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GCSE

# Mathematics

8300/2F      Paper 2 Foundation

Report on the Examination

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Specification 8300

November 2018

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Version: 1.0

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## General

Students appeared to find most questions accessible but there were a few questions later in the paper that this cohort found challenging. Students were able to demonstrate some good mathematics even if they were unable to give complete solutions. There was no evidence of time pressure. Students often did not set out their solutions clearly or show a full method.

Topics that were well done included:

- money problem
- bank statement
- coordinate grid problem
- drawing a composite bar chart
- scaling a recipe
- interpreting a ratio
- $n$ th term of a sequence
- standard form.

Topics which students found difficult included:

- compass point angles
- reflecting a shape
- evaluating a solution to identify the effect of an assumption
- understanding the constant of proportionality
- equating coefficients in an identity
- mean from a grouped frequency table
- area of a circle problem
- triangle perimeter using algebra.

### Question 1

This question was well answered. The common incorrect response was 35 cm.

### Question 2

This question was not well answered. The common incorrect response was  $-0.91$ .

### Question 3

This question was fairly well answered. The common incorrect responses were  $2x - 3$  and  $11x$ .

### Question 4

This question was poorly answered. The common incorrect response was  $135^\circ$ .

### Question 5

This question was very well answered. Some students worked out the new weekly pay but then gave that as their answer. Students who worked out the yearly increase in pence sometimes treated it as pounds when adding.

### Question 6

Both parts of this question were well answered. In part (a) the common errors were to confuse debits and credits or to deduct all three values. Some students made arithmetic slips or copied answers incorrectly from their calculators but recovered for follow through marks. In part (b) many students gave a good attempt at a description but sometimes had difficulty expressing themselves. Common misconceptions were that it was something that you owe the bank, your available money or money added to your account. Some students described a debit card.

**Question 7**

Parts (a) and (b) were well answered. In part (c), fully correct solutions were rare. Some accurate drawing was seen but many lines went out of tolerance, missing the relevant integer points and usually were the wrong length. Students who spotted that  $AB$  crossed 6 horizontal squares so their line should cross 4 were usually more successful than those who measured  $AB$  and calculated two thirds of the length.

**Question 8**

Part (a) was quite well answered. Some students only gave three correct orders or gave all 24 arrangements with R in any position. Some weaker responses listed pairs of letters. In part (b) there were many fully correct responses and the vast majority were able to handle calculating with time correctly. A common error was to add the wrong number of breaks, with adding a final extra break and the answer of 4.39 pm seen frequently. Basic arithmetic errors occurred when adding times but students usually showed their method.

**Question 9**

The vast majority of students were able to produce an accurate, well-drawn composite bar chart. Wednesday's bar caused the most difficulty. Part (b) differentiated well between more and less able students. Most students were able to correctly total at least one column from the table. A frequent error was to form a fraction using 24 and 48 and many gave this as an improper fraction. The correct fraction was occasionally not fully simplified or an error in cancelling was seen.

**Question 10**

This was fairly well answered. The common incorrect response was  $\times 12$ .

**Question 11**

In part (a), students did not always give units and occasionally gave incorrect units. The most common error was to multiply the given ingredients by 3. Occasionally students lost accuracy when calculating the number of eggs and gave an answer of 2.7 eggs. In part (b), most students divided but some students multiplied the values. Those who did divide sometimes rounded to 2 decimal places, 1 significant figure or truncated to 1 decimal place. Students who attempted a trial method testing different values were rarely successful.

**Question 12**

This question was poorly answered. Many students gave a reflection in the  $y$ -axis or a reflection in a different horizontal line. Some rotations and translations were seen. Occasionally students gave more than one transformation as their answer.

**Question 13**

Most students were able to access part (a) and make at least some progress working out the number who made a donation and the total donations or the number who filled in a tax form. There were a good number of fully correct solutions using the different methods. The most frequent error was to count some donations more than once. For example, students worked out the total donations and then, instead of working out just the government addition, also included the donations of the 500 for a second time. Some students assumed that 1000 people filled in a tax form.

Part (b) was poorly answered with many students struggling to express the necessary level of reasoning. Students often focused on the idea that all the donations increased. Some students ticked that it should stay the same because they thought that they had already addressed the government addition, not realising that it would now change.

**Question 14**

Most students made one of the two criticisms with the comment about the values not extending from  $-5$  to  $5$  being the most common. Frequently students said the shape of the graph was wrong because it should have been a curve. Some students gave very vague comments or stated an incorrect criticism such as  $(-5, 5)$  should have been plotted.

**Question 15**

In part (a), some students simply subtracted 8 and 4 from 20. It was also common to see 20 substituted for  $b$ . The answer was frequently given with incorrect money notation as 1.6.

Part (b) was better answered but some students only gave an expression or used  $A$ , which referred to the cost of the company in part (a).  $C = 3 + 1.90\text{pm}$  or per mile and  $C = 3 + 1.90$  were both seen.

**Question 16**

This question was fairly well answered. The common incorrect responses was 'A or B or both'.

**Question 17**

This novel question was poorly answered with a high number of non-attempts. Many students gave the name for part of a circle, so radius, chord, diameter and circumference were common.  $\pi d$  was also seen.

**Question 18**

Part (a) was very well answered, although many students gave their answer embedded in a ratio.

Part (b) discriminated well between more and less able students. Many students worked accurately, showed their working and gave a value in range. The word 'estimate' was needed because they were working with an average but students often misunderstood its use and used approximations. A common error was to work out the total for 12 months rather than 10 months.

**Question 19**

Although many students started to apply Pythagoras' theorem, they were often let down by poor mathematical notation and sometimes wrote incorrect statements such as  $144 = \sqrt{144}$ . Quite a few students calculated the square root by dividing by 12 which was not accepted in this 'Show that' question. Some students attempted to use the perimeter or the area or the sum of the angles.

**Question 20**

This question was very poorly answered and very few students knew how to equate coefficients in an identity. The majority started by attempting to expand the brackets, not always accurately, but often made no further progress. Some students were able to pick out the value of  $a$  by observation.

**Question 21**

This question was well answered, although the response  $n + 4$  was chosen almost as often as the correct response.

**Question 22**

Part (a) was poorly answered. Students who attempted midpoints were often able to work out the required products. However, it was very common to see a choice of method with many also totalling the frequencies and dividing by 4. Many students used the row with a frequency of zero but the product for that row was sometimes shown as a non-zero value.

Part (b) was much better answered but all other responses were chosen fairly often.

**Question 23**

This question was poorly answered with many students only able to work out the area of the rectangle. A significant minority of students attempted to work out the shaded area by using the formula for the area of a triangle or by dividing the rectangle into squares. Some students calculated circumference instead of area.

**Question 24**

The most successful students were those who attempted to work out the time it would take to fill the tank or the capacity that would be filled with the tap partially turned on. Many students made a correct first step but did not introduce the relevant proportion. Some students used 7.3 for  $7\frac{1}{2}$  minutes.

**Question 25**

This question was extremely poorly answered. Almost all students started by adding up the expressions for the sides and could progress no further. Those who equated the sides often set all three sides equal and did not know how to deal with an equation with three parts.

**Question 26**

The vast majority of students worked out the given calculation accurately but some did not show enough accuracy in their answer. However, it was rare to see one of the required calculations to verify that the result was within 0.1 of 3.14, with most students just stating the result. Many students did not attempt this question.

**Question 27**

Many students were able to work out the answer as an ordinary number but this became  $285^4$  or  $285 \times 10^4$ . Not all students showed the intermediate value from their calculator.

**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.