

GCSE

Methods in Mathematics (Pilot)

Unit **B391/01**: Foundation Tier

General Certificate of Secondary Education

Mark Scheme for June 2014

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

| Annotation | Meaning |
|------------|--|
| BP | Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response. |
| ✓ | Correct |
| ✗ | Incorrect |
| BOD | Benefit of doubt |
| FT | Follow through |
| ISW | Ignore subsequent working (after correct answer obtained), provided method has been completed |
| M0 | Method mark awarded 0 |
| M1 | Method mark awarded 1 |
| M2 | Method mark awarded 2 |
| A1 | Accuracy mark awarded 1 |
| B1 | Independent mark awarded 1 |
| B2 | Independent mark awarded 2 |
| MR | Misread |
| SC | Special case |
| ^ | Omission sign |

The **M**, **A**, **B** etc annotations must be used on your standardisation scripts for responses that are not awarded either 0 or full marks.

It is vital that you annotate these scripts to show how the marks have been awarded.

It is not mandatory to use annotations for any other marking, though you may wish to use them in some circumstances.

Subject-Specific Marking Instructions

M marks are for using a correct method and are not lost for purely numerical errors.

A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.

B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.

SC marks are for special cases that are worthy of some credit.

1. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

2. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT $180 \times (\textit{their '37'} + 16)$, or FT $300 - \sqrt{(\textit{their '5^2 + 7^2'})}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their (a)}$.

For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

3. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.
4. The following abbreviations are commonly found in GCSE Mathematics mark schemes.
 - **cao** means **correct answer only**.
 - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
 - **isw** means **ignore subsequent working** (after correct answer obtained).
 - **nfw** means **not from wrong working**.
 - **oe** means **or equivalent**.
 - **rot** means **rounded or truncated**.
 - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.

- **soi** means **seen or implied**.

5. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.
6. As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).
7. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.
8. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.
9. If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer' or 'cao'. Place the annotation ✓ next to the correct answer.

If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✖ next to the wrong answer.
10. Ranges of answers given in the mark scheme are always inclusive.
11. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.
12. Anything in the mark scheme which is in square brackets [...] is not required for the mark to be earned, but if present it must be correct.

MARK SCHEME

| Question | | | Answer | Marks | Part marks and guidance | |
|----------|-----|-------|---------------------------|-------|---|---|
| 1 | (a) | | 494 | 1 | | |
| | (b) | | 27 | 1 | | |
| 2 | | | Mrs Archer 8 Mr Bing 7 | 2 | B1 for Mrs Archer 8 or both values adding to 15 | |
| 3 | (a) | (i) | 2345 | 1 | | |
| | | (ii) | 5423 | 1 | | |
| | | (iii) | 4325 | 1 | | |
| | (b) | | 25 | 1 | | |
| | (c) | | 3 | 1 | | |
| | (d) | | $\frac{2}{4}$ | 1 | | |
| | (e) | | $42 - 35 = 7$ | 3 | B1 for showing 1 st tens box 1 higher than 2 nd B1 for a correct subtraction | Must only use the 4 numbers given |
| 4 | (a) | (i) | 26 cao | 1 | | |
| | | (ii) | 26.22 cao | 1 | | |
| | (b) | (i) | 8000 | 1 | | Allow words e.g. eight thousand or 8 thousand |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|------|--|-------------|---|---|
| | (ii) | 30 5000 (30 x 5000) = 150 000 | 1 1 1 | SC2 for 26 x 5000 = 130 000 | Must not be part of an attempt at multiplication of more accurate values |
| 5 | (a) | Red | 1 | | |
| | (b) | Green | 1 | | |
| | (c) | $\frac{1}{6}$ oe | 1 | | |
| | (d) | 1 red, 2 yellow, 2 blue, 5 green or 1 red, 1 yellow, 3 blue, 5 green | 3 | B1 for total of 10 soi B1 for 5 green B1 for 2 yellow and blue or 1 red and yellow If 0 scored SC1 for any total with green being half the total and any two of the other colours having the same number. | |
| 6 | (a) | Ruled line $y=2x+1$ drawn $0 \leq x \leq 4$. | 2 | B1 At least 3 points plotted correctly | Ignore graph outside $0 \leq x \leq 4$. |
| | (b) | Ruled line $y=2x+3$ drawn and ruled line $y=-\frac{1}{2}x+6$ drawn | 3 | B2 for one line correctly drawn or B2 for a parallel and a perpendicular line drawn to $y=2x+1$ but not through correct points B1 for either a parallel or a perpendicular line to $y=2x+1$ drawn Or B1 for a line through (0, 3) and a different line through (2, 5) | Ignore labelling Tolerance of two mm on points that the lines should pass through. |
| 7 | (a) | Correct reflection | 2 | B1 for 2 vertices of triangle in correct place or a reflection in any vertical line | Triangle must be on the grid |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|-----|---|-------|---|----------------------------------|
| | (b) | Correct rotation | 2 | B1 for a rotation through wrong angle about P Or B1 for a rotation through 90° anticlockwise or clockwise about any point | |
| | (c) | Correct translation | 2 | B1 for correct vertical or horizontal translation Or SC1 for translation $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$ | |
| | (d) | (i) C and D | 2 | B1 for C and D with one extra or for either C or D with no extras | |
| | | (ii) 2 or 3 | 1 | | Allow x2, x3, 2x, 3x |
| | (e) | 2 of rotation, reflection and translation | 2 | B1 for one identified | Condone reflectional, rotational |
| 8 | (a) | $\frac{1}{12}$ cao | 2 | B1 for $\frac{3}{36}$ or for clear cancelling of the 3 and 9 in working or clear full simplification of <i>their</i> $\frac{3}{36}$ providing that this is not an improper fraction | |
| | (b) | (i) $\frac{7}{10}$ oe fraction | 1 | | |
| | | (ii) $\frac{17}{100}$ oe fraction | 1 | | |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|-----|---|-------|--|---|
| | (c) | 0.4 | 1 | | |
| | (d) | Conclusion that 7 is a (prime) factor of 14 | 2 | B1 makes an incomplete statement eg $14 = 2 \times 7$ | |
| C9 | (a) | $2 \times 2 \times 3 \times 5$ or $2^2 \times 3 \times 5$ | 2 | M1 for two steps in a factor ladder or two correct factor pairs in a factor tree | Soi by 2, 3, 5 clearly identified as the prime factors Or $(10 \times 3 \times 2)$, $(2 \times 2 \times 15)$ $(5 \times 6 \times 2)$, $(5 \times 3 \times 4)$ |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|------|---|-------|--|---|
| | (b)* | 5 by 3 by 4 and 94 as answer with 3 other shapes and all correct SAs with no extras | 6 | <p>[10 × 3 × 2] 112; 2 × 2 × 15 128 5 × 6 × 2 104; 5 × 3 × 4 94</p> <p>B5 for all correct but with extras Or for 5 by 3 by 4 and 94 as answer with 3 other correct shapes and 3 SAs Or all correct but answer not clear</p> <p>B4 for 3 other correct shapes and 2 or 3 SAs Or 2 other correct shapes and 3 SAs</p> <p>B3 for answer of 5 by 3 by 4 and 94 Or 3 other correct shapes and 1 SA Or 2 other correct shapes and 1 or 2 SAs Or 1 other correct shape and 2 SAs</p> <p>B2 for 3 or 2 other correct shapes and 0 SAs Or 1 SA</p> <p>B1 for 1 other correct shape Or correct full method for SA seen</p> | <p>For extra shapes allow drawing or dimensions. For 6 marks, allow repeats only if no wrong SAs with them. Ignore extras that are deleted or have X next to them.</p> <p>For 5 or fewer marks condone extras just mark correct ones.</p> |
| C10 | (a) | 10 in $C \cap S'$ and 7 in $(C \cup S)'$ | 2 | <p>B1 for each SC1 for pair of numbers adding to 17</p> | |

| Question | | | Answer | Marks | Part marks and guidance | |
|----------|-----|------|-------------------|-------|--|--|
| | (b) | (i) | $\frac{3}{25}$ oe | 1 | | -1 once for bad notation eg 3 in 25, 3 out of 25 etc In all parts ISW attempts to cancel or turn into decimals or % |
| | | (ii) | $\frac{7}{25}$ oe | 1 | FT <i>their 7</i> and <i>their 25</i> from (i) | |

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