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GCSE

# Mathematics

8300/2H Paper 2 Higher  
Report on the Examination

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Specification 8300  
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**General**

Most students completed the paper in the time allowed. Only a few questions towards the end of the paper had a significant number of non-attempts and this was most likely due to the difficulty of the questions rather than a lack of time. Presentation of work was often good but many students did not show sufficient working in questions that required them to show that something was true. Similarly the proof question was often missing important steps. Some students were not able to recall relevant formulae that were needed to answer some questions.

Topics that were well done included:

- identifying a number written in standard form
- matching sequences to descriptions
- error interval
- problem involving a hemisphere
- completing a tree diagram
- scale drawing and loci
- density.

Topics which students found difficult included:

- giving a reason for a better estimate
- showing simplification of an algebraic fraction
- similar shapes problem
- probability using a Venn diagram
- showing intersection of a curve and a line
- functions.

**Question 1**

This question was not very well answered. Chord and sector were the common incorrect choices.

**Question 2**

This question was well answered. The common incorrect choice was  $0.25 \times 10^7$

**Question 3**

This question was quite well answered. The common incorrect choices were 5 : 2 and 2 : 3

**Question 4**

This question was quite well answered. The common incorrect choice was 4%

**Question 5**

This question was well answered by many students. Identifying square numbers and cube numbers was particularly well done.

**Question 6**

There were many ways to approach this problem and the question was a good discriminator. The most common method was to obtain the 14.28...% increase from 2001 to 2011 and to then increase the 480 000 by this percentage. Most decisions were correct after a correct method was seen. It was quite common to see an incorrect number of zeros on some of the numbers.

**Question 7**

Part (a) was quite well answered with most students identifying at least one correct estimate of a probability. A common error was to give two equivalent probabilities such as  $\frac{54}{90}$  and 60%. Some gave the average of the probabilities from the three days. In part (b) many could not give a correct reason. Some students referred to the number of misses while others selected a value such as  $\frac{3}{4}$ .

**Question 8**

Most students built up the amounts saved but there were quite a lot of numerical errors. Those who obtained correct totals up to £45 and £24 often miscounted and gave an answer of 7 weeks. Very few algebraic approaches were seen.

**Question 9**

Part (a) of this question was well answered. The most common error was to use 8.44 instead of 8.45. Part (b) was correct for many but it was common for students to multiply their lengths in part (a) by 4 or by 6 instead of by 5. The other common error was to multiply 8.4 by 5 to get 42 and then to write 41.5 and 42.5 as the error interval.

**Question 10**

Most students has some success with this question. The most common error was working with a sphere rather than a hemisphere.

**Question 11**

Part (a) of this question was very well answered and part (b) was quite well answered. In part (c) many selected and worked out the two correct combinations but some only gave one of these as the final answer. A common error was to multiply all four probabilities together.

**Question 12**

Both parts were quite well answered. In part (b) the common incorrect choice was that the answer to part (a) was too small.

**Question 13**

This question was not well answered. Many cancelled incorrectly and others obtained an equation and tried to solve it. Many of those who started by factorising correctly did not show sufficient working for the next stage or did not recognise the need to use the difference of two squares.

**Question 14**

This question was well answered although a significant number did not identify the region. Most students used compasses and used the scale correctly.

**Question 15**

This question was quite well answered. The common incorrect choice was that a woman had the highest score.

**Question 16**

Part (a) was well answered. Nearly all students who could recall the correct relationship between density, mass and volume gave the correct solution. Part (b) was not as well answered and was a good discriminator. The main error was not knowing the formula for the volume of a cylinder.

Some omitted  $\pi$  and others used  $\frac{1}{3}\pi r^2 h$

**Question 17**

Part (a) of this question was very well answered. Part (b) was correct for the majority but not particularly well answered. In part (c) many attempted a gradient and quite often used correct values. Common errors included reading the height as 4.5 m and dividing by 3.5 s

**Question 18**

This question was answered quite well although answers of  $3^5$  (or 243) and  $3^6$  (or 729) were quite often seen.

**Question 19**

This question was a good discriminator. Most students worked out  $35^\circ$  and tried to use half of the isosceles triangle. The common error for this approach was to work with  $\cos 35 = \frac{x}{6}$

Many of the students who worked with the isosceles triangle took the angle at the vertex to be a right angle. Those who obtained  $110^\circ$  were often able to use the sine rule correctly. A significant number added four lots of 12 when working out the final perimeter.

**Question 20**

This question was quite well answered. Some students did not give answers to 3 significant figures and others made errors when interpreting the given formula, for example, omitting a square or using an incorrect sign.

**Question 21**

In part (a) some who tried to use the cosine rule could not recall the correct formula. Some of those who did recall the formula then made processing errors. Others used Pythagoras' theorem. Most of those who obtained the correct value made the correct decision as to who arrived first. Part (b) was quite well answered although some simply said no rather than making it clear that it was no change.

**Question 22**

This question was well answered. The common incorrect choice was  $x^2 + y^2 = 5$

**Question 23**

Many did not understand the scale factor relationships between volumes and areas and this meant the question was not well answered. Most common was to divide 343 by 64 and then to multiply the answer by 176.

**Question 24**

This question was a good discriminator. Many could work out one volume using a valid set of three dimensions as well as being able to convert between cubic centimetres and litres. More able students worked out suitable volumes and made a correct conclusion. Most students used upper and lower bounds for their dimensions although this was not essential.

**Question 25**

This question was not well answered with most students failing to interpret the link between  $\frac{7}{12}$

and 35 correctly. Many worked out  $\frac{5}{12}$  of 150 or  $\frac{5}{12}$  of 35. Some of those who correctly worked out  $y$  to be 43 gave this as their answer. Algebraic solutions were not seen often.

**Question 26**

This question was not well answered with many using the formula on the quadratic expression in the equation of the curve. Those who eliminated  $y$  correctly usually factorised to show that there was only one solution. Those who tried to eliminate  $x$  often made errors, usually involving the omission of  $y$  on one side.

**Question 27**

There were many very good presentations of this proof but also many instances of solutions lacking the necessary rigour. Steps were often missing and some did not attempt to use algebra at all. The question was a good discriminator.

**Question 28**

Many students were not able to process the functions correctly in part (a).  $f(2x)$  was often worked out as  $2f(x)$ ; and  $g(x - 1)$  was often worked out as  $3x - 1 + 7$ . Few understood the concept of an inverse function with many finding the reciprocal of  $3x + 7$  or working out  $-g(x)$ . There were a lot of non-attempts to part (b).

**Use of statistics**

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

**Mark Ranges and Award of Grades**

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.