AQA

A-LEVEL
MATHEMATICS

MFP1 – Further Pure 1
Report on the Examination

6360
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General

Presentation of work was reported as generally being good although some sketches were not drawn with sufficient care in Question 6. There was no clear evidence that candidates were short of time and a large majority of candidates completed their solution to a question at a first attempt.

Question 1

This question tested roots and coefficients of a quadratic equation. Almost all candidates stated the correct values for $\alpha + \beta$ and $\alpha\beta$. In part (b) most candidates used a correct identity to show that the sum of the roots, $\alpha^2 + \beta^2 - 2$, was zero. Arithmetical and sign errors were more common in calculating the product of the roots. As in previous series, some candidates lost marks by failing to give an equation as the answer, just writing $x^2 + Sx + P$ without the "= 0" whilst others had final answers which did not have integer coefficients. Candidates found the less familiar part (c) more challenging. A large majority of candidates did not equate the complex roots of the quadratic equation found in part (b) to $\alpha^2 - 1$ and $\beta^2 - 1$.

Question 2

Ideally, examiners were looking for '$\frac{x-4}{x^{1.5}}$ is not defined at the limit $x = 0$' for the explanation of why the integral was improper. Many explanations offered did not link the problem limit to the expression in a clear enough way.

In part (b) many candidates gained marks for splitting the integrand and integrating the two terms correctly, or by using integration by parts correctly. Sign or numerical errors were present in a number of solutions after the limits, with the 0 having been replaced by a letter, were substituted. In other solutions a common error was to use $\frac{8}{0} = \infty$

instead of stating that $\frac{8}{n} \to \infty$ as $n \to 0$.

Question 3

Parts (a) and (b)(i) of this question on complex numbers were generally answered well by candidates, although in part (b)(i) some lost heavily by just replacing p by -11 without showing that $p = -11$. Parts b(ii) and (iii) were often worked together and marked as such. Many found these parts more difficult and only the more able candidates completed them correctly using a variety of correct methods. Other candidates who gained credit in these parts normally did so for showing that the product of the two given roots was 5, but in general many of these did not know how to progress further. Often much work was done which did not lead to any of the required answers.

Question 4

Candidates had been well prepared for this question on general solutions of trigonometric equations and part (a) proved to be a good source of marks for many. Any errors were generally in an incorrect rearrangement or the use of -30 instead of, for example, 150 as the second angle. In part (b) candidates often seemed confused as to what they were required to do. Many solved equations found by equating their general solution to 200 to find n which they gave as their answer. Often a number of values were listed with no final answer indicated.

Question 5

Overall this question on matrices produced a spread of marks. In part (a) those candidates who wrote down the matrix multiplication in the correct order normally went on to obtain the correct values for the two constants. Recovery from a wrong order was accepted, but in general less able candidates did not know how to approach this part question. The more familiar question (b)(i) was answered well although not all candidates showed sufficient working to justify the printed result. The description of the combined two geometrical transformations in part (b)(ii) showed an improvement on recent past series. Many candidates recognised the transformations as an enlargement and a rotation but only a smaller proportion gave the full correct details for both. A small number of candidates used ‘stretch’ instead of ‘enlargement’ but frequently made no reference to it being a 2-way stretch. In part (b)(iii) a common error was to use $\mathbf{B}^{16} = \mathbf{B}^4\mathbf{B}^4$. Answers only given in a non-exact form were not awarded full credit.

Question 6

In part (a) a significant minority of candidates drew an ellipse instead of the required hyperbola. Although pleasingly clear correct sketches were presented, some others were carelessly drawn, appearing as two parabolas rather than two branches of a hyperbola. Part (b) was less well answered. It was not uncommon to see candidates using, or even stating, $k = +3$, despite the statement $k < 0$ in the question. It was evident that a significant minority of candidates seemed unaware that the equations of the asymptotes for the general hyperbola are given on page 5 in the Formulae Booklet. Instead of applying the transformation to the asymptotes less able candidates were making a basic error of square rooting the difference of two terms to get the difference of the square roots.

Question 7

In part (a)(i) candidates generally scored full marks, although a minority did not state the correct interval in their concluding statement and so lost the final mark. Part (a)(ii) was also well answered by a large majority of candidates. Candidates had been well prepared for recalling and using relevant summations in part (b). Slips occurred on occasion in neatening the expression to the required form. A significant number of candidates expanded their expression correctly to $2n^3 + 5n^2 + 3n$ before they factorised it to the required form in preference to taking out the common factor $n(n+1)$ at a much earlier stage. Most candidates obtained a correct solution to part (c)(i) but the final part of this question proved to be demanding for the majority. Many failed to realise that they needed to use $\sum_{r=k+1}^{60} g(r) = \sum_{r=1}^{60} g(r) - \sum_{r=1}^{k} g(r)$. Subtracting $\sum_{r=1}^{k+1} g(r)$ was a very common error. For those candidates who reached this stage, later arithmetic errors or wrong inequality signs sometimes led to the loss of the final two marks.

Question 8

A majority of candidates stated the correct equation of the asymptote, but others sometimes included other incorrect asymptotes. Many candidates understood the method that was required to obtain the printed inequality but sign errors, the most common illustrated by the incorrect intermediate stage $(k-1)x^2 - 3x + 3k = 0$, led to the loss of marks. With the answer given, examiners expected to see an extra step between $9 - 12k^2 + 12k \geq 0$ and the printed inequality before awarding full marks. A majority of candidates produced some work worthy of credit in the final part of the question including some excellent solutions seen. Unfortunately some other candidates started with an incorrect quadratic equation, preferring to use their incorrect answer to part (b) rather than that printed in the question. Even though they had an opportunity to recover when their quadratics did not give two equal roots, many did not go back to check their working. Only a very small number of candidates failed to give their answers in the required coordinate form.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator