

Mathematics A

General Certificate of Secondary Education

Unit **A502/02**: Mathematics B (Higher Tier)

Mark Scheme for November 2010

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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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Marking Instructions & Abbreviations**Marking instructions**

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Work crossed out but not replaced should be marked.
4. **M** (method) marks are not lost for purely numerical errors.
A (accuracy) marks depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
B marks are independent of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.
5. Two additional situations may appear in the mark scheme allowing the award of **A** marks or independent (**B**) marks:
 - i. Correct answer with no working
 - ii. Follows correctly from a previous answer whether correct or not (“FT” on mark scheme).
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. 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. If the answer is missing, but the correct answer is seen in the body allow full marks. If the correct answer is seen in working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would normally be given.
9. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work.

10. For answers scoring no marks, you must either award NR (no response) or 0, as follows:

Award NR (no response) if:

- Nothing is written at all in the answer space
- There is any comment which does not in any way relate to the question being asked (“can’t do”, “don’t know”, etc.)
- There is any sort of mark that is not an attempt at the question (a dash, a question mark, etc.)

Award 0 if:

- There is any attempt that earns no credit. This could, for example, include the candidate copying all or some of the question, or any working that does not earn any marks, whether crossed out or not.

11. Where a follow through mark is indicated on the mark scheme for a particular part question, you must ensure that you refer back to the answer of the previous part question.
12. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures seen. E.g. answer on 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.
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.
14. Ranges of answers given in the mark scheme are always inclusive.
15. Annotating scripts. The following annotations are available:

✓ and ✗

BOD - Benefit of doubt

FT - Follow through

ISW - Ignore subsequent working

M0, M1, M2 - Method mark awarded 0, 1, 2

A1 - Accuracy mark awarded

B1, B2 - Workless mark awarded 1, 2

MR - Misread

SC - Special case

^ - Omission sign

These should be used whenever appropriate during your marking.

Abbreviations

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

- Where you see **oe** in the mark scheme it means **or equivalent**.
- Where you see **isw** in the mark scheme it means **ignore subsequent working** (after correct answer obtained), provided the method has been completed.
- Where you see **cao** in the mark scheme it means **correct answer only**.
- Where you see **soi** in the mark scheme it means **seen or implied**.
- Where you see **www** in the mark scheme it means **without wrong working**.
- Where you see **rot** in the mark scheme it means **rounded or truncated**.
- Where you see **seen** in the mark scheme it 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.
- Figs: for example **figs 237** means any answer with just these digits with leading or trailing zeros disregarding any decimal point. E.g. 237000, 2.37, 2.370, 0.00237 but not 23070 or 2374.

| | | | | | |
|---|-----|------------------------|---|---|--|
| 1 | (a) | (i) 125 | 1 | | |
| | | (ii) 13 | 1 | | |
| | (b) | (i) 5^{10} | 1 | | |
| | | (ii) r^9 | 1 | | |
| | (c) | (i) 1 | 1 | | |
| | | (ii) 9 | 2 | M1 for $\sqrt[3]{27}$ or 3 seen as an 'answer' | |
| 2 | (a) | Correct rotation | 3 | M1 for any rotation A1 for correct centre A1 for correct angle | |
| | (b) | Correct translation | 2 | B1 for any translation | |
| 3 | | 270 | 4 | B3 for 250 Or M2 for correct calculation for weight of nails $20 \times 10 \times 5 \times 0.25$ oe Or M1 for correct conversion between g and kg and cm and m | |
| 4 | (a) | $x \leq 4$ oe | 2 | M1 for $3x < 10 + 2$ (or better) Or B1 for 4 oe seen | |
| | (b) | Correct representation | 1 | | |
| 5 | | Correct hexagon | 3 | M1 for 360/5 or 72 seen B1 for an angle of 72° drawn at O | |

| | | | | | |
|---|-----|--|-----|---|--|
| 6 | (a) | 7 points plotted $\pm 2\text{mm}$ | 2 | B1 for 3 correct points | |
| | (b) | 20 Oct | 1 | | |
| | (c) | Any 2 of 29 Oct – 1 Nov | 1 | | |
| | (d) | (i) 5 points correct | 1 | | |
| | | (ii) Conclusion with supporting reason | 2 | B2 for conclusion (Sam is correct, or wrong or can't decide) with clear reason Or B1 if not clear | |
| 7 | (a) | $y = x - 5$, $y = -3x + 5$, $y = \frac{1}{2}x + 5$ | 3 | B1 for each one | |
| | (b) | $y = -\frac{1}{2}x + 3$ | 2 | B1 for $y = -\frac{1}{2}x + c$ or $y = mx + 3$ | |
| 8 | | Both Lizzie and Parand are correct. Explanation of no correlation as first decreasing then increasing with age and that that constitutes a relationship. Correct language used. | 4-3 | For lower mark – minor errors in spelling, punctuation or grammar or small use of poor mathematical language. Look out for more sophisticated answers that say Lizzie is wrong as there is a non-linear correlation – this can earn full marks. | |
| | | Either Lizzie or Parand is correct, the other ignored or incorrect. Explanation of why that one person is correct. | 2-1 | For lower mark – explanation made with poor spelling, punctuation and grammar. | |
| | | Neither identified as correct or no explanation. | 0 | | |

| | | | | | |
|----|-----|--|--------|--|--|
| 9 | (a) | $160a + 20c = 6700$ Clear division by 20 | 1 1 | Or $1.6a + 0.2c = 67$ Clear division by 0.2 oe | |
| | (b) | $c = 15$ with algebraic method | 3 | M1 for attempt to subtract B1 for $a = 40$ | |
| 10 | | $\frac{3}{20}$ | 3 | B2 for $\frac{132}{880}$ oe seen OR B1 for $\times \frac{4}{11}$ soi B1 for cancelling the 4 or the 11 | |
| 11 | (a) | $p = 86^\circ$ Cyclic quadrilateral | 1 1 | | |
| | (b) | Diameter $> 8\text{cm}$ + convincing reasons | 3 | B1 for angle in semicircle = 90° B1 for BD not a diameter or BD is a chord | |
| 12 | (a) | $2\sqrt{3}$ | 2 | M1 for $\times \frac{\sqrt{3}}{\sqrt{3}}$ soi by $\frac{6\sqrt{3}}{\sqrt{3}}$ | |
| | (b) | $4\sqrt{3}$ | 2 | B1 for $\sqrt{48}$ | |
| 13 | (a) | Correct line | 2 | | |
| | (b) | Correct region indicated | 2 | B1 for identifying both lines e.g. by shading | |
| | (c) | 2 and 1 | 1 | | |

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