

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE MATHEMATICS

(9260/2E) Paper 2E

Report on the examination

June 2022

REPORT ON EXAMINATION: INTERNATIONAL GCSE MATHEMATICS 9260/2E PAPER 2E JUNE 2022

The vast majority of students appeared to find the paper accessible on the whole and attempted all the questions in the allocated time. Students found a few of the questions quite challenging, as indicated later in this report, but there were some outstanding scripts. Working was generally set out in a neat, orderly and coherent fashion, although occasionally the writing was not easy to read, especially numbers. Students should take care to ensure their writing is as legible as possible.

Topics that were well done included:

- Pythagoras' theorem
- irregular polygons
- ratio in a geometrical context
- tree diagrams
- composite functions.

Topics which students found difficult included:

- reciprocals
- construction of an angle bisector
- set theory notation
- enlargement with a negative scale factor
- decreasing functions.

QUESTION 01

A majority of students thought that the reciprocal of 0.5 was $\frac{1}{2}$ and less than 50% gave the correct answer.

QUESTION 02

The vast majority of students were able to perform the calculation correctly.

QUESTION 03

Most students chose the correct answer, with incorrect answers being fairly evenly spread between the other three options.

QUESTION 04

Approximately two thirds of students chose the correct answer.

QUESTION 05

A few students only took 5 or x or y as a factor, but the vast majority were comfortable with this type of factorisation.

QUESTION 06

This question was not too well attempted, with about one third of students not scoring any marks. Some students tried to construct a perpendicular bisector and others drew one pair of intersecting arcs with centres at X and Z . A few who did construct the angle bisector lost the final mark by not then placing P so that YP was 6 cm. Students should be made aware that construction arcs are an integral part of their answer to the question and they should not, therefore, attempt to erase them.

QUESTION 07

There were many fully correct tables in part (a), and most students were able to plot their points in part (b), with occasional difficulty in plotting the y values of 1 and 3. Although some students then joined them with straight lines, the majority attempted a smooth curve.

QUESTION 08

A few students who used Pythagoras' theorem on triangle BCD forgot to square root 56.25. A few others who correctly obtained 7.5 cm then went on to subtract the sides from 30 cm, but also included the side 6 cm. Nevertheless, this question was very well attempted, with a large number of fully correct solutions.

QUESTION 09

This question was also very well attempted. Students understood the nature of an identity and how to evaluate c and d . The negative sign before the second bracket proved to be a stumbling block, which prevented some students from achieving full marks on this question.

QUESTION 10

This proved to be a challenging question. In part (a) only just over half of the students selected the correct option, with almost one quarter choosing the third answer. In part (b) many omitted 1 as a square and cube number. A few included the number twice, thus getting an answer of 5. Some just listed the elements of the union and then thought they should add them up. A few worked out the intersection of B and C.

QUESTION 11

Most students began with a correct operation, but some began by dividing 8 by 3 or subtracting 3 from 8. The negative sign proved difficult for many and consequently $t < -12$ was a common incorrect answer.

QUESTION 12

A few students used 360° for sum of angles of the pentagon. Others wrote an expression for the sum of the angles in terms of x and then equated this to 0. However, the vast majority of students were able to solve the problem correctly and score full marks.

QUESTION 13

Most errors occurred in working out the Week 3 price, where quite a few students incorrectly worked out the cost of two rolls by adding on 25% to the cost of one roll, and some simply subtracted \$0.25 from

\$1.40. Nevertheless, many students scored quite well on this question. In questions involving percentage calculations students are advised to write the calculation as a decimal or fraction operator in order to ensure being awarded method marks when they incorrectly evaluate the calculation.

QUESTION 14

There were many good attempts at this question. A few students worked out that the third angle was 96° , but gave this as their answer and did not go on to find x . A few used 3 : 4 as the ratio of the sides and tried to use trigonometry somehow, or thought it was a right-angled triangle, so that x was 5.

QUESTION 15

Around a quarter of students chose the first option, but most selected the correct option.

QUESTION 16

Many students were able to obtain $c + d = 57$, but some then simply chose 2 numbers with a total of 57. Others were able to work out the product with the frequencies but not form a correct equation for the mean. Those students that were able to form two equations in the two unknowns usually went on to solve correctly and obtain the correct values.

QUESTION 17

Some students seemed to think that C was at the minimum point and so began by differentiating the equation. Many students began correctly, but some who correctly found A and B then treated P as being the midpoint, while others who worked out that $AB = 9$ then divided 9 by 4 instead of 3.

QUESTION 18

About half of the students were able to unravel the problem and most of these went on to obtain the correct answer. The remaining students often confused speeds, distances, times and averages. Some simply divided the sum of the three speeds by 3, others began by dividing 52 by 2 or multiplying 48 by 3 and a few treated 45 minutes as 0.45 hours.

QUESTION 19

The majority of students chose the correct option, but almost one quarter chose the first answer.

QUESTION 20

Many students began by writing down the obtuse angle at O , but some could not progress any further. Some thought x and $2y$ were supplementary or that angle ABC was equal to y , while others tried to obtain numerical values of x and y . For those who were able to progress, the main methods used were using the reflex angle at the centre to obtain angle ABC or drawing the radius OB and using isosceles triangles.

QUESTION 21

Some students treated this question like a geometry question, trying to use the cosine formula or the area of a trapezium formula. Some used $2a$ for $\overline{SP}$ or wrote equations inconsistent with their lettering. The majority, however, were able to obtain the correct answer.

QUESTION 22

Having worked out the gradient of AB , the main stumbling block for students was to use this value when working out the equation of BC , or work out the perpendicular gradient incorrectly. Some students began by working out the coordinates of C and these attempts were largely successful.

QUESTION 23

In part (a) some students used the table as if they were finding a mean. Many students, however, were able to work out the correct frequency densities but there were mistakes in drawing the heights of the first and last bars and the second bar was sometimes drawn too wide. Part (b) proved more difficult. Some simply halved the 150 in the $250 \leq t < 280$ class. Others added the frequency of the first two classes and gave that as their answer or tried to proportion their total.

QUESTION 24

Most students who were successful with this question opted to change a common base of 9 or 3, although those who chose 3 sometimes made a mistake in one of the three powers, especially when changing 9^{6x} . Some students, however, did not change to a common base before trying to use the laws of indices and some used a calculator to evaluate 81^2 or other powers of 9 and 81.

QUESTION 25

Most students were able to complete the tree diagram in part (a), although 0.55 and 0.15 were common incorrect probabilities seen on the second pair of branches. In part (b), some students added probabilities from the first and second branches while others multiplied probabilities on the second branches together. However there were many correct answers.

QUESTION 26

Students found this question challenging and employed various methods to solve the problem. A common error was to work out that 42 people would be needed to complete 70% of the job and then to subtract 18 from this to work out how many extra people were needed, forgetting the time element. Some students thought that the same operation could be applied to all three variables. A few found that 63 workers were needed but forgot to subtract 18 to get the final answer.

QUESTION 27

The vast majority of students chose the correct answer in part (a). In part (b) many students were well rehearsed in rationalising the denominator. However, as has been commented on in the past, quite a number of students lost marks by missing out steps in the working. Students should show the expansions of both numerator and denominator before simplifying.

QUESTION 28

This proved to be a difficult question, with less than half of the students scoring marks. Some drew a shape somewhere on the page half the size of Q but with the same orientation as Q , often with C as one of the vertices. Others attempted to draw a shape twice the size of Q . The most successful attempts were by drawing rays from the vertices of Q through C .

QUESTION 29

There were many fully correct answers. Apart from a few arithmetical mistakes, the main error was to multiply the two functions rather than use the composite.

QUESTION 30

The vast majority of students began by using the method of differences. However, some subtracted incorrectly and thought the second difference was 4. Quite a number of students who correctly obtained -4 were then unsure how to proceed, but a good percentage of them were able to obtain the correct expression.

QUESTION 31

Many students were able to set up a correct equation, but the manipulation proved difficult and only about one half of these students were able to reach an equation in r and h alone. Some then had difficulty relating this to the angle in the diagram. Just under one quarter of students successfully worked out the angle, although sometimes by a circuitous route of using sine or cosine rather than tangent.

QUESTION 32

This is the first time that a question on decreasing functions has been set. Quite a few students made no attempt at the question and a considerable number of those who did attempt it did not realise that it was necessary to begin by differentiating the equation. Around one quarter of students who did differentiate did not know what to do next. Some simply tried to substitute values of x either into their derivative or into y . Students who went on to show that $x^2 < \frac{1}{4}$ then sometimes missed the $-\frac{1}{2} < x$ part of the solution and a few gave the answer using $=$ rather than inequality signs.

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