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Examiners' Report/ Principal Examiner Feedback

Summer 2010

IGCSE

IGCSE Mathematics (4400)
Paper 1F Foundation Tier

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IGCSE Mathematics
Specification 4400

There was an entry of just over 29,500 candidates, 2,500 more than a year ago. This comprised 19,000 from the UK and 10,500 from overseas. The Foundation tier entry actually declined slightly but this was more than compensated for by a 10% increase in the Higher tier entry.

All papers proved to be accessible, giving candidates the opportunity to show what they knew, an opportunity taken by the majority of them.

Paper 1F

Introduction

Only a minority of candidates achieved any success on Q15 (fractions) and Q17 (lower bounds). Otherwise, although the final three questions were demanding, this paper gave the 1,700 candidates the chance to demonstrate positive achievement and the remaining questions had pleasing success rates.

Although, as always, some candidates sacrificed marks by failing to show working, most showed their methods clearly.

Report on individual questions

Question 1

'Hundredth' appeared occasionally in part (c) but, otherwise, this straightforward starter posed no problems.

Question 2

There were few errors. In Part (e)(i), a small minority gave a fraction which was not in its simplest form, usually $\frac{3}{15}$.

Question 3

Errors were rare, even with the negative numbers in parts (c) and (d).

Question 4

The first two parts caused some problems. The pair of parallel lines was marked correctly far more often than the pair of perpendicular lines. It was not unusual to see two pairs of parallel lines marked, although the question asked for *a* pair. A range of answers was accepted for the area of the parallelogram. Many gave an answer within this range, often 9 cm^2 or $9\frac{1}{2}$ cm^2, usually by square counting, but 20 cm^2, the area of the surrounding rectangle, also appeared regularly.

Question 5

All parts of this question, especially the first two, were well answered. In part (a), n^3 was the most popular wrong answer. In part (b), the simplification was occasionally not completed, leading to answers such as $3p + 2p$ and $7p - 2p$. Sometimes, the correct answer was 'simplified' incorrectly as $5p^3$. In part (c), there was a wider range of wrong answers including 8^q, $6q$, q^6 and q^8. In this part, expressions with a multiplication sign, $q \times 8$ for example, received no credit but this was not penalised in the first two parts.

Question 6

The success rate for the first two parts was very high and that for the third part almost as good. Percentages were clearly well understood and there were no regular errors.

Question 7

The majority of candidates knew that a six-sided polygon is a 'hexagon' but a substantial minority plumped for 'pentagon'. Predictably, the proportion of candidates able to name an 'acute' angle was much higher than that able to name a 'reflex' angle, 'obtuse' appearing as often as the correct answer for the latter. Some candidates were unable to attempt (c) on rotational symmetry. Others appreciated that it was a number and, while the correct number, 3, was the most frequent, a variety of other numbers, including 0, 1, 2, 4 and 6, also appeared. Most candidates were able to measure accurately the length of one side of the polygon and use their answer to find the perimeter.

Question 8

Probability was generally well understood, although $\frac{1}{5}$ appeared regularly as the answer to part (a). Occasionally, unacceptable notation, such as 1 : 6 and 1 in 6, was used. Such answers received no credit; fractions, decimals and percentages are the only forms of probability answers which are accepted.

Question 9

In part (a), the cube of 8 was often correct but a variety of wrong answers also appeared, especially 2, the cube root of 8, and, to a lesser extent, 64, the square of 8, and 2.83, the square root of 8.

In part (b), both 3^4 and $2^3 \times 5^2$ were usually evaluated accurately, the only regular incorrect answers being 12 and 10^5 respectively. Part (c) was well answered, both calculation and rounding. 12.3 appeared occasionally as the rounded value and confusion between significant figures and decimal places led to answers like 12.244 and 12.245.

Question 10

Many candidates scored full marks but, as in previous years, it was noticeable how many candidates completed the table correctly but were then unable to interpret the pairs of values as coordinates of points.

Question 11

The majority of candidates gained full marks for finding the area of the rectangle in the part (a). The most common error was finding the product of the wrong two dimensions. There was occasional confusion between area and perimeter and some candidates attempted to calculate the total surface area.

In part (b), it was pleasing to see many candidates appreciating the need to round down in this practical context. Even the large number of candidates who rounded up scored 1 mark out of 2, if they showed their working or the value 8.7. Candidates whose answer to the first part was wrong could still score full marks in the second part, if they made correct use of their incorrect answer and showed their working.

Many candidates successfully found the volume in part (c), although 1440 cm^3 (45 × 32) was a popular wrong answer. The sum of 45, 29 and 32 was sometimes found.

The circle's area in part (d) was often correct but two incorrect answers appeared with some regularity. 50.3 cm^2 came from use of a formula for circumference or substitution of $r = 4$ into πr^2 or doubling 8, instead of squaring it. 804 cm^2 came from substitution of $r = 16$ into πr^2.

Question 12

Both parts were well answered. 1500 g (100 × 15) and 900 g (100 × 9) were common wrong answers to the first part. Premature approximation was the cause of some incorrect answers. Rounding $\frac{100}{6}$ to 16.7 or truncating it to 16.6 led to answers of 250.5 g and 249 g respectively. In the second part, answers of 4500 g (900 × 5) and 800 g (900 − 100) appeared regularly.

Question 13

Although a fair proportion of candidates were successful, finding the angles did pose some problems. Providing geometrical reasons, however, proved much more demanding, even though they were marked quite tolerantly. There were many correct reasons but there was a wide variety of incorrect ones as well. There was some confusion between 'alternate' and 'corresponding' while 'opposite', 'interior' and 'parallel' all appeared regularly. 'Z angles' and 'F angles' are not accepted as alternatives to 'alternate' and 'corresponding' and, on their own, receive no credit.

Question 14

The expansion of $5(n + 6)$ was often correct, although $5n + 6$, $11n$ and $30n$ were all seen. The correct expansion, $5n + 30$, was sometimes 'simplified' to $35n$, which lost the mark. Part (b) was well answered, although $6y$ appeared regularly and y^5 occasionally. Many candidates successfully solved the equation, showing a complete algebraic method, which was required for full marks. The usual first step was expansion of the brackets, although occasionally both sides were divided by 4. There was a range of errors, including incorrect rearrangement of $4x - 8 = 3$ as either $4x = 5$, $4x = -5$ and, more surprisingly, $4x = 12$.

Question 15

Only a minority of candidates achieved any success on this question. A few candidates realised that multiplication was required in the first part but attempts at addition, subtraction or division were just as likely. $\frac{9}{25}$ $\left(\frac{3}{10} \div \frac{5}{6}\right)$ appeared as the answer often enough to be noticed. The second part was often not attempted. When it was, 12 was a popular wrong answer and it was not unusual to see answers given as fractions. 1 mark was awarded for any multiple of 24, often 96.

Question 16

The correct modal class, $400 < V \leq 500$, was the most frequent answer to part (a) but 6 was also very popular, possibly because it was the 'modal frequency'. 44, the frequency of the modal class, also appeared regularly.

In part (b), many candidates successfully found an estimate for the mean, showing their working clearly. A wide variety of incorrect methods was, however, also employed. Most of these consisted of summation of upper or lower limits, halfway values or frequencies followed by division by 6 or by 80 but multiplication of each frequency by 100, the class width, was also a regular starting point. 170 appeared occasionally as the answer, perhaps the result of transposing the leading digits of 31 600, the correct '$m \times f$' total, prior to division by 80.

Question 17

The correct lower bound was rare in part (i) and rarer still in part (ii). 19.5 cm was regularly given as the lower bound for the length of BC.

Question 18

Many candidates scored full marks on this routine trigonometry question. Premature rounding of cos 41° cost some candidates the accuracy mark. The use of sin 41° was seen frequently but received no credit, unless it was followed by the use of Pythagoras' theorem.

Question 19

In the first part, which had a low success rate, many candidates gave combinations of transformations, which scored no marks. When a single transformation was given, it was as likely to be a rotation as a reflection. Even when a reflection was given, the equation of the mirror line was unlikely to be correct, $y = x$ appearing more often than $y = -x$.

The success rate for the second part was higher and a fair number of candidates gained full marks. Of the rest, many gained 1 mark for a clockwise rotation of 90° about (−1, −1) or for an anti-clockwise rotation of 90° about an alternative centre of rotation.

Question 20

In both parts, only a minority of candidates were successful. There was a large range of incorrect answers, especially 2 in part (a).

Question 21

Both parts were accessible only to strong candidates. There were some correct inequalities in part (a) but a large number and wide variety of incorrect ones as well, including $-4 < x \leq 3$, $-4 \leq x \leq 3$ and $-4 < x < 3$. Each of these gained 1 mark out of 2, as did inequalities in which one 'end' was correct, such as $-4 \leq x > 3$. A substantial minority of candidates did not appreciate the notation required and gave answers like $-4 < 3$ or $-4 > 3$.

To score full marks in part (i), a candidate's final answer had to be $x > -4$, not -4 or $x = -4$.

In part (ii), the most common error was to list −4 or 0 in addition to the three correct values. It was not unusual for candidates who failed to solve the inequality in part (i) to make a fresh start in part (ii) and, using trial methods, complete it successfully.

Statistics

Overall Subject Grade Boundaries – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Overall subject grade boundaries	100	71	56	41	26	11	0

Paper 1F – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Paper 1F grade boundaries	100	71	56	41	26	11	0

Paper 2F – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Paper 2F grade boundaries	100	71	55	40	25	10	0

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