General Certificate of Secondary Education
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Mathematics 43652F

(Specification 4365)

Paper 2 (Foundation)

Report on the Examination

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General

The new linear specification has a greater proportion of functional, problem solving and applications questions; and this is the first calculator paper. However, students generally performed well on functional questions where familiar contexts allowed them to access the mathematics required. Responses to problem solving questions were more variable. There was no evidence that students were short of time.

Topics that were well done included:

- pictogram
- money questions
- chance
- angles on a straight line and angles at a point
- linear equations.

Topics which students found difficult included:

- rotational symmetry
- comparing medians and comparing ranges
- alternate angles and corresponding angles terminology
- Pythagoras' theorem
- solving inequalities
- frequency polygon.

Question 1

This was a good starter for most students. Common errors were to give the key as representing two people, resulting in answers to part (b) of 32, or 42 if 20 had been used for the first category. Some students had the correct key but then counted the half figures as one person.

Question 2

This question was generally well answered, although there was some evidence that a significant minority of students did not use a calculator and, having shown the correct calculation, made arithmetic errors. Money notation was generally correct. In part (a), some students only used one dartboard. Other students used rounding to give an inaccurate answer. In part (b) the most common incorrect answer was £35.50. Part (c) was understood by nearly all candidates and there were many ways to solve the problem. The most common method was to work out the total cost of £14.55, but some students did not then answer the question.

Question 3

Probability words are very well known and this question was correctly answered by almost all students.

Question 4

This problem solving question was accessible and quite well answered, with most students giving the correct solution, and many others satisfying at least two of the criteria. The most common incorrect answers were 3, 3, 3, 4, 4 and 3, 3, 3, 3, 4.

Question 5

Although this question was generally well answered, again there was evidence that many students did not have a calculator.

Question 6

Forming fractions from shaded grids are usually well answered, but in part (b) many students did not simplify their fraction. The most common error in part (c) was to shade four squares.

Question 7

Almost all students were successful in part (a). In part (b) there was less success, with many giving repeated answers, not using six coins, or not offering three sets of answers.

Question 8

Responses to this question were very mixed, although many correct answers were seen. The most common error was $1.5 \times 6 = 9$. A few answers of 2000 metres were seen.

Question 9

Part (a) was the most successful question on the paper. In part (b) many students worked out the distance of 210 miles from *M* to *L*, but did not go on to use the answer from part (a).
$210 – 70 = 140$ was a common incorrect answer. In part (c), the most common difficulty for students was calculating 80% of the 90 miles, with some students finding 80 as a percentage of 90 and others simply using 80 miles. Those who correctly obtained 72 miles sometimes subtracted this to give 18 miles but then used this as their 80%.

Question 10

This question was generally answered well, although a significant minority squared 2201. Many errors were seen in the rounding, with 47 and 46.9 quite common.

Question 11

Line symmetry caused few problems in part (a) but rotational symmetry in parts (b) and (c) had less than half of all students giving correct responses.

Question 12

The required simple angle theorems were well known and applied well, although a few students used 380° in part (b). Errors tended to be arithmetic, presumably where a calculator was not used.

Question 13

Almost all students had some success with this question but few fully correct answers were seen.

Question 14

Many correct solutions to these equations were seen, with part (b) the least successful of the three parts. In part (c) answers of 17 were quite common whilst some students wrote 12 + 5 ÷ 2 giving an answer of 14.5. Embedded answers were sometimes shown without the answers being identified.

Question 15

Both parts of this question were quite well answered. In part (a) the most common error was to add 5 and 6.2. In part (b), some students used their answer to part (a) as the length of *AB*, and weaker students sometimes had misconceptions writing, for example, 3*x* as 37 or 3 + 7.

Question 16

In calculating the summary measures in parts (a), (b) and (c), students were generally successful, but responses to part (d), making a comparison, were poor. Many students did not attempt this part and of those who did, very few interpreted the context. Most students simply restated the answers to parts (b) and (c) along with the median and the range given for the athletes. Many stated that a greater median for footballers meant that they were quicker. There was also a widespread misunderstanding of range, which was often referred to as an average.

Question 17

Although generally well answered, many students only reversed one of the operations, with 52.8 and 0.3 common. Some students did the reverse operations in the wrong order, giving 7.8 Another error was to give 7.2 + 6 = 7.8

Question 18

The most successful method used was to list outcomes. Students who used probabilities often added ½ and ¼. Final answers of 1 in 8 or 1 : 8 were occasionally seen.

Question 19

This question proved to be a good discriminator. Again, on this type of question students should always check that they have actually answered the question. Many did all the mathematics that was required and then omitted a conclusion or gave an incorrect conclusion. The most successful methods used were either to work out the distance covered in 2.5 hours and compare that with 169 miles, or to obtain the time taken for the journey as 2.6 hours and compare that with 2.5 hours. Those who tried to work out the time of arrival were less successful. It was common to see 2.6 hours changed to 3 hours (2 hours and 60 minutes). Other errors in the use of 2.6 hours were common, for example, 6.30 + 2.6 = 8.90 or 6.30 + 2.60 = 9.30

Question 20

'Best buy' type questions are generally understood by all students and part (a) was also a good discriminator. The main difficulty was finding two-thirds of £520. Many students only found one-third, whilst others used 30% or 0.3 for one-third. The most popular way of finding two-thirds of 780 was to work out one-third and subtract this from £780. In calculating the mileage cost, students often had a mixture of pence and pounds leading to, for example, 44 + 9000 or even 44 + 900. In part (b) a significant minority made no attempt, and the majority did not score. The most common error was to write 15 × 3 × 13 + 8 = 593

Question 21

In both parts, answers were usually correct but very few students gave correct reasons, with the majority stating that "angles in parallel lines are equal".

Question 22

This question was another good discriminator, with most students able to make some progress, for example, working out totals. There were many valid methods seen but the most successful was calculating 93% of 1200 as 1116 and comparing that with 1104. However, a common error was to calculate 93% of 1104. Again, as with other decision questions, many students, having done all the mathematics, did not answer the question.

Question 23

This question was the least attempted on the paper. Responses on this Foundation tier were generally poor, with very few students giving a complete solution. Many gave answers to two decimal places, whilst others chose 3.8 as it was closer than 3.9. This simple statement was insufficient as a reason.

Question 24

Approximately three-quarters of all students did not score any marks on this standard Pythagoras' theorem question. Those who did score, usually gave a fully correct solution with good presentation. Many incorrect answers involved working out the area of the triangle. A significant number of students confused lengths and angles, giving an answer of 126 because 23 + 31 + 126 = 180

Question 25

Very few students gave a fully correct answer, although most were able to give a suitable question with a time frame. Common errors with the response section were to omit a section for zero, not have an open-ended final response or some gave overlapping responses.

Question 26

In part (a), many answers of 7 were seen but it was rare to see the inequality sign used correctly. Responses to part (b) were shared equally between all the options.

Question 27

Very few students were able to complete a correct frequency polygon, with lots of histograms drawn and many plotting 17 at one small square above 16 (16.4). A large number correctly plotted the points but did not join them up, or joined the points and then completed a polygon shape by joining the first point to the last point.

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