority of students omitted the ± signs in their final answer. At Level 3 both roots are required, unless instructions are given to the contrary.

Question 10

There were many correct answers but incorrect answers were usually just freehand drawings which did not fit the required accuracy.
A pair of compasses is required for this question. Students need to construct as part of the specification, so accuracy is required.

Question 11

This question was answered well by the majority. Most students were able to attempt to complete the square. There were occasional sign errors.

In part (b) many good answers were seen. Graph sketching has improved much over the life of this specification. The main errors still present are not giving the turning point or incorrectly labelling it.

Question 12

Part (a) was well answered with the majority of students scoring full marks. Some errors in arithmetic were seen and others struggled with the initial interpretation but on the whole this was well answered.

Part (b) was not so well answered. Many students did not know the correct formula to use missing out signs or full terms. Of those that did know the formula many were able to equate it to 2500 thus gaining the second mark. As this is a non-calculator paper the arithmetic involved is kept to a reasonable level, there is often a simple way to deal with the numbers involved and those that did $2500 \div 25 = 100$ first were more successful at achieving a final answer than those that multiplied out the bracket requiring 147×25. Centres should encourage students to look at the numbers involved before deciding upon the order of calculations.

Question 13

The correct values in the table were often seen.

However a lot of inappropriate scales were used for the graph. Some were far too small 1cm to 1unit especially on the x-axis and others trying to use the full width and produced all sorts of scales which they then found difficult to use. Centres are advised that more unstructured curve plotting would be beneficial to students. As a result of inappropriate scales the points at ± 0.5 and ±1.5 were too often incorrectly plotted or often not plotted at all. This did lead to inaccurate curves.

Part (c) was less successfully answered but those who appreciated that $y = 3$ were usually successful in reading the points from the graph. Far too many students used $y = -3$ in this part of the question.

Question 14

There were some very good answers to this question. Reading from the graph and use of the trapezium formula were often seen. Occasional mistakes in the arithmetic led to incorrect final answers, the other common error seen was for students to miss out the ordinate $y = 4$
(at $x = 0$).

Question 15

This is a standard question for this qualification, with many full answers seen. A few students did not correctly isolate x or y in the initial linear equation but the main error seen, in incorrect answers, was an inability to rearrange a quadratic equation. A few students did struggle with solving quadratic equations but this was not the main difficulty.
Centres are reminded that final answers should be given in coordinate pairs.

Question 16

This was not well answered with a variety of lines seen. It was a straightforward question but the majority of normal lines drawn were in fact parallel to the y-axis.

Question 17

Some fully correct answers were seen. Many students drew a correctly shaped curve. Centres now need to ensure that students fully label their graphs and this will lead to even more correct answers. Often only one label was seen, either the intercept or the asymptote but not both.

Question 18

Part (a) was very well answered with the majority of students scoring full marks.

Part (b) was not so well answered with common errors being a partial stretch or a correct stretch and then a translation as well.

Question 19

This question was well answered. Students were often able to set up a proportionality statement and then use k as a constant and substitution to evaluate k was also often seen.
The main error was to work all the way through with a proportionality sign and not use the equals sign in the final formula.

Question 20

Pleasingly the question was well answered with many accessing marks on this final question. Part (a) was correctly answered by the majority, with many students rationalising successfully.

In part (b)(i) the correct answer was often seen.
For (ii) many students were able to make a sensible start to the question and $\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{2}}$ was often seen. Unfortunately they could not then add these fractions.
Alternative methods were awarded credit but this was the most popular first step and so centres should ensure students are confident when adding fractions, far too many 'just added the tops and the bottoms'; a common misconception.

In summary centres are advised:

To encourage the consideration of both positive and negative roots.

To practice basic skills around squaring negative numbers and adding fractions.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

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