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General Certificate of Education

Mathematics 6360

MPC2 Pure Core 2

Report on the Examination

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General

Presentation of work was very good. Most candidates answered the questions in numerical order and completed their solution to a question at a first attempt. Some candidates produced more than a page of working to answer Question 3(a) and, as a result, appeared to be short of time to attempt all the parts in the final question. A few candidates did not attempt the final question yet their solutions to earlier questions were concise; could it be that such candidates failed to turn over the page after Question 8?

Once again, too many candidates had not been reminded to complete the boxes on the front cover to indicate the numbers of the questions they had answered.

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

Questions which start with "Write down" do not require anything other than the answers for full credit. Candidates who show long working for these type of questions will still be awarded the marks for correct answers but they may penalise themselves by failing to have sufficient time to complete the paper.

Candidates should use a greater degree of accuracy for intermediate values than that asked for in the question. In Question 2, using intermediate values to two decimal places will not result in a correct final answer to three decimal places.

When asked to show a printed result sufficient working must be shown to convince the examiners that the printed answer is not just being quoted. Solutions which go directly from $\log_a 6^3 - \log_a 8$ to the printed answer $\log_a 27$ will not be awarded full credit.

Question 1

The vast majority of candidates were able to quote and use the correct formulae for the area of the sector and for the arc length and most obtained both correct answers. Again, some weaker candidates quoted formulae from page 8 of the formulae booklet without understanding the meaning of them and gained no credit.

Question 2

The trapezium rule was usually well understood, with fewer candidates mixing up 'ordinates' and 'strips'; although failing to use sufficient brackets correctly is still a problem. Those who used $2x$ instead of 2^x could score a maximum of two marks for the question.

Question 3

Although in part (a) most candidates gave the correct values for p, q and r, it was disappointing to see a significant number of candidates having to resort to a page of working involving logarithms to various bases before obtaining the three values. In part (b), many candidates preferred to use logarithms rather than use the laws of indices directly; both approaches were equally successful.

Question 4

Most candidates applied the cosine rule correctly, and convincingly obtained the printed result in part (a). Part (b) was beyond the capabilities of many candidates. A significant number tried to use the identity $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$ without success. Those who quoted the correct identity, $\sin^2\theta + \cos^2\theta = 1$, gained a mark but it was disappointing to see some then take the square root

of each term. In general only the better candidates reached the printed answer legitimately. It was pleasing to see many candidates recover to obtain the correct area of triangle ABC.

Question 5

There continues to be an improvement in candidates' general ability to answer questions on geometric series. Use of wrong formulae was less common than in previous sessions. However, far too many candidates carelessly lost negative signs within their solutions and so failed to gain all the accuracy marks.

Question 6

This calculus question again proved to be a good source of marks for many candidates. Part (a)(i) was answered very well but in part (a)(ii) a significant minority used $\frac{\mathrm{d}^2y}{\mathrm{d}x^2} = 0$ instead of $\frac{\mathrm{d}y}{\mathrm{d}x} = 0$. In part (a)(iii), although most candidates showed that they understood the method to find the gradient of the tangent, a significant proportion failed to find and use the gradient of the normal. Many candidates showed that they had a good understanding of integration but, surprisingly, errors in integrating $(x + 1)$ were almost as common as errors in integrating $\frac{4}{x^2}$. Examiners expected to see some simplification of the algebraic term $\frac{+4x^{-1}}{-1}$. In the final part, the evaluation of $\mathrm{F}(4) - \mathrm{F}(1)$ as 8.5 was the most common error.

Question 7

This question on the binomial expansion was the worst-answered question on the paper. Although a majority of candidates showed some understanding of the topic, many of these candidates failed to include the correct powers of 2 in the second and third terms. More serious errors involved either using the first row of Pascal's triangle as 1, and so taking $1, 7, 21, 35$ as the first four binomial coefficients for $(1 + X)^8$; or ignoring the coefficient of x and writing "$a = 8$, $b = 28$ and $c = 56$". Although some elegant solutions were presented, in general it was common to see those candidates who attempted part (b) either just writing the x^3 term from part (a) or trying to expand $(1 + 2.5x + x^2)^8$.

Question 8

Most candidates were able to give a correct value in part (a) but a significant minority did not give any second value, despite the hint in the question: "answers". A common wrong answer was "4.407". In part (b)(i), some candidates mixed up the coordinates and in part (b)(ii) "$(\pi + a)$" was the usual wrong answer. The description of the required transformation in part (c) was answered better this year.

Although some excellent solutions were seen to part (d), these were very much the exception. The vast majority of candidates could not deal correctly with the $2x$ beyond finding the first solution, $x = \frac{2\pi}{5}$.

Question 9

Most solutions to part (a) were correct but some weaker candidates resorted to using 10 for a or just stated "$x = 8/3$". The majority of candidates gained credit for applying a correct law of logarithms in part (b) but many then made the error of writing $\log_a 6^3 - \log_a 8$ as "$\frac{\log_a 6^3}{\log_a 8}$".

Hence, full credit was not awarded to those candidates who went directly from $\log_a 6^3 - \log_a 8$ to the printed answer: $\log_a 27$. In part (c)(i), a significant minority failed to introduce p and left their final answer as "$y = \log_{10}\left(\frac{27}{8}\right)$". The final part of this last question was frequently not attempted. Although some very good solutions were presented, it was surprising to see some otherwise able candidates quoting wrong formulae; "gradient $= (x_2 - x_1) \div (y_2 - y_1)$" was the most common of these.

Mark Ranges and Award of Grades

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