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Examiners' Report/ Principal Examiner Feedback

November 2009

IGCSE

IGCSE Mathematics (4400)
Paper 2F Foundation Tier

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There was an entry of approximately 2000 candidates (600 Foundation and 1400 Higher), most of whom took the opportunity the papers gave them to show what they knew.

Paper 2F

Introduction

The standard of this paper proved to be appropriate. Candidates found all questions accessible and almost all questions had pleasing success rates. In general, methods were well explained and working presented clearly and neatly.

Report on individual questions

Question 1

Few errors were made on this straightforward starter. If made, they were most likely with the rounding in parts (d) and (e). 4400 and 5000 appeared occasionally for the former, with 4670 and 5000 for the latter.

Question 2

Although well answered, the scale reading in part (a) proved far from trivial, answers in the ranges 303-304 or 380-390 appearing with some regularity.
In part (b)(i), 180 m*l* was usually shown correctly on the scale but errors were common with the conversion in part (b)(ii). 1.8 was the most popular wrong answer but 18 and 180 000 also had some support.
The conversion in part (c) also caused problems, 250 being the most common wrong answer.

Question 3

Errors were rare in part (a). When they occurred, the most frequent wrong answers were 'unlikely' in (i), 'likely' in (ii) and 'likely' in (iii).
Part (b) was also well answered but a substantial minority placed both crosses between 0.5 and 1, sometimes with V at 0.5 and T at 1 and sometimes with V to the right of T.

Question 4

In the first two parts, almost all scored full marks for the pattern and the table.
The majority were also successful on part (c), usually using repeated addition but occasionally using the *n*th term. The most popular wrong answer was 38, obtained by doubling the number of dots in Pattern number 6.
Part (d) was well answered; most explanations involved subtracting 3 but some referred to the *n*th term.

Question 5

In the first part, the vast majority were able to identify the lowest temperature correctly.
In the second part, the answer was usually correct and usually unaccompanied by working, a mental 'counting on' method presumably having been employed. It was not unusual to see the correct answer accompanied by incorrect working, for example,
$-4 - 1 = 3$ or $-4 -(-1) = 3$ but this was not penalised. The most common wrong answers were 5 and −3.
The third part was more demanding but still well answered. One mark was awarded for identifying the highest and lowest temperatures. Some candidates went on to use these values wrongly in a variety of ways, for example $3 - 5 = -2$ or $-5 - 3 = -8$, while faulty counting on led to a range of 9. Candidates who took 0°C as the highest temperature went unrewarded, as did those who found the sum of all the temperatures or calculated the mean.

Question 6

Almost all candidates measured accurately the length of the line in part (a) and the size of the angle in part (b).
The drawing in part (c) proved more difficult. Many candidates gained full marks for a quadrilateral within the permitted tolerance, regardless of whether they had drawn an arc of radius 9.1 cm, centre *C*. In fact, the majority did not but this omission incurred no penalty, as the question was not testing construction and did not include the instruction 'You must show all construction lines.' Candidates who failed to gain full marks frequently scored 1 for a quadrilateral, often a trapezium, with either angle *BAD* or the length of *CD* correct. Some candidates drew the correct angle and drew a correct length from C but did not realise they required the intersection of the two lines.

Question 7

Errors were rare in the first two parts although, in part (b), a small minority converted the fraction to a decimal, which they then rounded or truncated. This led to a slightly inaccurate answer, which was penalised.
Part (c) had a high success rate. When a method was shown, it was almost always conversion of the fractions to decimals. Candidates who failed to gain full marks often scored 1 for converting at least two of the fractions to decimals or for showing three fractions in the correct order. However, candidates who did turn their fractions into decimals were often still unsuccessful, as they could not order the decimals correctly. A few candidates used equivalent fractions with typically a denominator of 600.

Question 8

In the first part, the angle was usually correct, although 109 (180 − 71) appeared occasionally. The quality of reasons varied widely, however. Typical acceptable reasons were 'Sum of angles at a point = 360°' and '360° in a circle'. Mere mention of 360°, 'The angles add up to 360°', for example, was insufficient and no credit was given either for an explanation of the method used, such as 'I subtracted 71 from 360' or '360 − 71'.
'Opposite' was the key word for the award of the mark for the reason in the second part. 'Vertically' sometimes preceded it but not often and it was not a requirement. The most common wrong reason was 'corresponding'.

In the final part, the angle was often correct, although 108.5 $\left(\frac{360-2\times58-27}{2}\right)$ appeared with some regularity. 'Sum of angles on a straight line = 180°' was the type of reason hoped for but minimal versions of this, such as '180° on a line' were also accepted.

Question 9

In addition to an accurate pie chart, sector labels 'Won', 'Drew' and 'Lost' were needed for full marks. Many candidates did this successfully and a high proportion of these included working showing how they had calculated the sizes of the angles. A noticeable minority showed no working and drew a pie chart in which the sector angles appeared to be random.

Question 10

The success rate for part (a) was very high. It was slightly lower in part (b) but the majority of candidates successfully used either the angle sum of a quadrilateral or allied angles. Some candidates thought the angle sum of a quadrilateral was 180° and, not realising that diagrams are never deliberately misleading, gave an answer of 22 $\left(\frac{180-2\times68}{2}\right)$, despite the fact that, in the diagram, the required angle is clearly obtuse.

Question 11

Both currency conversions were almost always correct.

Question 12

Many candidates completed the table accurately. Of these, the majority went on the draw the correct line but, surprisingly, a significant minority could make no further progress and were unable to interpret the pairs of values in their table as coordinates or plotted the points at half their correct *x*-coordinates. A few candidates plotted the points correctly but failed to join them.

Question 13

Part (a) was well answered. Colon notation, for example, 2 : 5 was expected and no credit was given for the related fractions, even if the numbers were correct. The simplest form of a ratio comprises integers and so answers like 1 : 2.5 did not score full marks. A few candidates failed to take the units into account and gave an answer of 24 : 1. Others simplified 24 : 60 but not fully, giving answers such as 6 : 15.
Part (b) proved straightforward, no errors occurring with any regularity.

Question 14

The majority of candidates evaluated the expression accurately. A few gave the answer 1140.233333, the result of evaluating $11.7 + \frac{18.4^2}{0.3}$.

Question 15

In the first part, the size of the angle was usually correct. The most common wrong answer was 68, the result of assuming the *CA* makes an angle of 62° with South. Providing a reason, though, proved much more demanding. There was a range of wrong reasons, 'corresponding' being the most popular. 'Adjacent' appeared occasionally and a more original one was 'internet'. Centres are reminded that 'Z angles' is not accepted as an alternative to 'alternate angles'.
Bearings usually cause difficulties and part (b) was no exception. The most common wrong bearing was 118° (180 − 62). Although some candidates were able to identify angle *BAC* as 59°, few went on to add 62^o and get the correct bearing.

Question 16

Errors were rare in part (a) and only slightly more frequent in part (b), where 200 (80 ÷ 0.4) and 30 appeared occasionally.

Question 17

Although the first part was well answered, there were two popular incorrect answers, which were 21.7 (3500 ÷ 161) and 5635 $\left(\frac{161}{100} \times 3500\right)$.
The second part, while reasonably well answered, posed greater problems. Some started promisingly with $\frac{338}{5.2} = 65$ but went no further. Others were either unable to make a start or obtained their answer from a misconceived method, the most regular ones being £17.576 (338 × 0.052), £1757.60 (338 × 5.2) and £321 $\left(338 \times \frac{100}{105.2}\right)$.

Question 18

Many candidates described the first transformation fully. Some scored 1 mark out of 2 for 'reflection' but then either omitted the mirror line or described it incorrectly. Similarly, 'flip' and 'mirror image' went unrewarded.
The majority of candidates realised that the second transformation was an enlargement but only a minority were able to describe it fully. The most common errors were $\frac{1}{2}$, 1 or 2 for the scale factor and (2, 6) or (13, 6) for the centre of enlargement.
No marks were given for a combination of two transformations, even if one of them on its own would have received credit.

Question 19

$5d$ was the most frequent answer from the small number of candidates who made an error in part (a).
Part (b) was also well answered. If an error were made, it was most likely to be with the y term, the answers $8x + 3y + 2$ and $8x - 5y + 2$ appearing regularly. Errors with the coefficient of x were less common but $2x$ was occasionally seen.
Part (c) was quite well answered but a significant minority did not appreciate what was required and so 'simplified' the expression, often to $2n$ or $4n^3$.

Question 20

The standard construction with two intersecting arcs, centred on the ends of the line, was expected. The onus is on candidates to make their method clear to examiners. Many did this successfully but some were either unable to make a start or used measurement to draw the perpendicular bisector and then added a selection of arcs for the examiner to choose from.

Question 21

Full marks were common on this question. Candidates who correctly calculated the total rainfall and then went on to use it in some way, usually dividing by 31 to find the mean, were not penalised. Those who used upper limits or lower limits instead of halfway values scored 1 out of 3. Those who obtained 310, only 5 less than the correct answer, generally did so using a completely incorrect method $(23 \times 10 + 3 \times 10 + 2 \times 10 + 3 \times 10)$ and so received no credit.

Question 22

The majority of candidates gained full marks. Of the rest, many scored 1 mark for substituting the values of n and e into the formula. The wrong answer which appeared most frequently was 11, the result of evaluating $8.6(1 + 0.2)$ as $8.6 + 0.2 = 8.8$. Incorrect 'cancelling' of the brackets occasionally resulted in an answer of 8.6.

Question 23

Only a minority drew the correct line in the first part. The line passing through (2, 0) and (0, −3), that is, the line $3x - 2y = 6$ was seen more often than the correct line and a wide variety of other wrong graphs was seen, especially $x - y = 3$, $3x = 2y$ and $2x = 3y$.
The second part was demanding and often not attempted. There was a wide range of incorrect answers, both regions and lines.

Statistics

Overall Subject Grade Boundaries – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Overall subject grade boundaries	100	73	57	42	27	12	0

Paper 1F – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Paper 1F grade boundaries	100	72	57	42	27	12	0

Paper 2F – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Paper 2F grade boundaries	100	73	57	42	27	12	0

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