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Mathematics 6360

MPC2 Pure Core 2

Report on the Examination

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General

Presentation of work was generally very good. The vast majority of candidates answered the questions in numerical order and completed their solution to a question at a first attempt. Most candidates appeared to have sufficient time to attempt all the questions in the 90 minutes.

Once again, too many candidates had not completed 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:

- Write down formulae before substituting values.
- Read the questions carefully. For example, in Q2(a), a significant number of candidates found the length of the chord *PQ* instead of the arc *PQ*.
- A general result cannot be proved by just verifying that the result is true for a few particular values. For example, in Q3(d) the given expression for the *n*th term of the geometric series is not proved by verifying that the given first four terms are obtained by substituting *n* =1,2,3 and 4.

Question 1:

Although many candidates were able to correctly write $\sqrt{x^3}$ in the form x^k it was not uncommon to see the incorrect answers k = 3.5 or $k = \frac{1}{3}$. Although follow through marks were available, a significant minority of candidates subsequently differentiated $x^{\frac{1}{3}}$ incorrectly as $\frac{1}{3}x^{\frac{2}{3}}$. In addition to arithmetical errors the most common error in finding the equation of the tangent was to use the gradient of the tangent as $-\frac{1}{5}$; in effect, the equation of the normal was found. Very few candidates failed to write their equation in the required form.

Question 2:

This question, which tested radian measure, was not answered as well as expected. A significant number of candidates found the length of the chord *PQ* instead of the arc *PQ* in part (a).

In part (b), only a minority of candidates found the correct expression for α in terms of π. Those using $\frac{3\pi}{7} + \alpha + \alpha = \pi$ usually went on to score both marks but it was not uncommon to see π replaced by 180 in candidates' initial statements. Those attempting to solve the problem by using the sine rule were rarely successful.

In the final part of the question a significant number of candidates found the perimeter of the sector instead of the perimeter of the shaded segment. It is worth recording that a significant minority of candidates who failed to score the marks in part (a) gave a correct expression for the arc length in part (c).

Question 3:

A greater proportion of candidates than in previous years used the correct formulae when answering this topic, which involved an infinite geometric series. Many candidates found the correct value for the common ratio, although the incorrect value 1.25 was seen. Candidates who gave this incorrect value did not seem to be concerned that their answer for the sum to infinity was negative. In part (c) some candidates did not gain the accuracy mark because they only gave a one decimal place answer for the sum of the first twenty terms. The final part of the question, as expected, was a challenge to all. No credit was given to those who just used particular values for n. Better candidates stated that the nth term was $20\times0.8^{n-1}$ but only the most able candidates gave the intermediate stage, $20\times0.8^{-1}\times0.8^{n}$, or equivalent, to persuade the examiners that the printed result had been obtained convincingly.

Question 4:

Most candidates correctly used the cosine rule in part (a) but some failed to show sufficient detail in their working to be able to justify the printed answer to the degree of accuracy stated.

In part (b) most candidates found the correct answer for the area of the triangle although the incorrect expression $\frac{1}{2}\times8.3\times8.56\times\sin65$ was seen more often than any other errors.

Part (c) was not answered well with many candidates assuming that the perpendicular was also the bisector of angle B. Those who used $\frac{1}{2}BC\times AD =$ answer (b) usually went on to score full marks in part (c).

Question 5:

This question, which tested the basic definition of a logarithm as well as testing the laws of logarithms, was answered much better than in previous series. The most common error was in part (b), where $\log_a 30-\log_a 15=\dfrac{\log_a 30}{\log_a 15}$ was seen quite often.

Question 6:

Those candidates who formed the two equations in p and q normally went on to solve these simultaneously to find the correct values for p and q. Some candidates, however, only used one of the equations and substituted q = 6 to find the value of p and so never showed that q = 6. Many candidates found the correct value for u_4 but a significant number of candidates did not attempt part (c). Candidates who replaced both u_n and u_{n+1} by L, generally scored all the three marks in part (c). The most common wrong start to answering part (c) was to replace u_{n+1} by L + 1.

Question 7:

Although many candidates applied a correct method to find the expansion of $\left(1+\frac{4}{x^2}\right)^3$, accuracy marks were sometimes lost because brackets were missing and the factor 4 was not squared when finding the value of q. Although a significant minority of candidates failed to use the expansion in part (a), despite the word 'Hence', most other candidates obtained the method mark in part (b), but it was surprising to find candidates having more difficulty integrating '1' than integrating the terms in x. Many candidates scored the method mark in part (b)(ii) but arithmetical errors were common in the subsequent evaluation.

Question 8

Candidates generally applied the trapezium rule correctly and gave the final answer to the given degree of accuracy. Many candidates failed to gain full marks in part (b)(ii) as their diagrams did not show four trapeziums. There were also a significant number of candidates who either failed to draw any diagram or who drew the sloping sides of their trapeziums under the curve. Most candidates realised that the geometrical transformation was a stretch, but the wrong answer 'stretch parallel to the *y*-axis, scale factor 3' appeared almost as frequently as the correct answer. A high proportion of candidates showed that they were able to use logarithms to solve the equation $6^{3x} = 84$ but some only gave their answer to two decimal places. The final part of the question was poorly answered, although a minority of candidates did score some credit for partially correct answers, for example, $f(x) = 6^{x+1} - 2$.

Question 9

This question, on solving trigonometrical equations, was the worse answered question on the paper. In part (a), although the majority of candidates scored the mark for writing $2x = 48$ (or $x = 24$) many failed to score any of the remaining three marks because they just quoted 156 (from $x = 180 - 24$) as the only other solution.

In part (b) candidates generally quoted the correct identity, $\tan\theta = \frac{\sin\theta}{\cos\theta}$, but a significant number of these candidates were unable to use it to derive the correct value for tan θ. Those other candidates who tried to solve the equation by initially squaring both sides of the given equation were generally less successful.

Mark Ranges and Award of Grades

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