Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

November 2019

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Non-Calculator) Paper 1H

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GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Higher Paper 1

Introduction

The vast majority of students were able to attempt the first ten questions on the paper. After this, success was less evident – most likely due to the fact that this was a November examination.

It was pleasing to see many students clearly showing their working and able to communicate ideas when appropriate.

Report on Individual Questions

Question 1

Most students gained at least two marks on this question, usually for producing two factor trees with no more than one error. It was common however to see answers of 12 (finding the HCF) or 2 where many students thought that the lowest common factor was required.

The listing of multiples was often seen, but unfortunately this was often littered with arithmetic errors.

Question 2

Only a few students failed to determine that there were 10 men and 20 children in the choir. The correct value for *n* (2) or a correct ratio of 2:1 was often seen but many misread the question thinking that *n* was the number of children and an answer of 20 was a common error. An answer of 2:1 was awarded full marks. It was common to see students do 60/3 =20 and give 20 as the number of men and then 10 as the number of children meaning their answer of 2 but came from incorrect working and so could not be credited.

Question 3

Although a correct mixed fraction was found by many students, a large number still find great difficulty in working with fractions. The less able students, instead of working with "top heavy" fractions, split the fractions to multiply them and working of 1 (1×1) and $\frac{3}{12}(3 \times \frac{1}{4})$ was sometimes seen. Other students tried to add the fractions with $\frac{21}{12} + \frac{16}{12} = \frac{37}{12}$ regularly seen. Many answers were left as 28/12, when the question clearly stated that a mixed number was required.

Question 4

Many students did not understand the meaning of perpendicular and were therefore unable to score on this question. Of those who did, the perpendicular was often simply drawn with no sensible attempt at construction; stray arcs were often seen. It was pleasing, however, to see a significant number of students gaining full marks, usually with arcs centre *D* radius *DP* and centre *C* radius *CP*. Quite often the construction of a perpendicular bisector of *CD* was seen; this gained no marks. A significant number of students seemed not to understand the definition of perpendicular.

Question 5

180 – 75 – 51 = 54 was the common first step seen but many saw this as a method to find the required angle *BDC* incorrectly using ‘angles on a straight line’. Some correctly found angle *ACB* = 54º but could go no further and for those that did arithmetic errors were often seen preventing a complete and correct solution. Some students were unable to deal with the ratio and often 54 was simply halved. Others assumed that angle ADC or BDC was 90 degrees.

Question 6

This question was poorly answered with the majority of students simply attempting to find the mean of the weights 5, 9 and 6. Their resulting conclusion did relate to the question asked but no credit was given unless a correct process was applied. A number of students found the mean to be 7.1 kg but then failed to conclude that Donna was incorrect in her assertion, thus only gaining two marks. A number of students worked out the total weights correctly but then added them together with the 6 in the tens column leading to an answer of 125 instead of 71.

Question 7

In general, both parts of this question were answered well. In part (a), p^7 was the modal incorrect answer offered. In part (b), a significant number of students used correct rules of indices to derive expressions of x^4 and/or y^2 but often these were not seen in a product or a fraction. It was also common to see 12 – 6 = 6 instead of 12 ÷ 6 = 2.

Question 8

It was rare to see a fully correct solution to this question. Bearings remains a topic which many students find difficult to understand. Those students able to correctly draw a bearing of 070º usually went on to score well. The ability to use distance = speed × time did enable many students to gain at least one mark for a distance of 18 km and often an additional mark for correct use of scale. When a correct position for *Q* was found, the distance from *L* was usually correct but the bearing of *Q* from *L*, a reflex angle, was usually not correct.

Question 9

Distance = speed × time was usually applied in part (a) gaining the majority of students at least one mark. Misuse of units however was very common. 72 × 18 (= 1296) and 72 × 0.18 were the usual errors seen. Partitioning methods were usually incomplete and therefore gained no credit.

Part (b) was less well done again largely through the use of incorrect conversions. 1 km = 100 metres was a common mistake. Some students showed that the two speeds were the same but failed to answer the question posed.

Question 10

This question was poorly answered by this cohort of students. Any marks gained were usually in part (a) for correct plotting of the given values. However, it was common to see the points plotted in parts of the intervals other than at the ends.

Often seen were plots at time values of 30, 40, 50, 60 and 70 minutes; this gained no credit and prevented any success in part (c).

Many students drew histograms. A lack of understanding of quartiles and interquartile range was evident in part (b), 30 – 10 = 20 was a common error.

In part (c), correct readings from time = 50 and 90 were often found but then either just stated or added together gaining no credit. Many students struggled with the scale on the horizontal axis and often misread the required values.

Question 11

Those students who understood the concepts involved usually gave a correct solution. An incorrect answer of 60 (12 ×5) was common, as was 30 – 5 + 12 = 37.

Question 12

Although the question asked for identification of Spencer's mistake in line one, credit was given for answers which correctly explained how q could be made the subject of the formula, so answers of "he should have subtracted the 5 first before multiplying by 2" were awarded the mark. Any ambiguity in answers was penalised.

Question 13

Any marks gained in this question were usually in part (a), only a very small number of students gained the mark in part (b).

In part (a), many students correctly found the common denominator of $3x(x + 1)$ or equivalent. Unfortunately, numerators of 5 and 2 were often retained gaining no credit. A numerator $5 \times 3x + 2(x + 1)$ was often not or incorrectly simplified resulting expressions of $15x + 2x + 2$(or 1). It was also disappointing to see so many students having found the correct simplified expression then try to simply further. In algebraic questions, such subsequent incorrect working can never be ignored, and the final accuracy mark is lost.

In part (b), the modal approach was to expand the brackets rendering the resulting expression near impossible to factorise.

Question 14

Very few students were able to derive a correct quadratic equation from which a complete solution could be found. A common mistake was in finding the area of the triangle, $(x - 2)(x + 4)$ and $(x - 2) + (x + 4)$ were often seen, many times without brackets shown. One mark was available in a special case for a correct product expanded and equated to 27.5.

Many students after seeing a right-angled triangle, often started their solutions by attempting to use Pythagoras' theorem. When a trial and improvement method was employed, credit could only given if the final answer was correct.

Those students who realised that the area of the rectangle of sides $(x - 2)$ and $(x + 4)$ was 55 were often successful in getting the correct answer.

Question 15

Students are familiar with this type of question and at least one mark was usually gained for showing an understanding of the meaning of the recurring decimal notation, although 0.418418…was not uncommon. Many identified two decimals with a terminating decimal difference but were unable to accurately find the difference. Any subsequent incorrect cancelling of $\frac{414}{990}$ was ignored.

Question 16

It was pleasing to see many students, in part (a), attempting to multiply the given expression by $\frac{\sqrt{11}}{\sqrt{11}}$, some just wrote $\times\sqrt{11}$ but credit was given if the intention was clear. Student should be encouraged to write $\frac{\times\sqrt{11}}{\times\sqrt{11}}$. Many students correctly worked out the surd product but then failed to fully simplify, leaving $\frac{22\sqrt{11}}{11}$ as their answer. This was not awarded the final accuracy mark.

In part (b), students who knew to multiply numerator and denominator by $2\sqrt{3} + 1$, gained one mark but were often unable to complete the simplification to gain further credit.

Question 17

This question was very poorly answered, many simply using a scale factor of 2.25 (9 ÷ 4) in an attempt to make progress. Some looked as though they wanted to use the formulae for surface area and volume of a cylinder, but never really made any meaningful start. A few students correctly found the ratio of lengths but could go no further.

Question 18

In part (a), only a very few students correctly found an algebraic expression for the inverse of $f(x)$. The most successful approach was in showing $f(3) = 50$ but a great number of students found $f(50)$ instead which was clearly incorrect. Notation was often poor with the cube root symbol not encompassing the whole expression in some cases.

Only a minority of students correctly quoted $hg(x) = (x + 2)^2$, in part (b), and were able to make any progress. The most common mistake was in substituting $x + 2$ into $hg(x)$. Those who managed to substitute correctly and form an equation often failed to simplify and solve the resulting quadratic equation.

Question 19

The correct answer to this question was seen only very occasionally. Some students were able to gain credit for $9^{-\frac{1}{2}} = \frac{1}{3}$ or equivalent. Only a very few were able to write $27^{\frac{1}{4}}$ in any useful format.

Question 20

Both parts of this question were poorly attempted. A translation of the given function was often seen in part (a), but rarely was this a correct one. A correct translation of either, -1 in *y* direction OR -3 in *x* direction obtained 1 mark.

In part (b), it was rare to see a correct reflection of f(*x*) drawn, many students either guessing the coordinates of *B* or using a diagram found in part (a).

Question 21

Again, only a very few students were able to make any headway in sketching a graph of the given quadratic. The *y*-intercept and the turning point were most often found by constructing tables of values. Some students did attempt to solve the quadratic, usually by completing the square, however this was often littered with mistakes. Many of the students who attempted this question drew a parabola which was symmetrical about the y-axis.

Question 22

Fully correct solutions were very rare indeed. Equal pairs of angles were sometimes identified but often with no reasons given. The most common award of one mark was for showing triangles *AED* and *EBC* to be equilateral with all angles of 60^{o} shown. One mark for BC being common to both triangles was also awarded on a number of occasions.

Summary

Based on their performance on this paper, students should:

- read questions carefully.
- ensure that they know the difference between factors and multiples.
- re-visit the four rules of fractions.
- understand that constructions and scale drawings require accuracy of measurement.
- take care in interpreting the scale on the axes in graphical questions.
- ensure that specific questions posed in problems are answered, eg. “Is Donna correct” requires an answer of “yes” or “no” together with full explanation.

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