OCR
RECOGNISING ACHIEVEMENT

GCSE

# Mathematics A

General Certificate of Secondary Education

Unit **A503/01:** Mathematics C (Foundation Tier)

# Mark Scheme for January 2013

Oxford Cambridge and RSA Examinations

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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**Annotations**

| Annotation | Meaning |
|---|---|
| | Correct |
| | Incorrect |
| | Benefit of doubt |
| | Follow through |
| | Ignore subsequent working (after correct answer obtained), provided method has been completed |
| | Method mark awarded 0 |
| | Method mark awarded 1 |
| | Method mark awarded 2 |
| | Accuracy mark awarded 1 |
| | Independent mark awarded 1 |
| | Independent mark awarded 2 |
| | Misread |
| | 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**

1. **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.

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 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.

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 – $\sqrt{}$(*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).

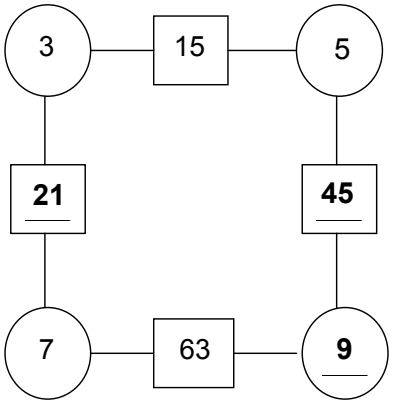
9. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **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) | | Evens | 1 | | If probabilities given in any part then penalise first occurrence only |
| | (b) | | Unlikely | 1 | | |
| | (c) | | Impossible | 1 | | |
| | (d) | | Certain | 1 | | |
| 2 | (a) | (i) | 63 | 1 | | |
| | | (ii) | 18 or £0.18 | 1 | | Not 0.18 alone |
| | (b) | |  | 1<br>1FT<br>1 | For 45, FT 5 × *their* 9 dep on 9 being an integer | |
| 3 | (a) | (i) | 10 | 1 | | |
| | | (ii) | 14 | 1 | | |
| | (b) | (i) | Rectangle drawn with area of 12<br>Perimeter of rectangle/square is less than 16 | 1<br>1 | Indep | eg 4 by 3 gets **1, 1**<br>6 by 2 gets **1, 0**<br>3 by 3 gets **0, 1** |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | | **(ii)** | Rectangle drawn with perimeter equal to area | 2 | **B1** for shape other than rectangle with perimeter equal to area<br>or correct perimeter **and** correct area recorded for two rectangles | eg **B2** for 4 by 4 square, 6 by 3 rectangle |
| **4** | **(a)** | **(i)** | $(^{-}2, 3)$ | 1 | | |
| | | **(ii)** | (4, 0) | 1 | | |
| | **(b)** | | 114° to 119° | 1 | | |
| | **(c)** | **(i)** | Marks cross on map at ($k$, 0) where $^{-}5 \leq k < {}^{-}0.5$ | 2 | **B1** for cross marked at ($k$, 0) where $k$ is in the range $^{-}0.5 < k < 4$ | Accept any unambiguous marking of Acton |
| | | **(ii)** | Gives correct coordinate for *their* cross | 1FT | Strict FT *their* cross for Acton | If more than one 'cross' then mark not available unless Acton clearly labelled |
| **5** | **(a)** | **(i)** | B<br>D | 1<br>1 | | Accept answer 0.2 oe<br>Accept answer 0.6 oe |
| | | **(ii)** | Arrow marked on line between C and D | 1 | | |
| | **(b)** | | C | 2 | **M1** for 8 green and 9 blue [and 2 pink and 1 red] or 8 green and 20 | For **2** marks accept answer 0.4 oe<br>For **M1** check for figures next to bullet points in window |
| **6** | **(a)** | **(i)** | 13 | 1 | | Do not accept embedded answers in parts (i), (ii) and (iii) |
| | | **(ii)** | 7 | 1 | | |
| | | **(iii)** | 80 | 1 | | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | **(b)** | **(i)** | $15a$ | 1 | | |
| | | **(ii)** | $5 - x$ | 2 | **B1** for $kx + 5$ or $-x + k$, $[k \neq 0]$<br>or for correct answer seen and then spoilt | Condone $-1x$ for $-x$ |
| **7** | | | £1.52 or £1.53 | 2 | **M1** for $2.44 \div 8 \times 5$ oe [1.525] | |
| **8** | **(a)** | | 20 000 | 2 | **M1** for $25 \times 20 \times 40$ | |
| | **(b)** | | 20 | 2FT | Correct or FT *their* (a) ÷ 1000<br>**M1** for 1 $cm^3$ = 1000 $mm^3$ soi<br>or for $2.5 \times 2.[0] \times 4.[0]$ | |
| **9** | **(a)** | **(i)** | 5 | 1 | | |
| | | **(ii)** | 12 33 [pm] | 1 | | |
| | | **(iii)** | 53 | 1FT | FT difference in minutes between *their* (a)(ii) and 11 40 | Dependent on *their* (a)(ii) being later than 12 00 |
| | **(b)** | | 3 hours 2 minutes or 182 minutes | 2 | **M1** for identifying 15 35 return train in working | 16 50 alone is insufficient for the 15 35 train |
| | **(c)** | | 0.50 nfww | 2 | **B1** for [£]29 shown as total cost for family or answer 50p and £ sign not deleted<br>Or **SC1** for answer 3.50 nfww | Allow **2** marks for answer 50p with £ sign deleted in answer space |
| **10** | **(a)** | **(i)** | 56.25 or $56\frac{1}{4}$ | 1 | | In part (a)(i), (ii) and (iii) penalise first occurrence only of equivalent improper fractions |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | | (ii) | 10.9 or $10\frac{9}{10}$ | 1 | | |
| | | (iii) | 3.3 or $3\frac{3}{10}$ | 1 | | |
| | (b) | (i) | 347 | 1 | As final answer | |
| | | (ii) | 346.8 | 1 | As final answer | |
| | | (iii) | 300 | 1 | As final answer | |
| 11 | | | 780 | 3 | **M2** for 420<br>Or **M1** for 300, 900 or 120 or 1080<br><br>After **0** scored **SC1** for answer 810 | |
| 12 | (a) | (i) | 20*a* | 1 | | Not 20 × *a* or variable other than *a* |
| | | (ii) | 3*y* | 1 | | Not 3 × *y* or variable other than *y*<br>Not $\frac{3y}{1}$ |
| | (b) | (i) | 216 | 1 | | |
| | | (ii) | 35 | 1 | | |
| | | (iii) | 7 | 1 | | |
| | (c) | | 10 | 1 | | |
| 13 | (a) | (i) | 50 [.0] | 1 | | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | | **(ii)** | ml or millilitres | 1 | | Accept $cm^3$, mils |
| | | **(iii)** | 4900 g [grams]<br>or 4.9 kg [kilograms]<br>or 4 kg 900 g | 2 | **B1** for 4900 or 4.9 with no/incorrect units | |
| | | **(iv)** | 3.3 [0]<br>cm or centimetres | 1<br>1 | For **2** marks accept 3.66 [m] **and** [40] millimetres | 3.66 m and 40 cm scores **1** for the cm |
| | **(b)** | | Yes and shows either 137.5 [cm] or 4 feet 4 inches<br><br>Or Yes and shows 52 inches and 55 inches or 4 ft 4 inches and 4 ft 7 inches<br><br>Or Yes and shows the difference 7.5 cm or 3 inches | 4 | **B3** for no/wrong decision and 137.5 cm or 4 feet 4 inches shown or the difference 7.5 cm or 3 inches shown<br>**or** 52 inches and 55 inches [4 ft 4 inches and 4 ft 7 inches] shown<br>Or **M2** for (4 × 12 + 7) × 2.5 shown<br>or 130 ÷ 2.5 [52]<br>Or **M1** for 4 × 12 + 7 shown<br>or for 7 × 2.5 [17.5] seen<br>or 48 × 2.5 [120] seen<br>or for 65.5 seen | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| 14* | | | Well structured and grammatically correct solution with no errors seen and final answer given to 2 decimal places.<br>Must show 625 ÷ 1.12 = 558.03[..] or 558.04<br>And 850 ÷ 1.68 = 505.95[…]<br>And American shop by £52.09<br>**OR**<br>If working in other currencies must show 1.68 ÷ 1.12 and exchange rate as €1 = $1.5 oe and 625 × 1.5 = [$]937.5[0] for French TV or 850 ÷ 1.5 = [€]566.67 for American TV<br>And then correct decision with either $87.50 or €58.33 | 6−5 | For 5 marks, show 558.03[..] or 558.04 **and** 505.95[…]<br>**and** American shop by £52.08 or £52.09 (and does not show the division steps)<br>**or** French shop by £52.09 (and shows the division steps)<br><br>**Or** well structured and 'correct' with spelling/grammatical/unit errors<br><br>**Or** well structured and grammatically correct solution, with all method steps required for 6 marks, correct and shown and tries to work to two decimal places. Condone answer rounded to £52.<br>Or allow one rounding slip to 2 dps in conversions only and FT *their* slip to answer | If working in other currencies shows [$]937.5[0] for French TV And [€]566.66 to [€]566.67 for American TV<br>And then correct decision with $87.50 or $87.51or €58.33 or €58.34<br><br>eg Allow 5 marks for American by £52 with all method steps and correct previous figs shown to 2dp<br><br>Trial and improvement can be used to obtain values up to a maximum of 5 marks<br>If a choice of methods and values is given, mark only those leading to the answer or apply the choice rule |
| | | | Converts both values to reasonable accuracy<br>Converts both to 558 to 558.05 **and** 505.95 to 506 **and** concludes American shop by £52 to £52.10<br>**Or** converts accurately to 558.03[..] or 558.04 **and** 505.95[..], or [$]937.5 or 938, or [€]566.6[..] or 566.7[0] or 567 but incorrect/no final answer | 4−3 | Converts either to 558[.0..] **or** 505.95 to 506 but incorrect/no final answer<br>**Or** exchange rate €1 = $1.5 oe | Units important with answer for 4 marks |
| | | | Correct method for both conversions<br>Shows 625 ÷ 1.12 **and** 850 ÷ 1.68 or 1.68 ÷ 1.12 or 1.12 ÷ 1.68 | 2−1 | Shows 625 ÷ 1.12 **or** 850 ÷ 1.68<br>**Or** converts 625 and/or 850 incorrectly but then makes the correct decision with the correct difference for their prices | Condone omission of units for 1 mark |
| | | | No relevant working shown | 0 | | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| **15** | **(a)** | | [FC], FS, CF, CS, SF, SC only | 2 | **B1** for 3 of these 5 seen | |
| | **(b)** | | $\frac{4}{6}$ or $\frac{2}{3}$ or 0.66 to 0.67 or 66 to 67%<br>nfww isw | 2 | **M1** for $\frac{n}{6}$ soi $n < 6$ but NOT after denominator = 12<br>Or **SC1** for answer $\frac{5}{9}$ | –1 for poor notation eg 4 : 6, 4 in 6, 4 out of 6 etc |
| **16** | **(a)** | **(i)** | 40 | 1 | | |
| | | **(ii)** | 15 | 1 | | |
| | | **(iii)** | 5 | 2FT | Correct or FT *their* (a)(ii) ÷ 3 correctly evaluated<br>**M1** for *their* (a)(ii) ÷ 3 | FT correct to 1 dp if appropriate |
| | **(b)** | **(i)** | Stopped oe | 1 | Or acceptable alternative | Ignore extra/incorrect comments |
| | | **(ii)** | Fill up tank oe | 1 | Or acceptable alternative | Ignore extra/incorrect comments |
| **17** | **(a)** | **(i)** | Rectangle 10 by 6<br><br>Any line down middle of a rectangle, parallel to length | 1<br><br>1FT | Ignore extra lines anywhere<br><br>Any rectangle with no extra lines | Condone freehand<br>The edge of the grid may be used as the side of the rectangle |
| | | **(ii)** | Rectangle<br><br>10 by 4 | 1<br><br>1 | Ignore extra lines anywhere<br><br>Rectangle with no extra lines | Condone freehand<br>The edge of the grid may be used as the side of the rectangle |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | **(b)** | | 184 | 4 | **M1** for [1 or 3 ×]10 × 6 soi by 60 (or 180)<br>**M1** for [2 or 3 ×] 5 × 10 soi by 50 or 100 (or 150)<br><br>**M1** for [2 ×] $\frac{6 \times 4}{2}$ soi by 12 or 24 but not if goes on to 24 × 2 | Allow **M1**, **M1** for combining areas eg (5 + 6) × 10 or 16 × 10<br><br>Condone if part of volume calc. |
| **18** | **(a)** | | 0.08 oe | 2 | **M1** for 1 – (0.4 + 0.17 + 0.35) soi by answer of 0.44 | Allow **M1** for answer 0.8 after 0.92 oe seen in working<br>For (a) and (b) –1 once for poor notation eg 0.57/1. Ignore wrong cancelling after correct fraction |
| | **(b)** | | 0.57 oe | 2 | **M1** for 0.4 + 0.17 soi by answer of 0.21 | |
| | **(c)** | | 875 | 2 | **M1** for 2500 × 0.35 or for $\frac{875}{2500}$ | |

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