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General Certificate of Education

Mathematics 6360

MFP1 Further Pure 1

Report on the Examination

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General
There was a very good response to this paper, the majority of candidates being well prepared and reasonably careful about showing their working fully and clearly. There were some exceptions to this: candidates who may very well have known exactly what was intended occasionally lost marks through omitting important steps.

Question 1
Most candidates found this a very good introduction to the paper and gained full marks, or very nearly so. Errors in parts (a) and (b) were rare, and were nearly always sign errors rather than those caused by the use of an incorrect procedure.

In part (c) the most common mistake was to have a 4 instead of a 16 in the product of the roots of the required equation. Some candidates failed to see the connection with part (b) when finding the sum of the roots, but more often than not they still found the right value for this sum.

Question 2
Almost all candidates knew how to find the gradient of the line in part (a) of this question, but a distressingly large minority of them made a sign error in subtracting the y-values of A and B, which led to the introduction of an unwanted term $-\frac{6}{h}$ in the answer. In part (b) this should have caused difficulties, but almost invariably the candidates took this term as tending to zero as h tended to zero. Those candidates who wrote "$h = 0$" instead of letting h tend to zero lost a mark here, but it is pleasing to report that this error was comparatively rare.

Question 3
In part (a) (i) of this question most candidates showed some knowledge of complex numbers but failed to display clearly the real and imaginary parts asked for in the question. Part (a) (ii) appeared to cause candidates no trouble at all; but by way of contrast, very few candidates saw what was required in part (b): many equated the real part to zero, while others equated the real and imaginary parts to each other.

Question 4
Part (a) was very familiar to the majority of candidates – perhaps **too** familiar in many cases as the result $\lg(ab^x) = \lg a + x \lg b$ was quoted rather than properly shown by the use of the laws of logarithms.

Part (b) presented a less familiar type of challenge. It was not necessary or indeed helpful to try to find values for the constants m and c. All that was needed was to read values directly from the graph and to convert as appropriate between y and Y.

Question 5
Part (a) was a standard type of question on this paper, but as on past papers it was common to see candidates introducing the general term $2n\pi$ **after** they had divided both sides of the equation by 3. Another very frequent source of confusion came from an inappropriate use of the $\pm$ symbol. Candidates who wrote out the whole equation twice, once with a plus sign and once with a minus sign, at an early stage, usually obtained a correct general solution, whereas those who used the plus-or-minus sign often ran into errors when adding π to each side of the equation.

Part (b) was very poorly answered. Many candidates used $n = 10$ or $n = 11$ in their general solution and did not seem to notice that the resulting values of x were well below the minimum value of 10π required by the question. Some candidates wrote down the correct answers but failed to indicate how they had 'found' them 'from their general solutions' as specified in the wording of the question.

Question 6

The sketches of the ellipse in part (a) of this question were mostly satisfactory, though some candidates failed to take square roots when working out the required coordinates.

Part (b) was one of those parts of questions where the absence of any explanation made it hard for the examiners to see what the candidates were trying to do. Some gave the answer in simplified form without any preliminary working. On this occasion the examiners condoned this poor examination technique where it looked as if the candidate had done the right thing. But there were many errors here: some modified the x term rather than the y term, some multiplied the y by 2 instead of dividing it by 2, and many failed to include this 2 in the squaring process when simplifying their equations.

Part (c) was found to be rather hard, but many candidates realised that completing the square was needed and at least made an effort, often failing to see the connection between their correct equations and the required numbers a and b. The alternative approach of applying the translation from the outset, using the letters a and b, was about as popular as the completing the square method, but the algebra became too heavy for many candidates and the necessary comparing of terms did not take place.

Question 7

In this question part (a) was very well answered in general, candidates being able to choose the correct form of matrix for each type of transformation and to insert the correct forms for the necessary sines and cosines.

In part (b), however, the majority of candidates failed to see the close connection between the given matrix and the one that they had found in part (a) (ii). The answers given often appeared to be wild guesses.

In part (c) many candidates saw the need to multiply the two matrices but often in the wrong order. Those who obtained the correct matrix $\begin{bmatrix} 0 & 4 \\ 4 & 0 \end{bmatrix}$ often confused it with a scalar matrix when giving the geometrical interpretation.

Question 8

Part (a) was usually well answered, with most candidates writing down the equations of the two vertical asymptotes but then struggling to establish the equation of the horizontal asymptote; although the correct answer $y = 1$ appeared more frequently than the most common wrong answer, $y = 0$.

Part (b) was slightly unfamiliar, but most candidates tackled it confidently. A sign error often led to the disappearance of the x^2 term, while in other cases the quadratic and its discriminant were correctly found but the candidates omitted to mention the essential feature of the discriminant, ie the fact that it was negative, indicating the absence of any points of intersection.

Candidates were mostly on familiar ground with part (c), but marks were sometimes lost in part (c) (i) by a failure to show enough steps to justify the printed answer, and in part (c) (ii) by a sign error which prevented the candidate from reaching the required equation legitimately.

Most candidates were able to make a good attempt at part (d) in the time remaining for them. The origin was usually given correctly as one stationary point, and many found the x-coordinate of the other stationary point after a more or less lengthy calculation. Many failed to see that the y-coordinate was simply the value of k used in this calculation, but they were able to calculate it correctly from the equation of the curve.

Mark Ranges and Award of Grades

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