# GCSE

## Mathematics A

General Certificate of Secondary Education

Unit **A501/01:** Mathematics A (Foundation Tier)

# Mark Scheme for January 2013

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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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**A501/01**                                         **Mark Scheme**                                      **January 2013**

## Annotations

| Annotation | Meaning |
|---|---|
| ✔ | 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 |
| ʌ | Omission sign |

These should be used whenever appropriate during your marking.

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**

1.  **M** marks are for <u>using a correct method</u> and are not lost for purely numerical errors.
    **A** marks are for an <u>accurate</u> answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
    **B** marks are <u>independent</u> of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
    **SC** marks are for <u>special cases</u> that are worthy of some credit.

2.  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 <u>not from wrong working</u> **full marks** should be awarded.

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

3.  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 × (*their* '37' + 16), or FT 300 − √(*their* '$5^2$ + $7^2$').  Answers to part questions which are being followed through are indicated by eg FT 3 × *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.

4.  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.

5.  The following abbreviations are commonly found in GCSE Mathematics mark schemes.

    - **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 and applies as a default.
    - **nfww** 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**.

6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

7. In questions with a final answer line following working space,

   (i) if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

   (ii) if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

   (iii) if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

8. 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).

9. 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.

10. 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.

11. Ranges of answers given in the mark scheme are always inclusive.

12. 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.

13. 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.

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| 1 | (a) | | 75 | 1 | | |
| | (b) | | 27 and 16 | 1 | Both required | |
| | (c) | | 16 | 1 | | |
| | (d) | | 75 and 56 | 1 | Both required | Condone 131 |
| | (e) | | 7 | 1 | | |
| 2 | (a) | | 240 | 1 | | |
| | (b) | | 11:05 or 2305 | 1 | Accept am or pm etc; accept 1105, 11.05, etc; accept '5 past 11' | |
| 3 | (a) | | (4, 2) | 1 | | |
| | (b) | | (⁻5, 3) plotted | 1 | Condone no/wrong labels if point correct and no 'choice' | |
| | (c) | | (0, ⁻4) plotted | 1 | Condone no/wrong labels if point correct and no 'choice' | |
| 4 | | | *a* obtuse<br>*b* a right angle<br>*c* reflex | 3 | **1** each | |
| 5 | (a) | | School | 1 | | |
| | (b) | (i) | North or N | 1 | | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | | **(ii)** | Left or L | 2 | Accept N or NW | |
| | | | Right or R | | Accept E or NE | |
| | | | Left or L | | **B1** for two correct | |
| **6** | **(a)** | | 134 or 1.34 **m** | 2 | **M1** for 6.7 × 20 or for figs 134 | |
| | **(b)** | **(i)** | 401 and 'Yes' | 2 | **B1** for 401 [and 'No']<br>Or **M1** for adding all five and correct conclusion FT *their* sum | Allow **2** for estimation method with enough detail to show correct result<br><br>Allow suitable conclusion also mentioning luggage, etc |
| | | **(ii)** | 80.2 oe | 2FT | FT from *their* (b)(i)<br>**M1** for *their* sum/5 | 80200 g is equivalent |
| | | **(iii)** | 114 | 1 | | |
| | **(c)** | | 60 | 2 | **M1** for 1 litre = 1000 ml seen or used or for petrol quantity/50 (may be after conversion attempt) soi by figs 6 | eg **M1** for 3000 |
| **7** | **(a)** | | 82 or 1 **h** 22 [min] | 1 | | |
| | **(b)** | | Frequencies: 2, 12, 6, 0, 1 | 2 | Must be in Frequency column isw<br>**B1** for three or four frequencies correct or for all correct tallies in Tally column | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | **(c)** | | All heights correct, or correct FT *their* frequencies | 1 | | Accept freehand |
| | | | Bars the same width and with consistent gaps | 1 | Allow no gaps | Allow omission of a label/space for 70-79, but space must be zero or equal to other bar widths |
| | | | Bars labelled correctly | 1 | | |
| **8** | | | B and 25 days, with correct result for A and with correct working for C up to at least 28 to 29 days | 6 | **B5** if correct results for A and B and with correct working for C up to at least 28 to 29 days, but no correct conclusion<br><br>Or **B1** for A lasts 50 days<br>AND<br>**B2** for B lasts 25 days<br>Or **M1** for 6 a day seen or used<br>AND<br>**M1** for (120 − 5 × 7)/3 or 85/3 or 119<br>**B1** for 28 to 29 or 35 to 36 | Accept results in week and days, eg 7 weeks and 1 day for A, but isw after correct number of days<br><br>Alternative strategy: may work out for eg C and check how much medicine used for that number of days on A and B – allow equivalent marks for each calculation<br>eg B 25 days, with A has used 250 ml and C has used 89 capsules earns all **6** marks |
| **9** | | | UK median = 157, SA median = 153 so UK taller [on average] or No | 3 | **B2** for both medians correct and wrong or no conclusion or for one median correct and correct conclusion FT *their* wrong median<br>Or **B1** for one median correct<br>Or **SC1** for both medians clearly indicated on diagrams | Alternate method: equivalent credit for one median correct and showing correctly that less/more than half of other distribution is this height, and then correct conclusion |
| **10** | **(a)** | | $8a + 4$ or $4(2a + 1)$ as final answer | 2 | **B1** for one term correct in final answer or for correct version seen and then wrongly 'simplified' | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | (b) | | $25c + 15r$ or $5(5c + 3r)$ as final answer | 2 | Condone $t =$, $c25$, $25 \times c$, etc<br>**B1** for one term correct in final answer or for correct version seen and then wrongly 'simplified' or spurious 'p' | |
| | (c) | | $[x =]$ ⁻3 | 2 | **M1** for $5x = $ ⁻15 oe or for *their* answer FT *their* $ax = b$, with one of $a$ and $b$ correct<br><br>Or **B1** for correct embedded final answer | eg $5x + 15 = 0$ or $x = \dfrac{2 - 17}{5}$ or better<br>No FT for $a = 1$ or $b = 0$ |
| | (d) | | $18y + 30$ as final answer | 1 | | |
| | (e) | | $5(y - 3)$ as final answer | 1 | oe<br>Condone omission of final bracket; allow inclusion of multiplication sign | |
| 11 | | | Angle 77° correct | 1 | Tolerance ± 2° | |
| | | | 12.2 cm drawn accurately, FT *their* angle | 1 | Tolerance ± 2 mm | |
| | | | Remaining vertex in correct position FT, with compass arcs drawn correctly | 2 | **B1FT** if no compass arcs<br>Or **M1FT** if correct arcs with error in one of the lengths<br><br>If they ignore line given and start again, mark accordingly, but for the first mark their line must be 8.5 to 8.9 cm | Use deviation of top left hand vertex from ideal, if in tolerance, to help judge acceptable position for final vertex<br><br>If in doubt of tolerance, check with the protractor and/or ruler instead of the multi-line overlay |
| 12 | (a) | | $33.6$, $\dfrac{168}{5}$ or $33\dfrac{3}{5}$ | 2 | **B1** for other answers rounding to 33.6 or for both 282.24 and 8.4 seen oe as fractions | **B0** for correct answer seen then spoilt since obtainable from 3.6 × 2 + 13.2 × 2 |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | **(b)** | | $2^3 \times 3 \times 5$ | 2 | Product required but indices need not be used<br>**M1** for 2, 3, 5 and no others<br>or for factor tree or division with at least two of 2, 3 and 5 found as factors | |
| **13** | | | 998 and 200 correctly on answer lines | 3 | **SC2** for 5 × 200 − 2 = 998 seen with answer lines not completed correctly (eg final answer wrong or they may not realise 200<sup>th</sup> term)<br><br>Or **B1** for 998 on an answer line<br>And **M1** for 200 on an answer line or for $5n - 2 = 998$ or $5n = 1000$ or for at least two correct trials of $5n - 2$ with outcomes between 900 and 1100 for clear values of $n$, with $n$ an integer<br><br>If **0** in question, then **SC1** for 3, 8 and 13 found (first three terms) or for any three trials of $5n - 2$ with correct outcomes for clear values of $n$, with $n$ an integer | **SC2** for eg $n = 200 \rightarrow 998$ oe |

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