

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE MATHEMATICS EXTENSION

(9260) Paper 1E

Report on the examination

November 2020

REPORT ON EXAMINATION: INTERNATIONAL GCSE MATHEMATICS EXTENSION 9260 PAPER 1E NOVEMBER 2020

Students gave some well-constructed solutions on many of the questions. However, some did not set out their solutions clearly and numbers were often written ambiguously. There was no evidence of time pressure, with the majority of students completing the paper.

Topics that were well done included:

- percentage increase and decrease
- division of a mixed number by a fraction
- index laws
- circle theorems
- representing parallel vectors
- inverse function
- expansion of three binomials
- acceleration from a velocity-time graph.

Topics which students found difficult included:

- using equivalent ratios
- representing vector addition
- matrix multiplication
- drawing a box plot from a stem-and-leaf diagram
- completing the square
- describing a single transformation
- using the periodic nature of a cosine graph.

QUESTION 01

This question was very well answered. The common wrong answer was $\frac{5}{12}$.

QUESTION 02

Students answered this question well. The common wrong answer was (9.5, 6).

QUESTION 03

Students answered this question well. The common wrong answer was $4x \equiv 28$.

QUESTION 04

This question was very well answered. The common wrong answers were $\frac{5}{2}$ and 1.

QUESTION 05

The expression in part (a) was usually factorised correctly, although a few students went on to form an equation and solve it. Part (b) was also often factorised correctly, but some students only gave a partial factorisation. Students should be careful when transferring their answers to the answer line because a significant number of transcription errors were seen.

QUESTION 06

Many correct solutions were seen, often well-explained, using all possible methods. Some students aimed to prove the lines were parallel and seemed to change the solution to one of their equations to show they had two matching values of x . Other students gave a circular argument, for instance starting with $2x + 16 = 124$ to work out x and then substituting x back in to show that $2x + 16$ made 124.

QUESTION 07

In part (a) students who gave the answer as a decimal or percentage often did not show sufficient accuracy. Some gave the number of students rather than the probability, and sometimes a denominator of 75 was used.

In part (b) most students identified the four who did not use a phone or social media, either on the diagram or in their working. Some gave the number of students as their answer rather than the probability. Occasionally a denominator of 75 was used. Students who worked in decimals or percentages usually showed the fraction first, but some only gave a percentage or decimal to 1 significant figure.

QUESTION 08

This question was very well answered. However, students should show their method in case they make an arithmetic slip. For example, $3000 \times (1 + 4\%)$ is not accepted as a method so it is important that students write their multiplier as $1 + 0.04$ or 1.04 or $1 + \frac{4}{100}$ or $\frac{104}{100}$.

QUESTION 09

This question was very well answered. Most students showed a full method, which is vital on a calculator paper, and usually used correct arithmetic.

QUESTION 10

There were many fully correct solutions seen on this question. Most students formed the equation $8x - 20 = 90$, but some then rearranged this to $8x = 70$. Occasionally, students only had 7 sides for the perimeter of their shape.

QUESTION 11

Part (a) was very well answered. In part (b,) many fully correct answers were given. Occasionally, students only gave the result from their calculator, with no laws of indices used.

QUESTION 12

This question was poorly answered. Although some students did manage to give a full solution, they often made the problem more complicated than necessary. Those who simply searched for equivalent ratios, where the number of adults matched and the total passengers on each coach were fewer than 30, reached the solution with very little working. Students who used algebra and inequalities often became overwhelmed and struggled to make any progress.

QUESTION 13

In part (a) some students filled the tree diagram with frequencies rather than probabilities. Occasionally, the set of probabilities for B was completed with the combined probability of A and B, for example instead of $P(B \text{ odd})$ the student filled in $P(\text{odd}, \text{odd})$. In part (b) it was very common for students to calculate the probability that at least one, rather than exactly one, of the numbers was odd. Students who had made a slip in (a) were often able to follow through with their probabilities in this part.

QUESTION 14

This question was extremely well answered, with just a few students thinking the angle at the circumference was double or equal to the angle at the centre.

QUESTION 15

In part (a) most students were able to draw the vector $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ onto the right-hand end of the given vector.

Students often finished at that point, but those who completed the triangle of vectors usually did so correctly. Some students wrote the vector $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$ in the working but then miscounted squares when drawing it. Occasionally, students only drew a parallel vector of the same length. Most students remembered to add the direction arrow.

Part (b) was very well answered, with only occasional miscounting or inaccurate drawing noted.

QUESTION 16

Sign and arithmetic mistakes were often seen in part (a). The most common error was to square each of the entries. In part (b), misconceptions were frequently seen when students attempted to multiply out the pair of matrices. Those who formed the correct equations were usually able to correctly solve them, with just the occasional slip solving $3 = 6b$.

QUESTION 17

Some students were able to demonstrate a complete understanding of how the measures can be taken from a stem-and-leaf diagram to draw a box plot. Not all students used the 4th, 8th and 12th values for the lower quartile, median and upper quartile, so some thought the median was 16.5 and the upper quartile was 19. A few students did not understand the format of a stem-and-leaf diagram and ignored the key. Some students worked out the mean instead of the median. Occasionally, students also plotted the interquartile range.

QUESTION 18

There were some well-written, fully correct solutions. However, some students tried to incorporate the ratio by substituting 5 for r and 12 for h . Those who realised that they should use $5x$ and $12x$ for this approach usually went on to correctly work out r . Some students only had π on one side of the equation and others divided 72.9 by 3 instead of multiplying.

QUESTION 19

Although there were many solutions with fully correct working there were also some with premature approximation, resulting in an answer out of the given range. Some students treated it as a right-angled triangle.

QUESTION 20

This question was very well answered. The common wrong answer was $3a^2$.

QUESTION 21

In this AO2 question the vast majority of students knew that they needed to use Pythagoras' theorem to work out the radius. A considerable number of students did not realise that they should use trigonometry to work out angle BOC and, of those that did, some worked out the angle OBC in error. Sometimes a fully correct method was inaccurate due to premature approximation.

QUESTION 22

In part (a), most students were able to set up and solve the correct equation. The common error was to ignore the domain and give 3 or ± 3 as the answer. Occasionally, students worked out $f(14)$. Part (b) was very well answered. The common wrong answer here was $\frac{1}{7x}$.

Part (c) was less well answered, and many students forgot to cube the 2 and chose the answer x^3 .

QUESTION 23

Most students started by finding the second differences. Some did not know how that related to the final expression. Those who understood the next step usually went on to give a fully correct solution.

QUESTION 24

Very accurate algebra done in a systematic way, with full working shown, led to a good response from students. 'Expand and simplify' requires students to expand any brackets and then collect terms. Some misunderstood the word simplify and thought they needed to factorise their answer in some way.

QUESTION 25

Many students just worked out the percentage increase from 2014 to 2018. Others assumed that it was the same increase each year so divided this by 4. Students found it hard to express the mathematics coherently, but sometimes intuitively ended up with the correct value for r . It was common to see r as 0.15.

QUESTION 26

It is important that students follow the given requirements. Most students did not complete the square as instructed, but differentiated to find the minimum instead. That meant that although the correct values were frequently seen they were often from an inappropriate method. Those who did complete the square sometimes made algebraic errors, but often gave a fully correct solution.

QUESTION 27

Part (a) was extremely well answered. In part (b), most students used the approach of working out the area under the graphs up to $t = 10$, although many used incorrect times, for example using 10 instead of $10 - 4$. Few students formed an equation, but those who did usually gave a fully correct solution. Some used the formula distance = speed \times time and worked out 10×6 for the runner and 10×12 for the cyclist.

QUESTION 28

Most students differentiated, but many lost the constant term. Those who substituted to find the gradient often went on to do further work such as substituting into the original equation, working out the equation of the tangent or the second differential.

QUESTION 29

This question was very poorly answered. Despite being asked for a single transformation many students gave combined transformations, often a rotation and an enlargement. Some did not recognise it as an enlargement because the shape became smaller. The scale factor was usually given as 3, -3 or $\frac{1}{3}$.

QUESTION 30

This slightly unusual question was not answered well. Some students only gave 60° as an answer and some just gave the two values that they could work out by extending the graph. Those who knew that the graph was periodic usually gave the other correct pair as well.

QUESTION 31

Many students did not realise that they needed to use bounds for this question. Of the students who used bounds, many chose 16 as the upper bound of the distance. Some who used correct bounds forgot to change the units and gave their answer in kilometres per minute. It was common to see the upper bound of the distance divided by the upper bound of the time.

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