OCR
RECOGNISING ACHIEVEMENT

GCSE

# Methods in Mathematics (Pilot)

General Certificate of Secondary Education

Unit **B391/01:** Foundation Tier

# Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

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Annesley
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Facsimile: 01223 552610
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**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**

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 – √(*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).
   - **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. 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'.

7. 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).

8. 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.

9. 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.

10. 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.

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) | (i) | 17 | 1 | | |
| | | (ii) | 36 | 2 | **M1** for $48 \div 4 \times 3$ or for 12 or 144 **seen** | |
| | (b) | | $\frac{1}{3}$ | 2 | **M1** for $\frac{3}{9}$ | |
| | (c) | | 0.23, $\frac{1}{4}$, $\frac{3}{10}$<br>with all 3 shown in comparable form | B1<br><br>2 | <br><br>**M1** for any two comparable forms<br>eg 0.23 and 0.25 | Or 0.23, 0.25, 0.3(0) on answer line, or 23%, 25%, 30%<br><br>23(%), 25(%), 30(%) |
| 2 | (a) | | 32<br>24 | 1<br>1 | | |
| | (b) | | 4 or 3<br>3 4 | 3 | **M2** two different rectangles with *l, w* such that $l + w = 7$ or $lw = 12$ **with** other condition considered<br>**or**<br>**M1** any *l, w* where $lw = 12$, or any *l, w* where $l + w = 7$<br>**or**<br>**SC2** if only correct rectangle drawn with no answers on answer line | Allow one calculation error for other condition |
| | (c) | | 54 | 2 | **M1** for $3 \times 6$ (=18) or $3 \times 3$ (=9)<br>or $3 \times 6 \times 3$, or 18 | $3 \times 6 \times 2$ scores 0 |
| 3 | (a) | | (One) hundred (and) forty seven thousand | 1 | | Allow errors in spelling if intention is clear |
| | (b) | | 15 000 | 1 | | Accept answer in words |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | (c) | | 354 400 | 2 | **M1** for 147(000) + 132(000) + 37(900) + 37(500) or implied by one incorrect digit in a six digit answer or answer of 353(000) | Column addition with these numbers without + signs imply **M1** Sum could be next to table |
| **4** | (a) | | 36 + 64 | 1 | | |
| | (b) | | 25 – 16 = 9 or 25 – 9 = 16 | 1 | | |
| | (c) | | 36 ÷ 9 = 4 or 36 ÷ 4 = 9 or 64 ÷ 16 = 4 or 64 ÷ 4 = 16 | 1 | Condone 16 ÷ 4 = 4<br>81 ÷ 9 = 9 | |
| **5** | (a) | | Correctly positioned words | 2 | **B1** for either 'evens' correct, or for 'certain' and 'impossible' correct | If no mark on diagram take middle of word as intention for position |
| | (b) | | 'Being picked' and 'not being picked' are not equally likely outcomes | 1 | eg only one out of many tickets or it would only be correct if there were just two tickets | |
| **6** | (a) | | 13 | 1 | | |
| | (b) | | 11 | 1 | | |
| | (c) | | 3 | 1 | | Allow embedded answer on answer line |
| **7** | (a) | | (4, 3) | 1 | | |
| | (b) | (i) | (6, 3) | 1 | | |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | | (ii) | D positioned correctly to make kite.<br>D positioned correctly to make trapezium.<br>D positioned correctly to make parallelogram.<br>At least two correct labels. | 1<br>1<br>1<br><br>1 | | Condone drawn on grid at side<br><br><br><br>Allow any clear labelling. |
| **8** | (a) | (i) | 5 | 1 | | |
| | | (ii) | 2 | 1 | | |
| | | (iii) | 7 | 1 | | |
| | (b) | (i) | Quadrilaterals | 1 | Or any valid description | |
| | | (ii) | Regular polygons | 1 | Or any valid description | Accept regular shapes |
| | (c) | | Suitable shape shown | 1 | eg circle | Clear intention that it is not a regular or four sided shape |
| **9** | (a) | | 1.44 | 2 | **M1** for 1.2 × 1.2 or **figs** 144 | |
| | (b) | (i) | (0).16 | 2 | **M1** for $^{-}$(0).16 or positive **figs** 16 | |
| | | (ii) | $^{-}$ (0).4 | 1 | | |
| | (c) | | 9 | 2 | **M1** for 4.5/0.5, 45/5, (9/2)/(1/2) or 9/2×2/1 | |
| **10** | (a) | | $5x(x - 2)$ | 2 | **B1** for $5(x^2 - 2x)$ or $x(5x - 10)$ or $5x[f(x)]$ | Accept $5x(1x - 2)$ or $(5x + 0)(x - 2)$<br>$f(x)$ must be linear |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | (b) | | Fully correct solution leading to final answer 1.3 **oe** | 3 | **2** for answer 1.3 with algebraic steps missing or 1.3 not final answer<br>or incorrect answer from 1 algebraic step wrong<br>**or**<br>**1** for answer incorrect with one correct algebraic step shown | Three steps are<br>Multiplying brackets in equation<br>Isolating and combining terms<br>Dividing |
| **11** | | | Totally correct hexagon | 4 | **B1** for 1 side drawn 4cm<br>**B1** for (Angle) 120 seen or drawn<br>**B1** for hexagon formed<br><br>**OR**<br>**B1** for 6 radial lines with 4cm indicated<br>**B1** for (Angle) 60 seen or drawn<br>**B1** for hexagon formed<br><br>**OR**<br>**B1** for circle drawn with points/arcs on circumference approx equal intervals<br>**B1** for radius 4cm<br>**B1** for hexagon formed | Tolerance throughout ± 2mm, ± 2° |
| **12** | (a) | | (2) 3 4 (5) 6<br>3 4 5 6 7<br>4 5 6 7 8<br>(5) 6 7 (8) 9<br>6 7 8 9 10 | 1 | Condone one error | |
| | (b) | (i) | $\frac{3}{25}$ **oe** | 2FT | FT completed table only<br>**B1** FT for numerator,<br>**and**<br>**B1** for 25 as a denominator | Equiv fractions decimal or %<br>**isw** for attempts to change form 3 in 25 etc **–1** once for question<br>FT provided $p < 1$ |

| Question | | | Answer | Marks | Part Marks and Guidance | |
|---|---|---|---|---|---|---|
| | | (ii) | $\frac{12}{25}$ **oe** | 1FT | FT from *their* table and *their* 25 | FT provided $p < 1$ |

**APPENDIX 1**

Exemplar responses for questions **5(b)**

| | **Response** | **Mark awarded** |
|---|---|---|
| 1 | To have an evens chance of winning there must be her ticket and only one other. | 1 |
| 2 | There are more than just 2 cards so the chance is unlikely. | 1 |
| 3 | She is wrong say if there was two raffle tickets one was hers and the other was someone elses that would be an even chance. | 1 |
| 4 | Because Cedrines raffle ticket may not have the same amount of other tickets in the raffle. | 1BOD |
| 5 | Because there may be more other tickets than just hers. | 1 |
| 6 | Because Cedrine does not have half of the tickets. | 1 |
| 7 | Because there are more than 2 tickets. | 1 |
| 8 | It depends how many people have bought a raffle ticket. | 1 |
| 9 | She don't know how many tickets there are. | 1 |
| 10 | Because there are many other raffle tickets, so you don't know what ticket will be picked. | 1 |
| 11 | Because there's more tickets, so it is unlikely that hers will be picked. | 1 |
| 12 | She is wrong because it depends on the number of tickets in the raffle. | 1 |
| 13 | It depends on the amount of tickets. The less in the raffle the more certain it is hers gets picked. | 1 |
| 14 | Because there is more tickets than hers, there is a less probability that hers will be picked. | 1 |
| 15 | Because there are other tickets. Another ticket being picked rather than her ticket. | 1BOD |
| 16 | If 10 have a ticket she will have a chance of one tenth (or 1/10) of winning. | 1 |
| 17 | Because Cedrine is saying that she has half a chance where there will be more than two. | 1 |
| 18 | It isn't even depending on the amount of tickets, if there is 100 she will be 1/100 which is not like 50/50. | 1 |
| 19 | She is wrong because there will be loads of tickets and has a very unlikely chance. | 1 |
| 20 | Because there is more than two tickets in the raffle so there is a higher chance it won't be picked. | 1 |
| 21 | More than two raffle tickets may have been sold. | 1 |
| 22 | Because there will be a lot more cards to be picked from. | 1 |
| 23 | Because there is not a certain number of tickets so it would be random. | 0 |
| 24 | She is wrong because your name is only 2 out of whatever number is in the picking bowl. If it was an even chance of winning the either you would have only 2 names in the box or as many tickets with your number or equal to half of the number in the box. | 0 |
| 25 | Mathematically she is wrong because there is a probability that the ticket will be picked by a calculation based on the number of people who buy tickets. | 0 |
| 26 | Because there could be an odd amount of tickets. | 0 |
| 27 | She is wrong because there is only one ticket so it would be picked as there will be one ticket overall. | 0 |

| | | |
|---|---|---|
| 28 | 100−1 = 99. 1 out of a hundred tickets. | 0 |
| 29 | Because some people might have bought more than one ticket. | 0 |
| 30 | Because there is more people in the raffle. He is more in the likely/unlikely. | 0 |
| 31 | She is wrong because more people will buy tickets, it is a chance 1 in a million hers will be picked. So she is wrong. | 0 |
| 32 | The raffle tickets have many different numbers, not two numbers. | 0 |
| 33 | Because the probability of her ticket being picked is one out of the whole bag, and there is more in the bag than 1, so the others have a better chance, because the probability is higher. | 0 |
| 34 | If it was evens only two people would have to buy the tickets. | 0 |
| 35 | She is wrong because the number of tickets is not even. Its certain. | 0 |

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**1 Hills Road**
**Cambridge**
**CB1 2EU**

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