Examiner's Report

Principal Examiner Feedback

Summer 2018

Pearson Edexcel GCE Mathematics

In AS Further Pure Mathematics paper 8FM0_21

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Introduction

As this was the first sitting of this paper for the new specification and, not unexpectedly, the entry was very small. Some very good responses were seen but there were also many cases where questions were left completely blank. Question 4 appeared to be the best source of marks and question 5 was the most demanding. Some students were obviously well prepared but others struggled with many of the questions and appeared not to have covered much of the material. Students are advised to provide sufficient detail in "explain" or "show that" questions and also to give an appropriate conclusion when necessary.

Question 1

This question was generally well done by those students who knew the appropriate algorithms. For the divisibility test in part (i), by far the simplest algorithm was to add and subtract alternate digits although some students were clearly aware of other valid methods. Some chose to ignore the instruction not to perform any division and effectively performed a long division calculation. In part (ii), it was expected that students demonstrate explicitly all steps of the algorithm which many students did. Some left this blank and others made a half-hearted attempt which suggested that they had some idea of how the algorithm works but became lost along the way. Again, as in part (i), some students ignored the instruction and attempted to the HCF using prime factors.

Question 2

(a)(i) There were many cases here where the Cayley table had been completed fully correctly or with one or two errors so often contributed as least 2 marks.

(a)(ii) The majority of students clearly knew the axioms for a group. Many referred to closure and the fact that there was an identity element and that each element had its own inverse. However, it was expected that for full marks, students should identify specifically, the inverse of each element rather than just state "each element has an inverse". For the final mark, it was also expected that students should make a conclusion such as "so T forms a group".

(b) For those students who attempted this part, most could present a valid argument such as

$R_2*R_2*R_2 = (R_2*R_2)*R_2=R_1*R_2 = I$ and so R_2 has order 3 but again some students failed to provide a conclusion, thereby forfeiting the second mark. Some students also made an acceptable reasoned argument in terms of the actual transformations.

(c) It was expected here that students went beyond giving a general comment such as "no element generates the group". To score the mark here, students needed to describe the order of the elements and then make a conclusion as the general comment obviously applies for any non-cyclic group.

(d) It was not clear if students knew what to do here and some probably made a guess although several correct answers were seen.

Question 3

(a) Many students could score at least one of the marks here. It was expected that some reference was made to the "0.97", the "0.15" and the value of H_1. In order to qualify for the second mark, students needed to make reference to the units which was often overlooked.

(b) Several students scored full marks here whilst the majority only managed to score one or two marks, either for establishing the base case or making a start with the algebraic proof. Students often find the concept of proof by induction difficult and this was no exception with often a lack of rigour and detail provided, particularly with the conclusion, if the candidate got that far.

(c) There were very few correct answers here. Often students simply stated "it will get bigger" or "it will get smaller".

(d) Very few students knew how to tackle this part of the question and it was often left blank although a couple of novel approaches were seen to establish the percentage required.

Question 4

This was a good source of marks for many students and full marks were fairly common although there were also several completely blank responses. The most common error was to form the eigenvectors incorrectly from correct equations.

Question 5

(a) Fully correct diagrams were rare although a significant number of students knew that a circle or arc of a circle was required.

(b) This was one of the more demanding questions on the paper. Some students tried to establish the Cartesian equation from part (a) and made little progress. Those who were more successful used a geometrical approach, using basic trigonometry with right angled triangles.

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