GCSE
Mathematics

8300/3F Paper 3 Foundation
Report on the Examination

Specification 8300
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Version: 1.0

General

The majority of students found the paper accessible and attempted most of the questions. The work was generally well presented with working shown on most scripts. Arithmetic errors caused problems for some students who had otherwise engaged with a question and decided not to use a calculator. Some students did not show the working from their calculator.

Topics that were well done included:

- calculating a range from a diagram
- dimension of a rectangle deduction
- similar triangles
- problem solving percentage question
- problem solving probability problem.

Topics which students found difficult included:

- algebraic manipulation
- expanding single bracket and collecting terms
- calculating mean from a diagram
- dimension of a triangle deduction
- time and proportion
- ordering probabilities as fractions, decimals and percentages
- drawing a tangent to a circle
- consecutive cube numbers problem
- multi-step best value problem solving
- substitution into fractional algebraic expression
- ratio problem
- forming an algebraic equation from a geometrical context

Question 1
Nearly all candidates answered correctly.

Question 2
This question was reasonably well done.

Question 3
This question was reasonably well done

Question 4
This question was very well done.

Question 5
The notation for algebraic simplification was generally well known. In part (a) the most common incorrect answers involved one correct term $3a + 2b$ or $a^3 + b^2$, with some students continuing with incorrect further work e.g. a^3b^2. In part (b) common errors when expanding $5(x + 3)$ were $5x + 3$ and $5x + 15 – 5x + 10$ with some errors when collecting terms before or after expanding, e.g. $x + 3 = 3x$ or $5x + 15 – x + 2 = 21x$.

Question 6
This question was a good discriminator. The most common incorrect answer was 4 and 5, 5 and 6, 6 and 8, 10 and 9, 10 and 12 with some students not appreciating that the number cards could only be used once. Of those who had success, many listed the numbers and crossed them off when used.

Question 7
Both parts were well answered.

Question 8
Part (a) was very well done.

Part (b) was not very well answered. Most students read the information from the bars and correctly added them, but a common mistake was to divide by 8 or 4 with some students leaving the answer as 47. The most common incorrect answer was 47 ÷ 8 = 5.875 and a common misread was using away goals to answer 22 ÷ 10 = 2.2.

Part (c) was very well answered with most students calculating home and away goals and answering 25 – 22 = 3. Some students added up the differences between the bars for each quarter and then totalled the differences. Some students did not write down the numbers they were adding and then lost accuracy.

Part (d) proved challenging for most students. The bar chart was misinterpreted as referring to one game or to four games. Some stated the reason was because there were more away goals in the second quarter, whilst others stated there was not enough data. Answers often did not relate to the context of the question. Many students answered ‘yes’.

Question 9
This question was well answered by most students. In part (a) the most common error was to omit 30 or 1 and 30.

In part (b) the majority of students were able to use their answer from part (a) and write the probability as a fraction. Some incorrect solutions were to either write 3 out of 8, show a probability in ratio format or use a descriptive term such as ‘unlikely’.

Question 10
This question was not well answered by the majority but was a good discriminator. The height of the rectangle was usually found correctly, with the most common incorrect answer being 6 from a calculation of the perimeter. In the triangle part very little working was shown with trial and error used to obtain a correct answer of 3 or incorrect answers of 1.5 or 6.

Question 11
This question was an excellent discriminator of the more able students. Common errors were to misinterpret times as 5 am to 11am and work with 6 hours, incorrectly calculate the number of hours as 17 or 19 or to divide hours by 2 to get incorrect number of half hours. Build up methods rarely produced the correct solution and often lead to 19 hours or 37 half hours.

Question 12
This question was not well answered. Many students did not show any conversion work and just gave an incorrect order of probabilities. Those who did show conversions often had some success for correctly converting to decimals or percentages. Equivalent fractions were rarely seen in solutions.

Question 13
In part (a) the majority of students did not draw a tangent. Most of these students either left the diagram blank or drew a chord/ radius/ diameter.

Part (b) was not well answered. Students who were successful usually used πr^2 and stated an answer in the range [4.5, 6.2] or used a radius of 1.5 and obtained an answer of 7(.06…). Some did attempt to explain that the circle was drawn inside a 3 × 3 square and was therefore less than 9 cm^2, but many lacked a coherent explanation.

Question 14
In part (a) the majority of students did not correctly identify the cube, with a common incorrect answer being cuboid or square.

Part (b) was well answered.

Question 15
This question was an excellent discriminator of the more able students. A small majority of students were able to identify all five 3-digit cube numbers but many also listed 64 and 1000. A significant number of students did not understand the concept of a cube number.

Question 16
Part (a) was well answered by the majority of students. Of those who correctly found a scale factor of 2 most went on to a fully correct solution of 4.5. Many students assumed *B* and *E* were right angles and used trigonometry instead of a similar triangles.

Part (b) was not very well answered with 106^o the most common wrong answer.

Question 17
Both parts were poorly answered.

Question 18
The large majority of students did not answer this question well. Many correctly achieved the first step by calculating the cost of one battery, 45p or 49p, or the number of hours to power a toy using one pack, 40 or 33. Most students thought the question was a simple best-buy problem and did not progress further to compare either the cost per hour or number of hours per unit cost. A common mistake was using 5.30 instead of 5.5 for $5\frac{1}{2}$ hours in calculations.

Question 19
The majority of students had some success with part (a). Some students included xy with the numbers in the answer, for example, $6xy$. Other errors were to only use 2 × 3 = 6 and 5 × 12 = 60, adding instead of multiplying and simply replacing letters with numbers and answering 23, 53, 212, 512

Part (b) was not well answered. The most common error was students using different values of x in the same expression. Many solutions indicated errors in the use of a calculator when evaluating fractional calculations.

Question 20
The majority of students had some success on this question. However, many calculated 33 out of 60 as a percentage and added that to 75% with 130% being a common incorrect answer. The majority combined 33 and 75 to achieve 108 or 60 and 100 to achieve 160 but then failed to

correctly calculate a final percentage. Some truncated a correct solution to show 67 as their answer.

Question 21
This question was not well answered with most not using all the blue paint to find the maximum amount of purple paint. 20 : 8 leading to an answer of 28 was quite common. Some students correctly identified 30 ÷ 5 = 6 or 9 ÷ 2 = 4.5, but failed to use the resulting scale factors in a further correct calculation.

Question 22
Both parts were reasonably well answered.

Question 23
This question was not well answered. Most students appreciated the need to give an answer of 11 or one that rounded up to 11, but they frequently ignored the limitations on the length of the pipes. The most common incorrect answers were 4.5 + 6.5 and 4 + 6.

Question 24
This question was not well answered and had a significant number of non-attempts. In part (a) common errors were: failing to equate the two algebraic terms to form a correct equation, incorrect manipulation in attempting to solve the equation, not equating the two angles as corresponding but adding them to 180 instead.

In part (b) very few candidates set up the initial equation $60 = 2x + 10$, and so were unable to progress further. In part (b), many continued with the assumption that the lines were parallel and gave $3x – 20 = 60$.

Question 25
This question was not well answered and had a significant number of non-attempts.
In part (a) the majority of students were able to show either $\frac{2}{3} \times 720$ or $\frac{3}{5} \times 700$ but then gave incorrect arithmetic, without the use of a calculator, or used 0.6 as an equivalent for $\frac{2}{3}$. Common errors were $0.6 \times 1420 = 852$ or $\frac{2}{3} + \frac{3}{5} = \frac{5}{8}$ followed by $\frac{5}{8} \times 1420 = 887.5$
In part (b) the majority of students were able to show a method for either the total number of students in the school (1420) or the number who did not study French (520).
Common errors were to calculate the probability of a student studying French as $\frac{900}{1420}$ or using an incorrect method of $\frac{1}{3} + \frac{2}{5} = \frac{11}{15}$ or $\frac{3}{8}$

Question 26
This question was well answered.

Question 27
This question was not well answered and had a significant number of non-attempts. The majority of students did not solve the inequalities to identify the whole number differences for x. Common errors were to rewrite the inequalities in words, or write the differences in words for $3x$, or list the integers satisfied by each inequality for $3x$

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.