AQA

A-LEVEL

Mathematics

MPC2 – Pure Core 2
Report on the Examination

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General

Presentation of work was generally good although, for a minority of candidates, showing a printed result was less convincing due to a lack of sufficient steps in their working. The vast majority of candidates seem to have had sufficient time to tackle all that they could answer, with most picking up marks on topics throughout the sections of the specification.

Teachers may wish to emphasise the following point to their students in preparation for future examinations in this unit:

- When asked to show a printed result it is important to show sufficient details in the solution to justify stating the result. So, for example, in Question 2(a), just writing '$\frac{AC}{\sin 48} = \frac{20}{\sin 72}$, $AC = 15.6$' is insufficient to show that $AC = 15.6$ correct to three significant figures.

Question 1
A large majority of candidates scored full marks for this opening question which tested area of a sector and arc length. Errors were normally arithmetical rather than use of incorrect formulae.

Question 2
Most candidates started with the correct sine rule but a significant minority of solutions failed to show sufficient working to justify the statement that $AC = 15.6$ correct to three significant figures. Examiners expected to see some intermediate evaluation between $\frac{20\sin 48^\circ}{\sin 72^\circ}$ and 15.6, ideally 15.62… . Part (b) was not as well answered as part (a) due mainly to candidates incorrectly assuming that the triangle was isosceles and so used either a right-angle at *M* or used angle $MAB = 36^\circ$. Some candidates tried using the area of triangles but with few successful attempts seen. Part marks were obtained by candidates who found the correct length of *AB* or stated or showed the angle $C = 60^\circ$.

Question 3
A very high proportion of candidates scored full marks for parts (a) and (b) in this question which tested infinite geometric series. Candidates found part (c) to be more challenging with less able candidates failing to understand the sigma notation. Average candidates worked with $S_\infty - S_4$ rather than the required $S_\infty - S_3$, for which partial credit was awarded. The more able candidates used a variety of correct methods to find the correct value of the sum.

Question 4

In part (a) the differentiation of $\frac{x}{4}$ caused candidates just as many problems as the differentiation of $\frac{2}{x^2}$. It was not a rarity to see $\frac{x}{4}$ written as either $4x^{-1}$ or as x^{-4} before differentiating. There were a number of correct solutions presented for parts (b)(i) and (ii) but the most common error was to equate $\frac{\mathrm{d}y}{\mathrm{d}x}$ to $\frac{5}{2}$ rather than equating it to 0 since *M* was a stationary point. In part (b)(iii), where candidates realised that they needed to integrate, most managed to integrate the two terms correctly but a significant proportion of such candidates forgot to include the constant of integration and so did not score the final two marks.

Question 5

This question which tested limit of a sequence did not have the structure and printed answers that have appeared in past papers. It was pleasing to see more fully correct solutions than in some previous sessions but there were still a significant number of candidates who scored only 1 mark for writing the equation $132 = 160p + q$. Such candidates were unable to deal with the information about the limiting value being 20 and so could not form the equation $20 = 20p + q$. Candidates who obtained these two equations usually went on to score full marks for this question although some did fail in part (b) to find the correct value for the first term due to a wrong rearrangement of the correct equation $160 = \frac{4}{5}u_1 + 4$.

Question 6

In general part (a) was not answered well. Less able candidates generally scored 0 with a high proportion of them writing $\sin(x + 0.7) = 0.6$ either as $\sin x = 0.6 - 0.7$ or as $\sin x + \sin 0.7 = 0.6$. More able candidates found one of the solutions but frequently had an extra incorrect solution within the interval. Only the most able scored all 3 marks, with many others failing to deal with the required rounding to obtain both −0.056 and 1.8 .

Part (b)(i) was answered correctly by a relatively large number of candidates, which showed a significant improvement on past years. Part (b)(ii) provided a challenge for the top grade candidates, with some excellent solutions seen from the most able. In general this part was too demanding for the average candidate.

Question 7

A high proportion of candidates recognised that part (a)(i) involved a translation and part (a)(ii) involved a stretch but a significant number of candidates failed to give the correct details for one of these geometrical transformations. Although there was only one mark for part (b)(i) a majority of candidates did not make use of the given value for the first integral but instead integrated the second expression from scratch. For those who just wrote down the value, the most common wrong answer was 19. In part (b)(ii) most candidates showed a good understanding of the trapezium rule with many correct answers seen. The most common wrong answer was 19.6 due to too much premature approximation at an early stage. Less able candidates used wrong values for *x*. In the final part of the question, candidates had to interpret the diagram since the two curves had not been explicitly labelled with their equations. It was clear, in some explanations, that candidates had not matched the equations to the correct curves.

Question 8
Most candidates found the correct gradient of the given line but a significant minority made no further progress. The common error was to equate the gradient of the line with $x^{\frac{1}{2}}$ (=*y*) rather than with the gradient of the curve. Those who correctly formed the equation $\frac{1}{2}x^{-0.5}=\frac{2}{3}$ generally reached $\sqrt{x}=\frac{3}{4}$ but not all stated the correct value of x to be $\frac{9}{16}$. It was not uncommon to see $x=\frac{\sqrt{3}}{2}$. Those candidates who obtained the correct value for x normally found a correct equation for the required tangent.

Question 9
Most candidates used logarithms correctly to solve the given equation in part (a) but there were some who failed to give the value of x to more than two significant figures.

Although many candidates correctly eliminated the logarithms in part (b), to reach $\frac{k}{2}=a^{\frac{2}{3}}$**,** only a minority of candidates could then manipulate the indices to find a correct expression for a in terms of *k* . Part (c)(i) was answered well with a large majority of candidates scoring at least 2 of the 3 marks. It was pleasing to see that most candidates used their answers to part (c)(i) in manipulating the expression on the left-hand side of the equation in part (c)(ii). Less able candidates frequently applied the incorrect law $\log A+\log B=\log(A+B)$ to the right-hand side of the given equation. Those candidates who rearranged the equation so as to require the law for the difference of two logarithms were less successful in dealing with the resulting fraction compared to those who just used the correct law for the sum of two logarithms for the right-hand side of the given equation. Those candidates who eliminated the logarithms in a correct manner usually went on to score full marks for this final part of the question.

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