OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics A

General Certificate of Secondary Education

Unit **A502/01:** Mathematics B (Foundation Tier)

Mark Scheme for January 2012

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 used in the detailed Mark Scheme.

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 awarded for a correct final 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 of working

    i. 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.

    ii. but the answer space is blank, allow full marks. Place the annotation ✓ next to the correct answer.

    iii. but a completely different answer is seen in the answer space, 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.

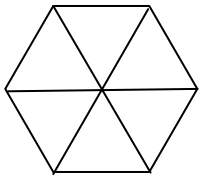
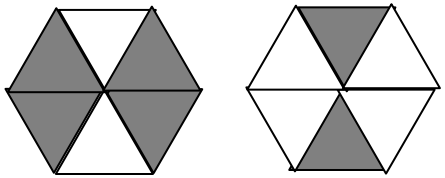
11. Ranges of answers given in the mark scheme are always inclusive.

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% $\frac{10}{100}$ or $\frac{1}{10}$ oe	1 1		Ignore faulty cancellation after correct answer seen
	(b)	(i)	(9) × **8** (=) **7** (2)	1		
		(ii)	(7) **2** (÷) **9** (=) (8) **72** (÷) **8** (=) **9**	1 1		
2	(a)		(£)3.85(p)	3	**M2** for (20 – *their* 16.15) oe Or **M1** for 20 – (3.4[0] or 12.75) or better and **M1** for *their* 16.6[0] – 12.75 or *their* 7.25 − 3.4[0] Or **M1** for 3.4 + 12.75 or 16.15 seen	May be 20 – (3.4 + 12.75) 16.6[0] or 7.25
	(b)	(i)	(£)1.20(p)	2	**M1** for 2.8 × 4 or 2.8 – 2.5 or 11.2 or 30 or 0.30 seen or *their* 11.2 – 10 soi or *their* 30[p] × 4 soi	Marks implied by eg *their* 11.2 is 12 and answer 2 eg *their* 30 is 40 and answer 1.60
		(ii)	8 [flowers] or 8[.75]% *Correct* statement comparing *their* 8 or 8.75% and 7 or 10%	2 1 dep	**M1** for 80 ÷ 10 oe or 7 ÷ 80 × 100 Dependent on **M1**	

Question			Answer	Marks	Part Marks and Guidance	
3	(a)		Reflex	1		
	(b)		142	2	**M1** for 180 – 38	
4	(a)		9	1		Ignore cm or cm^2 etc
	(b)		64	1		Ignore cm or cm^2 etc
	(c)		15	1		Ignore cm or cm^2 etc
	(d)		h^2	1	Allow $h \times h$	Ignore cm or cm^2 etc
	(e)		1000	1	Allow 10^3 if 1000 seen	Ignore cm or cm^2 etc
5	(a)		1935 – 1949	1		
	(b)		Rising Not steady or some falls Any correct figure correctly used	1 1 1	Describes upward trend Any correct mention of "up and down" eg starts at 13.5[…], ends at 14.4 (or 1995), decline from 1940 Accept starts at 13.5 to 13.6 etc.	Must use or clearly imply RISE Allow "positive correlation" to imply rise Read to nearest given value on scale Do not reward start or finish dates unless linked to a temperature Must be correct range from two adjacent points on scale
6	(a)		**c** **a**	1 1	Or $p = fg$ Or $t = 2h + 1$	

Question			Answer	Marks	Part Marks and Guidance	
	(b)		*Their subject, t* = [total] number of sweets [in the bag] *h* = [the] number [of sweets] each person [has]	1FT 1	Must say number or amount of… Number or amount	Not "sweets" Ignore reference to +1 Not 2*h* There is no follow through for *h* from a wrong Situation 2 in 6(a)
7	(a)	(i)	Regular hexagon with vertices within circles of overlay 3 diagonals only (indicating 6 tiles. Ignore extra lines of symmetry)	1 1	Mark intention. If more than one hexagon, mark the worst, complete, hexagon  If 0 then **SC1** for any intended regular hexagon	Vertices within or on circles of overlay Ignore shading in this part
		(ii)	Any correct shading giving 2 lines of symmetry	2FT	Follow through *their* drawing from (i) Condone poor shading, mark intention  **B1** Any other reflection symmetry shading	Even if not a hexagon or more than one hexagons. If multiple hexagons, or other, and the portion of the drawing that the candidate intends is not clear, mark symmetry for the whole drawing. Ignore side extensions to a single hexagon, as may be used to find angles in (iii) Do not accept rotational symmetry or sole hexagon completely shaded
		(iii)	720	2	Mark final answer first **M1** for 60 × 12 or 120 seen	Candidates may achieve 720 in working but give final answer 120. This scores **M1**

Question			Answer	Marks	Part Marks and Guidance	
	(b)	(i)	Any **quadrilateral** with **8** equilateral triangles clearly indicated	2	Mark intention and condone wrong size triangles Tiles may be cut to form a rectangle **B1** for any quadrilateral drawn	If multiple drawings shown and the chosen answer is not clear, mark the worst
		(ii)	Correct name	1FT	Follow through *their* **quadrilateral** Condone parallelogram for rhombus	If multiple drawings award mark for a correct name for a quadrilateral that has been drawn

Question			Answer	Marks	Guidance
8*			**Triangle/Paul** Complete **general** argument using geometric terms accurately showing Paul is wrong as: • Obtuse angle > 90 • Two obtuse angles total > 180 or You can **only** have one obtuse angle in a triangle • Angles in triangle = 180 **And** **Quadrilateral/Adile** Complete **general** argument using geometric terms accurately showing Adile is right as: • Obtuse angle < 180 • Two obtuse angles total less than 360 • Angles in a quadrilateral = 360	5-4	As 5 marks but with poor use of terms, spelling or grammar or missing steps in argument **or** One correct general **and** one correct specific case **or** **Two** conclusions, each based on a correct specific example such as Paul 95 + 95 = 190 exceeds 180, the sum of the angles in a triangle, **and** Adile 100 + 100 + 80 + 80 = 360 the sum for a quadrilateral. oe
			One correct general case **or** One correct specific case (See examples in 4 mark box) **or** Drawing of a quadrilateral with 2 obtuse angles indicated or 3 obtuse indicated with Adile is right oe **and** Drawing of a triangle with 1 obtuse angle indicated or Diagram showing that triangle is impossible with 2 obtuse angles with Paul is wrong oe **(Do not reward diagrams where comments contradict diagram)**	3-2	**(Do not reward diagrams where comments contradict diagram)** Drawing of a quadrilateral with 2 obtuse angles indicated or 3 obtuse indicated **or** Drawing of a triangle with 1 obtuse angle indicated **or** Diagram showing that triangle is impossible with 2 obtuse angles **or** 2 correct facts from list in 1 mark box
			A correct and relevant fact such as • Obtuse angle > 90 or obtuse angle < 180 • Two obtuse angles total more than 180 • Two obtuse angles total less than 360 • Angles in triangle = 180 • Angles in a quadrilateral = 360 • You can have one obtuse angle in a triangle • You can have up to 3 obtuse angles in a quadrilateral **or** One example, such as 95 + 95 = 190, but no conclusion	1-0	No relevant working **or** Any explanation based on number or length of sides or number of angles **or** A drawing with angles marked but no marking to show acute, obtuse or angle sizes or where comments contradict diagram

Question			Answer	Marks	Guidance	
9	(a)		$0.\dot{1}$	1	Accept description of dot over first 1 or r following 1	Condone $0.(1\ldots.)1^{r}$ and $0.11\ldots.1\dot{1}$ or two dots used over different 1s
	(b)		$0.8\dot{3}$	3	**M1** for attempted $6\overline{)5.0}$ **A1** for 0.83[33…] **A1** for $0.8[3\ldots]\dot{3}$	At least as far as [0.]8 after writing 5 ÷ 6
	(c)		$\frac{1}{4}$ or $\frac{1}{5}$ or $\frac{1}{8}$	1	Any correct fraction between $\frac{1}{9}$ and $\frac{1}{3}$	Ignore any decimals
10	(a)		3 points correctly plotted	2	**B1** for 1 point correctly plotted	Set "fit to height" Centre of the points should lie within or just touching the circles on the overlay – if in doubt give bod
	(b)		Line of best fit drawn	1	Straight line wholly within or touching tramlines and extending to both verticals of overlay	May cross tramlines beyond given verticals; purple anchored on (2, 10000)
	(c)		Positive	1	Ignore other adjectives eg weak	Not a description of higher engine size, higher price
	(d)		Any value in range 15 500 – 21 000	1	Condone a 3dp decimal eg 18.000	Not 18.0(0)
	(e)		Point furthest above *their* line of best fit	1FT	Correct (2, 29 945) or FT *their* line of best fit	

Question			Answer	Marks	Guidance	
11	(a)		Correct ruled line from $x = {}^{-}2$ to $x = 3$	3	**M2** for 2 correct points plotted (implied by correct but short line) Or **M1** for 2 correct points calculated or ruled line passing through (0, 4) or ruled line with gradient ${}^{-}2$	Overlay is guide only, the points must be plotted within ± ½ small square of correct place x: ${}^{-}2$, ${}^{-}1$, 0, 1, 2, 3 y: 8, 6, 4, 2, 0, ${}^{-}2$ Ignore extra lines
	(b)		Correct ruled line ($y = 3$) $x = \frac{1}{2}$ oe $y = 3$	1 1FT 1	Apply choice if more than one horizontal line, unless $y = 3$ is used or indicated Correct answer or FT *their* two straight lines (± ½ square) **SC1** for correct answers reversed	Any length, not a point

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