GCSE

# Mathematics C (Graduated Assessment)

# Mark Scheme for January 2012

**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 |
| ∧ | 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**

i.      **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.

ii.      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.

iii.    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.

iv.    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.

v.    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).
-    **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**.

vi.    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'.

vii.    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).

viii.   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.

ix.   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.

x.   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'.  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.

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

xii.   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.

xiii.   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) | (i) | 25 | 1 | | |
| | | (ii) | 17 | 2 | **B1** for 24 or 3 × 8 | |
| | | (iii) | $\dfrac{18}{25}$ | 2 | **B1** for $\dfrac{3}{5} \times \dfrac{6}{5}$ or better | |
| | (b) | | $\dfrac{7}{20}$ $\dfrac{2}{5}$ $\dfrac{1}{2}$ $\dfrac{3}{4}$ $\dfrac{9}{10}$ | 2 | **B1** for attempt to find common denominator or convert to decimals or percentages. OR **SC1** for 4 in correct order | Must be a common denominator with at least 4 correct numerators or 4 correct decimals or percentages. Cover incorrect answer, if others in correct order award mark. |
| **2** | (a) | | [⁻4]  ⁻1  [2]  5  [8] | 1 | | |
| | (b) | | Ruled line from (⁻2, ⁻4) to (2, 8) | 2 | **B1** FT for *their* 5 points plotted | Tolerance: line must pass on or inside the circles on the overlay. If line correct ignore any other points plotted. Incorrect line scores a maximum of 1 mark  Accept clear intention for plotting of points, but do not FT any points off given graph paper |
| | (c) | | 0·5 – 0·8 | 1FT | Or FT *their* ruled straight line if 2 marks not earned in (b) | If no ruled line accept only 0·5 – 0·8 |
| **3** | (a) | | 2 points plotted correctly | 1 | | |
| | (b) | | As height increases so does weight oe | 1 | | See exemplars |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | (c) | | Line drawn | 1 | | Their ruled line must cross both lines on the overlay. Anchor bottom left on (70, 165) |
| | (d) | | 72 – 78 | 1 | | |
| **4** | (a) | | 6*x* − 8 | 1 | | |
| | (b) | | 5(5*y* + 2) | 1 | | Condone missing final bracket |
| **5** | | | 11·3(0) | 4 | **B3** for figs 113 nfww or 138·7 Or **B2** for figs 1387 Or **M2** for a complete attempt at 14·6 × 9·5 with no more than 1 arithmetic error OR **B1** for figs 730, 1314, 570, or 38(00) or 3 boxes correct in grid method AND **M1** for an attempt at subtraction of *their* area from 150 | Must see where *their* 138·7 is from. It must be an attempt to find an **area**, not just 150 − 14·6 or 150 − 9·5 or 150 − 24·1 or 150− 48·2 |
| **6** | (a) | | Correct translation | 1 | Vertices of B at (⁻2, 4), (⁻2, 1), (0, 1) | |
| | (b) | | Rotation 90° clockwise oe [Centre] (0, 0) | 1 1 1 | eg 270° anticlockwise | **0** marks if more than 1 transformation given. |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| 7 | | | 13·3 | 2 | **B1** for $\frac{7\cdot6 \times 3\cdot5}{2}$ oe | |
| | | | cm$^2$ | 1 | | |
| 8 | (a) | | 4 | 1 | | |
| | (b) | | 34 | 2 | **B1** for 48 from $3y^2$ or ⁻14 from $2z$ | |
| 9 | (a) | | 5 : 2  or 2·5 :1 or 1: 0·4 | 2 | **B1** for 150 : 60 or simpler e.g. 75 : 30, 15 : 6 etc | **B1** for any equivalent simpler form of 150 : 60<br>Award **0** for eg 300 : 120<br>Any ratio must include a colon to score in working. |
| | (b) | | 0·02 | 2 | **B1** for 1 − [0]·98<br>Or **SC1** for 0·38 | |
| | (c) | (i) | 38 | 1 | | |
| | | (ii) | 35 | 1 | | |
| | | (iii) | 58 | 1 | | |
| 10 | (a) | (i) | Chord drawn | 1 | Accept diameter | Condone chord extended beyond circumference of circle |
| | | (ii) | Sector drawn and shaded | 1 | Enclosed by two radii and an arc | Shaded area must be within the circle |
| | (b) | | 24·8 to 25·14 | 2 | **B1** for $\pi \times 8$  or $2 \times \pi \times 4$ | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| **11** | (a) | | 4096 | 1 | | |
| | (b) | | 5·7 | 1 | | |
| **12** | | | 3·5 | 3 | **M1** for $6x = k$ ($k \neq 21$) OR <br> **M1** for $kx = 21$ ($k \neq 6$) <br> **M1** for $x = b/a$ FT correct from *their ax =* <br> *b* ($a \neq 1$) | Allow fully embedded <br> eg **M2** for $6x = 21$ |
| **13** | | | [they are] angles in a triangle <br> 180 <br> [they are] angles on a [straight] line | 1 <br> 1 <br> 1 | | |

**APPENDIX**

<u>Exemplar responses for Q.3(b)</u>

| **Response** | **Mark** |
| --- | --- |
| Positive correlation | **1** |
| Correlation | **1** |
| Positive relationship | **1** |
| As one goes up the other goes down | **0** |
| Negative correlation | **0** |
| | |
| | |
| | |