General Certificate of Education

Mathematics 6360

MFP2 Further Pure 2

Report on the Examination

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General

The great majority of candidates were well prepared for this paper and were able to convey what they had learned. Very few scored really low marks. However it should be re-emphasised that examiners have difficulty in awarding full marks in some instances where insufficient working is displayed, especially when printed answers are given. The general presentation of the work was adequate.

Question 1

Almost all candidates scored the two available marks in part (a). However in part (b) a number of candidates did not draw on the hint of part (a) but instead tried to manipulate the equation given in part (b). A few of these candidates expressed the given equation in $\tanh x$ and $\operatorname{sech} x$ and then squared, obtaining a quadratic in $\tanh x$. When factorised these candidates obtained two values for $\tanh x$, only one of which was the correct one. However, virtually no one rejected the incorrect solution so that it was almost impossible to award full marks when this method was used.

Question 2

This question was generally well done, with many candidates scoring full marks. When errors did occur they were usually in the omission of one of the four fractions that made up the sum, notably $\frac{1}{98}$.

Question 3

The verifications in part (a) were not always convincing, especially the verification that the point representing the complex number $2 + 2\mathrm{i}$ lay on the line L_1. The sketches in part (b) varied considerably. Those candidates who made a reasonably careful drawing generally scored higher marks as they were able to clearly show that the point representing $2 + 2\mathrm{i}$ lay on both L_1 and L_2. Careful sketches also improved a candidate's chance of scoring full marks in part (c).

Question 4

Whilst parts (a) and (b)(i) were well done, few candidates were able to complete part (b)(ii) correctly through not taking note of the hint given in part (b)(i). Those candidates attempting to work out $(\alpha + \beta + \gamma)^3$ were inevitably doomed to failure. Part (b)(iii) was usually attempted by assuming the result of part (b)(ii). There were many correct solutions to part(c) although slips of sign often led to a solution with three real roots, contrary to the statement of part (c)(i).

Question 5

Part (a) was a source of good marks for almost all candidates. If errors did occur they were usually errors of sign. Part (b) was also generally well done although it was disappointing to see the square root of $\operatorname{sech}^2 t \tanh^2 t + \operatorname{sech}^4 t$ written as $\operatorname{sech} t \tanh t + \operatorname{sech}^2 t$ a significant number of times. Responses to part (b)(ii) were mixed. Poor algebraic manipulation in the handling of $\operatorname{sech} t$ when expressed in terms of u let many candidates down badly so that they ended up with a polynomial in u to integrate.

Question 6

Again responses to this question were mixed. It was evident that some candidates thought that $(k + 2)!$ started at k, and wrote it as $k(k + 1)(k + 2)$. Others wrote down the result after some rather dubious algebra. Although there has been considerable improvement in the way that solutions by induction have been expressed, in this case what would otherwise have been acceptable solutions were spoilt by errors of sign. The same error occurred frequently. It occurred when a candidate tried to combine, in one bracket, a negative expression followed by a positive expression by placing a negative sign outside the combining bracket and then by forgetting to alter the sign before the positive term to compensate.

Question 7

Part (a)(i) was generally well done. The less successful candidates usually wrote the argument of $1 - \mathrm{i}$ as $3\pi/4$ instead of $-\pi/4$. In part (a)(ii) there was some poor handling of fractions in the argument of the product of the two complex numbers, and also some omission of raising the moduli of the two complex numbers to their respective powers. Many of the candidates who had been successful in part (a) often went on to complete part (b) correctly, although some candidates lost marks either through not giving z in the form asked for or by giving values for θ outside the specified range.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.