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GCSE

Mathematics A

General Certificate of Secondary Education

Unit **A501/01:** Mathematics A (Foundation Tier)

Mark Scheme for January 2012

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 <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 awarded for a correct final answer or a correct intermediate stage.
   SC marks are for <u>special cases</u> 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 <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.

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		Guidance
1	(a)		59 900	1		
	(b)		36 556	2	**M1** for 59 876 – 23 320	Condone 23 320 – 59 876
	(c)		25 280	1		
	(d)		Thirty[-]three thousand [and] fourteen	1		Condone poor spelling if meaning is clear
2	(a)	(i)	8	1		
		(ii)	5	1		
		(iii)	1 ¼ symbols drawn in Irises row	1		Quarter symbol must look square
	(b)	(i)	19	3	nfww **M1** for adding at least 6 terms soi by 133 **M1** for sum of at least 3 terms ÷ 7 **M2** is implied by answer of 115	Independent 115 comes from forgetting to press = before ÷ 7
		(ii)	22	1		
3	(a)		Triangle containing 10 <u>dots</u>	1	Right way up	Ignore position on grid Ignore lines
	(b)		28	1	May be seen in explanation if space is blank	
			Description of the triangle numbers	1	eg 'add 5 then 6 then 7 etc' No incorrect statements	A diagram or description of the shape is not sufficient See appendix for examples

Question			Answer	Marks	Guidance	
4			<table><tr><td>39</td><td>39</td></tr><tr><td>59</td><td>59</td></tr><tr><td>29</td><td>58 or FT</td></tr><tr><td>11</td><td>22 or FT</td></tr><tr><td>27</td><td>27</td></tr><tr><td>Total</td><td>205</td></tr></table>	4	**M2** for price of item column all correct Or **M1** for 3 or 4 correct **M1** FT for price of order column at least 4 correct **B1** for 205	Ignore units i.e. condone one error
5	(a)		2.7 to 2.9	2	Mark final answer Accept 2m 70<u>cm</u> to 2m 90<u>cm</u> **M1** for 5.5 to 5.7 seen or for figs 27 to 29 Or **SC1** for 2.1 to 2.3 (the width) as answer	May be on diagram if answer space blank **M1** or **SC1** may be seen on diagram or in working
	(b)		Bed 4 squares by 1.8 squares and ruled Desk 3 squares by 1 square and ruled Bed and desk in suitable positions	4	Accept 1.5 < x < 2 for 1.8 Desk correct by eye **B3** for bed and desk of correct size and ruled Or **B2** for any 3 correct ruled dimensions And **B1** for suitable positions, can be freehand	"Suitable positions" means • must not overlap where door opens • must have access to all of a long side of desk • must be in the room
6	(a)		47	1		
	(b)		103	3	nfww **M1** for at least two of 160, 91 and 148 And **B1** for 251	Values may be ringed in table, but **not** 103 alone

Question			Answer	Marks	Guidance	
7			360	4	Mark final answer nfww **B3** for 0.36 as final answer Or **M1** for 16 × figs 8 or 128 or 4 × figs 20 or for figs 208 And **B1** for 568 [ml] or 0.128 or 0.08 or 0.208 or 0.36 And **M1** for 568 − *their* (128 + 80) or for 0.568 − *their* (0.128 + 0.08[0]) After 0, **SC1** for 540 or 0.54[0] as answer	This M1 is dep on first M1
8	(a)		C within tolerance of correct position and triangle completed Correct compass arcs	1 1	Tolerance 2 mm on each line	Use overlay NB be on alert for spurious arcs drawn after guesswork/trial and improvement methods
	(b)		*Their* angle B ± 2°	1	Strict FT (correct angle is 69 to 73)	Allow FT if AC not completed
9			870 912 to 964 224	4	**M1** for reasonable conversion of 9 months to days soi by 270 to 279 or by 252 **M1** for 1 day = 24 × 60 × 60 [= 86400] secs soi **M1** for value ÷ 25	Accept eg ¾ × 365, ¾ × 52 × 7, 9 × 30 or 31 and condone 9 × 4 × 7 Multiplications can be seen in separate parts of the calculation 3456 implies last 2 M marks 144 or 2.4 implies last M1 Last M1 lost by × 25 seen

Question			Answer	Marks	Guidance	
10	(a)		Correct conversions, both the same way	M2	Eg price per can figs (25 and 23 to 24) cans per £ (4 and 4.21...) **M1** for one of these, but **not** 2.50 or 250	Allow alternative sensible strategies eg 10 for £2.50 would mean 12 for £3 and 12 for £2.85
			2 for 1 offer on 6 pack clearly identified	A1	Dep. on M2	
	(b)		Eg wants to share between 10 people; 12 heavier to carry;	1	Allow any sensible reason based on - money - health - transportation - quantity - quality	Ignore non-contradictory extra statements
11	(a)		5a	1	Accept 5A	Not a5, 5 × a, etc.
	(b)		3$y(7 - y)$ isw	2	**M1** for 3y(....) or for 3(7$y - y^2$) or for $y(21 - 3y)$	Condone omission of final bracket
12			2.31 as final answer	2	**B1** for other rot versions of 2.30596... to at least 1 dp or for figs 231 Or **SC1** for 17.54 or 223.28 or 203.18	
13			Cost: 11.20 and profit 16.80	3	**B2** for reversed answers or for one correct or for both correctly placed but with missing zeros After **B0,** then **M1** for 28 ÷ 5 or 5.6 or 11.2[0] or 16.8[0] seen	

Question			Answer	Marks	Guidance	
14			3.2(.....)	3	nfww **M1** for 2.57^2 + 1.93^2 or 10.3(298) **M1** for $\sqrt{2.57^2 \pm 1.93^2}$ oe	Or 6.6049 + 3.7249 Or **M2** for equivalent complete method using trig (condone poor notation) 3.2 from scale drawing scores 0
15	(a)		Correct expansion of brackets to 6x − 3 [=6]	M1	Need not be in equation, but if in eqn, rhs must be correct; or **M1** for correct division to 2x − 1 = 2	
			6x = 9 or 6x − 9 = 0 or FT	M1	For correct collection of terms, FT	
			$x = \dfrac{9}{6}$ or $\dfrac{3}{2}$ or 1.5 oe or FT	M1	isw for wrong conversion or embedded answer after acceptable answer seen FT *their ax* = *b* or *their ax* + *b* = 0 for *a* ≠ 1 or 0, *b* ≠ 0 Allow **B3** for $\dfrac{9}{6}$ or $\dfrac{3}{2}$ or 1.5 oe as answer nfww Or **SC2** for embedded answer eg 6 × 1.5 − 3 = 6	If their error leads to possible rounding, FT only for answer correctly rounded to 1 dp or rot to 2 dp or more Flow diagram: Allow **M2** for complete, correct, reversed flow diagram from start Or **M1** for 6x − 3 = 6 and **M1** for complete, correct, reversed flow diagram from that stage
	(b)	(i)	25.28	1	Allow $\dfrac{632}{25}$ oe	
		(ii)	53	1		

APPENDIX 1

Exemplar responses for question 3(b)

Response	Mark awarded
You add on one **more** to each row	1
You add on one **more** dot each time	1
Each time you add one dot to how many you add each time	1
Because you are adding on one **more** number in the sequence	1
Add another layer like 4, 5, 6, 7 dots a time	1
Because you add on one dot to each line on each pattern	1
You add on the pattern number to the bottom line	1
Whatever pattern number it is you add it to the sequence	1
Bottom row of the triangle goes up by one each time	1
You are adding one to the next row every time	1
It adds on one every time	0
All you do is go up by one	0
However many there are in the dots there is one more in the sequence	0
Adds 1 on each time 1, 2, 3, 4	0
The rule is to plus 1 on to the number of dots on every pattern	0
Pattern adds on a row each time	0
For each pattern you must expand it by one dot each side	0
You add on the number of dots in a pattern	0
I drew the dots under pattern 4 so I could count them	0
From pattern 6 you add on 7 dots	0
7 × 4 = 28 and I think that is the answer	0
I counted up till I got pattern 7 and got 28	0
In pattern 5 there would be 15 and in pattern 6 there would be 21 so the next would have 28	0
The same number of the pattern has the same number of dots on the side, just fill in the middle	0
The sequence has to look like a triangle	0
Each pattern goes up in the 3 times table	0

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