AS

MATHEMATICS

Unit Further Pure 1
Report on the Examination

6360
June 18

Version: 1.0

Further copies of this Report are available from aqa.org.uk

General

Most students seemed well prepared for the demands of this paper. Some excellent solutions were seen across all questions. Presentation of work was again reported as being very good. The final part of the final question caused the most difficulty.

Question 1

A large majority of students scored the mark in each of the four parts. The least well answered was part **(b)(ii)** where the most common error was an incorrect sign in the equation of one of the asymptotes.

Question 2

Both parts were answered correctly by the majority of students. Other than a few incorrect evaluations in part **(a)** the main reason for loss of the final mark was an imprecise statement, for example, 'change of sign so α lies between these values'. In part **(b)**, more students than expected differentiated $\frac{2}{x}$ as $2\ln x$.

Question 3

It was clear that almost all students understood the method required in part **(a)** to find the gradient of the line. However, poor algebraic manipulation and careless lack of brackets resulted in a significant minority of students obtaining the wrong expression for the gradient of PQ.

Part **(b)(i)** was not answered well by a majority of students. A higher proportion than in previous series just substituted $h = 0$ in their answer for part **(a)** without using 'lim' notation or without using $h \to 0$ approach. Explanations were also frequently unconvincing. The mark for stating the equation of the tangent in part **(b)(ii)** was scored by the majority of students.

Question 4

As expected, students found part **(a)** the most challenging. Some very good explanations were presented, but for a large number of students an imprecise statement usually resulted in the loss of at least one of the marks. In part **(b)** almost all students stated the correct value for $\alpha + \beta$. A large majority in part **(c)** presented sufficient intermediate work to convincingly show that $k = 4$. A majority of students also scored full marks in part **(d)**. Others made numerical slips in calculating the values for the sum or product of the given roots. However, most of these students were awarded the method mark for correctly substituting their values into the correct general formula.

Question 5

In part **(a)** almost all students used the correct expression for z^* and the correct expansion for z^2. Most students scored at least 4 marks but a significant number lost the final mark because they either did not isolate the real and imaginary terms or i was part of the imaginary term. A large majority of students applied the correct method in part **(b)** but a significant proportion of them gave the value for w as -1380 instead of $-1380\mathrm{i}$ and so lost the final accuracy mark.

Question 6

Approximately forty percent of the students scored full marks in part **(a)** for finding the correct general solution of the given trigonometric equation. The most common error was to replace $-\cos 80^\circ$ by $\cos 80^\circ$ instead of by $\cos 100^\circ$ or another correct equivalent. Some students mixed radians and degrees in their general solution and this was heavily penalised. Most students scored the mark in part **(b)(i)**, with many using their calculator. The majority of students scored at least 2 marks in part **(b)(ii)**. Writing $-\frac{\sqrt{3}}{2}$ in the form $\sin b\pi$, where b is a **positive** rational number was a problem for many. The most common wrong value for b was $-\frac{1}{3}$.

Question 7

Part **(a)** was well attempted with slightly more than 77 percent of the students scoring full marks. Many students provided sufficient evidence of working to justify reaching the printed result. However, a number of students failed to score the final mark because they did not **fully** correct an earlier error in their manipulation. The connection between parts **(a)** and **(b)** was usually recognised but failure to replace $\sum_{r=1}^{n} 57$ by $57n$ was the main reason for a low mark in part **(b)**. A common error amongst students who went on to form a correct cubic equation, was to divide throughout by n without giving a reason for why that was valid. Such students generally went on to score 3 of the 5 marks. Students who factorised the cubic correctly or stated the 3 correct roots of the cubic equation usually went on to score full marks after giving a valid reason for why 5 was the only possible value for n.

Question 8

This was a good source of marks for many students. In part **(a)** the vast majority of students formed at least three correct equations, although there were a small number who treated the left-hand side of the equation as though it were q**AB**. The usual loss of marks was due to errors in algebraic manipulation. Correct solutions were usually presented in all three parts of **(b)**. In particular, the correct order of matrix multiplication required in the final part was seen in a higher proportion of scripts than has been the case in most previous series.

Question 9

A large majority of students scored full marks in parts **(a)** and **(b)**. The common error in part **(a)** was to just give $x = 0.2$ without explicitly stating $y = 0$. In part **(b)** the final mark was lost due to either an error not corrected anywhere in the solution or missing an intermediate stage or a final answer not given in the form required. Again, the majority of students scored full marks in part **(c)(i)**, but there was a larger proportion than in the previous parts who did not score a mark as they did not use 'Hence'. Other students used the discriminant to find the equation of the tangents but linked it to an inequality.

Part **(c)(ii)** proved a challenge to most students. Students were required to first show that *AB* and parts of the two tangents can form three sides of a square. Instead, the majority of students either assumed the shape was a square and just found its area or else attempted to show sides were equal thus not distinguishing between a square and a rhombus. The modal mark for **(c)(ii)** was 2, for finding the correct coordinates of *A* and *B*.

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 www.aqa.org.uk/umsconversion