Principal Examiner Feedback

November 2011

GCSE Mathematics (5384F)
Paper 12F (Calculator)

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1. PRINCIPAL EXAMINER'S REPORT – FOUNDATION PAPER 12

1.1. GENERAL COMMENTS

1.1.1. The vast majority of candidates completed their answers in the spaces provided and many showed the steps in their working.

1.1.2. Poor algebra continues to be an issue for many candidates. Candidates should be advised to show their algebraic process on *both sides* of the equation. Solution of algebraic equations by trial and improvement is an all or nothing strategy for many candidates.

1.1.3. It was evident that a significant number of candidates did not have/use the appropriate equipment when answering questions 3 and 5, i.e. compasses and a protractor.

1.1.4. Candidates should be advised not to measure diagrams unless specifically asked to do so.

1.1.5. When using conversion graphs, candidates should be advised to show their work by drawing lines on the graph.

1.1.6. Candidates should be encouraged to check their long-hand calculations with their calculators.

1.2. REPORT ON INDIVIDUAL QUESTIONS

1.2.1. Question 1

This question was generally done well. In part (i) most candidates were able to add 1 hours 20 minutes to 17 55 either directly or by conversion to minutes. Common incorrect answers here were and (17 55+1 20=) 18 75 and (17 55+80=) 18 35.

In part (ii), many candidates were able to find the difference between 18 34 and 17 55, but a common incorrect answer here was to work out the difference between 19 15 and 18 34 (=41), thus indicating a fundamental misunderstanding of what was required in the question.

1.2.2. Question 2

This question was generally done well. In part (a) most candidates were able to find three quarters of 72 and write their answer in an acceptable monitory form.

In part (b), most candidates were able to write down two suitable numbers with the correct product, typically 0.04×2 and 0.2×0.4. A very common incorrect answer here was 0.02×0.04. Candidates should be reminded to use their calculators to check their answers.

1.2.3. Question 3

This question was done quite well but, judging by the number of circles that were drawn free hand, it was evident that many candidates did not have a pair of compasses for the examination. A significant number of candidates were unable to use their compasses efficiently to draw a continuous circle with a constant radius.

1.2.4. Question 4

This question was not done well. Few candidates were able to write down the mathematical name of both 3-D shapes.

Common incorrect answers in part (i) were rectangular based prism and (just) prism.

Common incorrect answers in part (ii) were circle and ball. As always, the spelling of these technical terms remains a mystery to many candidates.

1.2.5. Question 5

In part (a), the vast majority of candidates were able to measure accurately the length of the given line and give the answer in the required units. A common incorrect answer here was 80.

In part (b), most candidates were able to use their protractor to measure accurately the given angle. Some, perhaps confused by the twin scale on their protractor, incorrectly wrote the answer as 130.

In part (c), most candidates were able to draw accurately an angle of 130^o at *P* (those few who drew an accurate angle elsewhere were not penalised), but a surprising number incorrectly drew an angle of 50^o at *P* and then labelled it 130^o.

1.2.6. Question 6

Part (a) was not done well. Few candidates were able to draw all 6 lines of symmetry on the hexagon. Most drew only four lines of symmetry, typically two diagonal and two lateral lines of symmetry.

Parts (b) and (c) were not done well. Surprisingly a significant number of those candidates who drew only 4 lines of symmetry in part (a), then went on to write 6 for their answer to part (b).

Part (d) was done well. Most candidates were able to reflect the shape in the mirror line. Rare but common incorrect answers here were to draw the reflection against the mirror line and to translate of the shape 4 squares to the left.

1.2.7. Question 7

This question was done quite well, but a significant number of candidates simply measured the size of the angle from the triangle, apparently unaware that they were dealing with a diagram that was not accurately drawn. Candidates should be advised not to measure diagrams unless specifically asked to do so.

1.2.8. Question 8

Part (a) was done well by most candidates.

In part (b), most candidates were able to plot the points accurately and draw a suitable line through them. A common error here was to omit to draw a line through the points, or to draw a line that didn't reach the origin, or to draw line segments between points that had been incorrectly plotted (typically those points below £10); thus indicating a fundamental misunderstanding of the nature of conversion graphs.

Part (c) was done quite well. Most candidates were able to change $100 into pounds, usually by using their conversion graph or by doing a suitable calculation, commonly $100 \div 150 \times 100$. When using conversion graphs, candidates should be advised to show their working on the graph; in this case by drawing a horizontal line from 100 to meet their line.

1.2.9. Question 9

This question was done quite well, but generally with little evidence of the algebraic manipulation that had taken place.

In part (a), most candidates simply wrote down the solution of the equation by inspection.

Part (b) was done less well. Common incorrect answers here were 12 and 6.

1.2.10. Question 10

Part (a) was not done well. Few candidates were able to write down x, $3x$ and $x+6$ and then go on to show how these add to make $5x+6$. A common incorrect approach here was to take the 41 from part (b) and then use this to verify that $5\times7+6=41$.

Part (b) was done quite well, but algebraically solutions were rare. Most did this by inspection, or by writing down the reverse processes in a continuous calculation, e.g. $41–6=35\div5=7$. A common incorrect answer here was $41–6 = 35$, $35\div3 = ...$

1.2.11. Question 11

Part (a) was not done well. Many candidates were unable to convert 568ml to litres, commonly 5.68 was used. Considering the sizes of the bottles shown in the diagram it was perhaps surprising that a significant number of candidates just simply added the four amounts without any attempted to convert to the same unit. Some of those candidates who know how to convert 568ml to litres then went on to round their conversion to 0.57 (or 0.56), and thus lost accuracy mark in the question. A significant number of candidates, having achieved the correct total (7.388), then went on to round this for their final answer despite having any requirement to do so. Here, as elsewhere, candidates should be advised to use their calculator to check their long hand calculations.

Part (b) was done quite well. A very common error here was to use the amounts, rather than the costs, in their calculation, and some used a mixture of amounts and costs, e.g. $2.27 + 2 \times 0.86$.

In part (c), few candidates were able to find a solution for the least cost. Many appreciated that they needed to use a combination of bottles to give a total amount greater than 11 litres, typically 3×3.41 and 1×1.14, but hardly any used other combinations of bottles to check if they had indeed found the least cost.

1.2.12. Question 12

The calculation in this question was generally done well, with most candidates arriving at a correct answer of 68 or 0.68, with common errors $(5 - 3.72) \div 2 = 0.64$, $5.08 - 3.72 = 1.36$. Many candidates omitted to include the appropriate unit or were confused about what it should be, typically 0.68p.

1.2.13. Question 13

This question was not done well. Few candidates could recall or apply the rules for dealing with indices. By far the most common approach here was to do an extended calculation involving ordinary numbers but not always correctly arriving at 216. Many of those candidates who obtained 216 were then unable to write this in the required form. A significant number of candidates either thought the calculation required the multiplication of the base numbers and indices, i.e. $(30 \times 12) \div 24$, or it required the multiplication and/or division of the indices, e.g. $6^5 \times 6^2 = 6^{10}$ or $6^{10} \div 6^4 = 6^{2.5}$.

1.2.14. Question 14

Part (a) was not done well. Most candidates were unable to show the required result. Some realised that they needed to add $2x-10$ and $x+50$ to get $3x+40$, but few completed the proof by including y in their conclusion. Hardly any attempted to give reasons for the stages in their work, few of these were geometric reasons.

In part (b)(i), few candidates were able to work out the value of x. Here, as elsewhere, most candidates solved the equation either by inspection, or by using an approach involving a sequence of inverse operations, e.g.
$145 - 40 = 105 \div 3 = 35$.

In part (b)(ii), few candidates realised that they needed to use their value from part (i) in $x + 50$ and $2x - 10$ to determine the largest angle in the triangle; most simply stated an answer without working.

1.2.15. Question 15

The first stage in this question was answered quite well. Many candidates were able to divide £28 in the required ratio. The second stage in this question was answered less well. Relatively few candidates realised that they need to find the amount that Becky had left after giving a third of her share to her mother. Many simply worked out the share that was given to her mother and stopped there. Common incorrect answer here were 3.20 and 10 (derived from $35 \div 28 = 1.25$, $1.25 \times 12 = 15$, $2/3 \times 15 = 10$). Some candidates ignored the ages of the children and started their answer by dividing 28 by 3.

1.2.16. Question 16

Many candidates did not appreciate that they were being asked not only to find the missing length in the triangle but also the area of the triangle. A common incorrect method to find the missing length was $\sqrt{(12^2 + 6^2)}$. The poor use of mathematical notation by some candidates was evident in this question, e.g. $6^2 - 12^2 = 108$.

A significant number of candidates thought they had all the dimensions they needed to calculate the area of the triangle and simply wrote down ($1/2 \times 12 \times 6 =$) 36 or ($12 \times 6 =$) 72.

1.2.17. Question 17

Many candidates did not appreciate that they needed to compare two amounts of money in the same currency. A common incorrect answer here was to multiply a quantity by both 1.14 and 0.86, e.g. $10 \times 1.14 = 11.4$ and $10 \times 0.86 = 8.6$, and incorrectly select London. Some candidates efficiently calculated $1 \div 0.86$ and/or $1 \div 1.14$ and were thus able to compare a calculated amount to one of the given amounts; but many of those who compared ($1 \div 1.14 =$) 0.88 to 0.86 incorrectly deduced London as the best city for the Euros.

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