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General Certificate of Secondary Education
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Mathematics 43603F

(Specification 4360)

Unit 3: Geometry and Algebra (Foundation)

Report on the Examination

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Unit 3: Foundation Tier

General

This was the first unit 3 examination for this specification. The paper had a greater proportion of functional, problem solving and applications questions than module 5 papers in the previous modular specification. However, students generally performed well on questions with functional elements, where familiar contexts allowed students to access the mathematics required. Responses to problem solving questions were more variable. Students generally had the opportunity to demonstrate their mathematical understanding without any literacy issues hindering progress. There was no evidence that students were short of time.

Topics that were well done included:

- coordinates
- mathematical vocabulary
- net of a cuboid
- functional elements' questions.

Topics which students found difficult included:

- perimeter in a problem solving context
- using algebraic expressions in geometry
- Pythagoras' theorem
- multistep angle problem.

Question 1

This question was a good starter for almost all students, with both parts very well answered.

Question 2

Part (a), part (b) and part (c) were well done but only a minority of students were successful in part (d).

Question 3

Part (a) was generally well answered with almost all students having some success, but many did not give the answer in its simplest form.

In part (b) responses were good, although a significant proportion of students obtained 30 squares in total and did not then subtract 10. Another common error was to give 10 + 50 = 60% and then state that 50 squares were needed. Other students started from 50% = 25 and then made arithmetical errors in attempting to reach 60%. Very few students used the diagram as an aid in part (b).

Question 4

This question was very well answered.

Question 5

This question was very well answered, with part (b) more successful than part (a).

Question 6

This question was quite well answered. A common error in part (a) was to cube 3.8. Those students who used build up methods were usually unsuccessful as their work often contained arithmetical errors.

Question 7

Although the area in part (a) was well answered, many did not state the units.

A majority of students gave the correct scale factor in part (b) with an answer of 4 being the most common error.

Question 8

Reading the scales was quite well done in both parts (a) and (b) with more correct responses in part (b) than part (a).

Part (c) was the most successful part of this question. The most common approaches were to give 57 × 19 = 1083 or 56 × 19 = 1064 accompanied by a statement indicating that more fuel was needed. Others worked out 1100 ÷ 19 = 57.8 and then gave a correct response. Use of 1100 ÷ 56 = 19.6 was rarely seen. A significant minority of students gave a correct calculation followed by an incorrect conclusion. Some misconceptions were seen, for example interpreting 36km short as needing an extra 36 litres or 1.9 litres being referred to as 1.9km.

Question 9

A large majority of students drew a fully correct net. Common errors were the omission of one of the rectangular faces or a rectangle with incorrect dimensions. A few made a 3-dimensional drawing.

Question 10

This problem solving question proved challenging for the majority of students. Many confused perimeter with area, whilst others either guessed the length of the sloping sides as 5cm or measured them as 4.8cm.

Question 11

This functional elements' question was a good discriminator. A majority gave fully correct solutions in parts (a) and (b) whilst there was far less success in parts (c) and (d).

In part (b) many students started with 120 ÷ 8 or 120 ÷ 12. It was quite common to see different amounts of each sweet in the bag. Build up methods were used quite frequently but many students only went as far as writing 16 and 24. Some who used 48 + 72 = 120 gave 48 and 72 as their answers.

In part (c) it was common to see 100 grams = 1 kilogram leading to an answer of 5. Many students just wrote 120 ÷ 6 = 20.

Responses in part (d) were generally poor, with many students attempting to calculate the cost per sweet. A significant number gave correct calculations in order to make the comparison, but then chose the wrong bags. Attempts at comparisons using different weights, for example 20 grams and 600 grams, were commonly used.

Question 12

Bearings is a topic that students find challenging at this tier. Only a minority of students were successful in part (a). Although many were able to use the rule successfully in part (b), most were unable to relate the problem in part (c) with the angle exceeding 360°. Many students related the problem to the fact that they had a 180° protractor. Very few students gave an example in order to explain their reasoning.

Question 13

Almost all students were successful in part (a).

Only a very small number of students gave a correct answer in part (b). A common error was to give $360 \div 5y = 72$. Others gave the missing angle as y or $4y$.

Question 14

Students tended to give a fully correct or a totally incorrect answer to this question in approximately equal numbers. Those who were successful used a variety of methods, with a small proportion setting up an equation in x and many more simply writing $48 \div 12 = 4$ followed by $5 \times 4 = 20$ or $3 \times 4 = 12$, $4 \times 4 = 16$, $5 \times 4 = 20$. Common misconceptions included $5x = 48$ with the answer $x = 9.6$ or $48 \times 5 = 240$.

Question 15

This question was not well answered. Many students made no attempt. Common incorrect answers were 17 and 34. When solutions were correct they were usually very well presented with full explanations.

Question 16

A majority of students did not score on this question. Common incorrect calculations were $\pi \times 6$, $\pi \times 12$ and $(\pi \times 6)^2$.

Question 17

Only a minority of students at this tier recognised that this was a Pythagoras' theorem question. Those who did usually gave well-presented fully correct solutions. A common error was to attempt to calculate area. A few obtained 130 but then halved their answer or did not use a calculator.

Question 18

The first two parts of this question were quite well answered. A common error was to join the points with straight lines.

Part (c) was the least attempted question on the paper. Only the more able students drew the correct line, with many simply plotting points or drawing lines $x = 2$ or $y = 2x$ or $y = x + 2$. Some only drew the line $y = 2$ in the first quadrant. As a consequence of not attempting part (c), responses in part (d) were also poor. Many students wrote down coordinate pairs without choosing the x coordinates.

Question 19

A majority of students did not score on this question, although some very good, well-presented solutions were seen. Those who had most success usually made use of the diagram for working. Use of 90°, 60° and 45° were often seen. Common errors were assuming triangle ACX was isosceles, working out $180° - 72°$ and then dividing the answer by 2 to obtain $w = 54$; using a protractor on the diagram; and using 360° instead of 180° in the triangle.

Question 20

This problem solving question discriminated well. Most incorrect solutions came from considering the problem as a volume question, missing the fact that the three values were all different or starting with the calculation $52 \div 12$.

Mark Range and Award of Grades

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