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Examiners' Report/ Principal Examiner Feedback

November 2010

IGCSE

IGCSE Mathematics (4400)
Paper 1F Foundation Tier

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IGCSE Mathematics
Specification 4400
Paper 1F

For November 2010 the total IGCSE Mathematics entry was approximately 2000 candidates, a figure broadly in line with the two previous November sessions. There was a significant drop in the number of Foundation candidates from last year (from 600 to 300) and a corresponding increase of around 300 in the number of Higher level candidates.

Most of the 352 Foundation tier and 1812 Higher tier candidates took the opportunity the papers gave them to show what they knew.

Papers are marked online and it was pleasing to note, that with very few exceptions, most candidates kept their written responses within the areas designated for both working and answers, and did not stray outside these boundaries. Candidates should continue to use a pen with black ink, or HB pencil (or darker) for diagrams.

Introduction

On questions common to Paper 3H there was often a distinct difference in approach between Foundation and Higher candidates. Many Foundation candidates favoured a numerical approach with algebra questions and scored no marks as a result. Questions requiring manipulation of fractions, without a calculator, were sometimes reduced to decimal equivalents by Foundation candidates. This was a rare occurrence on Paper 3H.

Overall Paper 1F provided a good balance of routine questions, testing basic skills, and some more challenging questions towards the end of the paper that required more sophisticated mathematical techniques.

Report on individual questions

Question 1

Mistakes were extremely rare in part (a), but there was the occasional omission of, or extra, zeros in (a)(i). Very occasionally candidates offered 18981 as an answer in (a)(ii), misreading the multiply for an add.

Occasionally in part (b) 5 was stated as an answer, and in some cases its occurrence explained as $5 \times 7 = 35$.

Part (c) scored the least well of the components of question one with 1,3,11 a common response costing the candidate one of the two marks available.

Part (d) scored well. Candidates that failed to gain the one mark either offered 33 ,35, or 39 as a prime number between 30 and 40 or gave a prime number that was outside the range required. 37 was a more common correct response than 31.

Question 2

Mistakes were very rare here.

Question 3

Most candidates gave the required response of "kite" in (a). Wrong answers were usually "diamond" or "rhombus".
Part (b)(ii) was more challenging than part (i) and the angle *p* was the most common wrong answer for the reflex angle.

Question 4

Only the very weakest candidates made mistakes and gave the wrong response.

Question 5

Mistakes were rare in either part of this question though in part (b) some candidates shaded five squares instead of six.

Question 6

Part (c) was the source of most lost marks with some candidates rounding off their measurement to the nearest integer (7). This was penalised by one mark in part (c) but a full follow through was allowed in part (d). In this latter part, weaker candidates ignored the statement in the question that the quadrilateral had been drawn on a centimetre grid and proceeded to measure all four sides, (incorrectly).

Question 7

Better candidates did not lose marks in either parts (a) or (b). Occasional mistakes seen were answers of – 1 (from 5 – 6) in part (a) and in part (b) answers of – 3 (stepping in the wrong direction) or 11 – 3 = 8 carrying their answer from part (a) forward incorrectly.

Question 8

Generally both components of part (a) scored well.

Part (b) was the more likely source of mistakes. There was a variety of ways candidates could partition 90 km/h. Most chose, arguably the most sensible way of, 2 × 45 km/h. In more extreme cases candidates read off values at 10 km/h (then 9 × 10km/h) or at 5 km/h (then 18 × 5km/h) or even 3 km/h (then 30 × 3 km/h). Errors in reading from the graph were magnified by the multiplying factor. A reasonably generous range of values from 24 to 27 m/s (inclusive) was allowed to compensate for this but some candidates failed to achieve a final answer this interval. 90,000 (from 90 × 1000) was also seen regularly.

Question 9

Part (a) discriminated well with weaker candidates often stating an answer of 6 (from 360 ÷ 6). This type of mistake was replicated in part (b) with some candidates stating an answer of 18^{o} (from 360 ÷ 20).

Question 10

All parts of this question did not score particularly well.

If the term "congruent" was not understood, random guessing appeared to take place in part (a) though triangles B and D was the most common wrongly selected pair by far.

In part (b) many candidates fell into the trap of offering triangles A and D as their answer for two similar triangles.

"Reflection" was the most common wrong response in part (c).

Question 11

Part (b) proved to be a challenging question. Part (a) scored well and it was rare to use the follow through option from a wrong answer into part (b). Calculating the 8 hours correctly was the most difficult part of the question. Consequently, 9hrs 45 minutes appeared regularly and scored one mark for 45 minutes. Any answer of 8 hours n minutes was deemed worthy of two marks as it suggested some correct partitioning had taken place.

Question 12

Ten marks were available for this question and all components scored well and were accessible to a majority of candidates. Some minor points were in part (b)(ii) where the decimal point was not made clear in the answer (i.e 125%) and potentially scored no marks if no working was shown. Occasionally in part (b)(i) 20/160 was not cancelled as far as it could go and was left as 5/40 rather than 1/8.

In part (c) methods varied but were usually either $20 \times 5.25 = £105$ or $100 \div 5.25 = 19$ (.04) medals, both leading to a conclusion that £100 was not enough for 20 medals.

Question 13

Filling in the table correctly with the missing values was completed by virtually all.

A problem arose for some in part (b), in deciding whether to include the "12" already in the table, hence 1/5 was a common wrong answer for the probability of an outcome of 12. A full follow through was allowed in part (c) so this mistake was not penalised twice.

Question 14

This was the first question common to Paper 3H and although most candidates gained all three marks, mistakes were much more common. Dividing one column by another (i.e $25 \div 15$) occurred regularly. Weaker candidates were unable to notice an unusually large numerical answer in the context of the question (i.e $66 \div 5 = 13.2$ children per family). Once 2.64 was seen in the body of the script, full marks were awarded and rounding up (to three children) or down (to two children) was not penalised.

Question 15

For candidates capable and confident with algebra this question was an easy source of seven marks.

For others part (a) caused problems with $a + 3b$ a common wrong answer.

In part (b) an initial correct answer, which was then simplified incorrectly, was penalised. For example in part (b)(ii) $d^3 + 4d$ becoming $5d$ or $5d^3$ was awarded no marks.

Question 16

At Foundation level it was rare to award four marks as most candidates failed to give adequate explanations of how they arrived at either their final or intermediate answers. Abbreviations for "isosceles" or "alternate" were not deemed adequate. Although there were a variety of valid methods to get the correct answer of 40º, the key was to get angle $BAC = 70^\circ$ and state the reason as relating to isosceles triangles. This gave two marks. A further mark was awarded for $ABC = 40^\circ$, or for an angle clustered around x other than angle BAC. The final mark was for the correct answer and a valid reason, typically angle PAB being alternate with angle ABC.

Question 17

The numerical calculation for the area of the circle was generally performed well. Confusion often came through stating the units for area, metres or cm^2 being common wrong responses.

In part (b) 25 rather than 250 was often offered or 248.84 / 248.85 (2 decimal places).

Question 18

"Show that" questions involving fractions are common questions on both Foundation and Higher papers and it is an established principle that converting to decimals will be ignored and gain no credit. Candidates must also work on the fractions on the left side to reach an equivalent fraction on the right side. Treating fractional statements as an equation and swapping values from left to right (and vice versa) will also gain no credit.

Although a variety of methods gained full credit most successful candidates chose the more traditional method of taking the reciprocal of 4 in part (a) and converting from division to multiplication.

In part (b) the favoured method was conversion to improper fractions to arrive at 26/15. Although this had a higher tariff of three marks it had roughly the same success rate as part (a).

Question 19

Despite the frequent guidance given to centres that equations need an algebraic treatment to score marks, a significant minority of Foundation candidates still pursue a numerical approach and score no marks. This is particularly so in cases similar to part (c) where the answer is relatively easy to find by inspection. One line of algebra is usually sufficient to score marks. In part (a) this could be $3w = 19 - 7$ or $3w = 12$ in part b) $7x - 2x = -4 - 3$ and in part (c) $16 - 5y = 2 \times 3$ or $16 - 5y = 6$

Question 20

In part (a)(i) replacing ∩ with "and" to give "Mr Smith's clothes and hats" as an answer was not sufficient to gain the one mark available.

Part (b)(i) proved the most challenging part of this question and did not score especially highly at Foundation level. It was not essential, but the question would have been aided by a Venn diagram but this aspect of set theory is not in the specifications at Foundation level.

In part (b)(ii) students confused symbols for "is an element of" with the symbol for the universal set.

Question 21

In part (a) candidates who correctly selected the tangent ratio usually had no trouble reaching the correct answer. Premature rounding and not putting a value which rounded to 6.54 in the body of the script was the usual source of lost marks.

Part (b) scored less well. Some mistakenly though this second part of the question also involved trigonometry and inevitable pursued a fruitless path. A significant minority who recognized the question involved Pythagoras gained no marks by squaring and adding ($10^2 + 4.5^2$) to reach a side longer than the hypotenuse.

Question 22

A majority of candidates scored at least one mark in both parts and many scored full marks.

In part (a) partial marks could be gained by giving three numbers with a median of 5 or a mean of 4.

In part (b) it was a relatively easy skill to give four numbers with a single mode of 5 but it required a greater skill to reach this and deliver a median of 6 from the same four numbers.

Statistics

Overall Subject Grade Boundaries – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Overall subject grade boundaries	100	70	55	40	26	12	0

Paper 1F – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Paper 1F grade boundaries	100	72	56	41	26	11	0

Paper 2F – Foundation Tier

Grade	Max. Mark	C	D	E	F	G	U
Paper 2F grade boundaries	100	68	53	39	25	11	0

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