GCSE

Mathematics A

General Certificate of Secondary Education

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

Mark Scheme for November 2013

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 for a correct final answer, a partially correct 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 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 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.   In questions with a final answer line:

   (i) If one answer is provided on the answer line, mark the method that leads to that answer.

   (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

   (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9.   In questions with no final answer line:

   (i) If a single response is provided, mark as usual.

   (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10.   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.

11. 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.

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

13. 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.

14. 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)		[£]1.01	2	**B2** condone 101p or 1.01p as answer Or **M1** for 1p or £1 seen or 101 as answer	
	(b)		Two from | **5**	**3**	**2**	**1.50**	**1**	**50p** | | **GB** | **P** | **SB** | **T** | **R** | **LG** | | ✓ | ✓ | | | | | | ✓ | | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ |	2	Accept as colours **B1** for one correct way to make £8 without repeats	Condone missing 0s on 0.50 etc 5 and 3 is NOT DIFFERENT to 3 and 5
	(c)		8	2	Condone £[0].08 as answer for **B2** Or **M1** for 2 + 2 × 20 + 50 soi Or **SC1** for answer of 28	soi by 92
2	(a)		(7, 2)	1		
	(b)		50	1		
	(c)		ABCD drawn	1	Mark intention, accept freehand	D at (7, 5)
3	(a)		Semicircles	1		
	(b)		4	1	Condone 400 cm	
	(c)		$C = 3d$	2	Condone $C = 3 \times d$ **B1** for $3 \times d$ only or $3d$ only Or **SC1** for $C = 24$ [m] or πd	Accept equivalent forms eg $d \times 3 = C$ or $C = d \times 3$ $C \times \pi \times d$ oe scores **0** marks

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Question			Answer	Marks	Part Marks and Guidance	
4	**(a)**		25, 30, 31, 36	4	**M3** for all correct values seen Or **M2** for three correct values seen Or **M1** for two correct values seen Or **SC1** for correct order of *their* four values	$\frac{1}{4}$ of 100, 20×1.5, 10% of 310, 6^2 $\frac{1}{4}$ of 100 = 25 $20 \times 1.5 = 30$ 10% of 310 = 31 $6^2 = 36$

Question	Answer	Marks	Part Marks and Guidance	
(b)	Correct working including • Maths and Science identified **and** • correct conversions to a form allowing comparisons **and** • correct reference to improvement in both subjects	4	May be an intended fraction such as (total =) 50 and (score =) 27.5 Accept "Kieran [is] correct" 5% in Maths and 2% in Science	Performance 		Maths	Science	 	---	---	---	 	New	60%	72%	 	Old	55%	70%	
	Two pairs (Maths and Science) correctly converted each to comparable form **and** • unclear or no conclusion drawn or • no improvement oe **Or** attempt (using correct explicit method) to convert two pairs (Maths and Science) each to comparable form **and** correctly interpret *their* converted results	3 – 2	One pair (Maths or Science) correctly converted to comparable form **Or** attempt (using correct explicit method) to convert two pairs (Maths and Science) each to comparable form **and** incorrectly interpret *their* converted results			Maths	Science	 	---	---	---	 	New	0.6	0.72	 	Old	0.55	0.7	
	Change one score (fraction) correctly to any different form	1 – 0	No scores correctly converted or no correct evidence			Maths	Science	 |---|---|---| | New	$\frac{60}{100}$	$\frac{36}{50}$ or $\frac{72}{100}$	 | Old	$\frac{55}{100}$	$\frac{35}{50}$ or $\frac{70}{100}$	 Condone "false" fractions that allow correct comparison eg |	Maths	Science	 |---|---|---| | New	$\frac{30}{50}$	$\frac{18}{25}$	 | Old	$\frac{27.5}{50}$	$\frac{17.5}{25}$	

Question			Answer	Marks	Part Marks and Guidance	
5	**(a)**		Valid and explicit approximation method	M1		
			At least 1 value rounded to 1sf	M1		Expect 3 or 60
			170 to 190	A1	If **0** scored, allow **SC1** for 170 to 190	Condone poor money notation Exact answer 176.9p $\approx$ 177p Expect £1.80 or £1.83
	(b)	**(i)**	10[.00]	1		Condone 10.0
		(ii)*	5000 ÷ 200 oe and 25 **Or** 30 × 200 oe and 6000 or 6 kg **Or** 5 [potatoes per kilogram] oe and 25 **Or** 5000 ÷ 30 and 166[.6..] **And** Clearly states that 30 cannot be guaranteed oe	3	Condone "At least 5 potatoes..." Accept "No"	oe = for each kilogram or in each kilogram
			5000 ÷ 200 oe **Or** 30 × 200 oe **Or** 5 [potatoes per kilogram] oe **Or** 5000 ÷ 30 oe **And** Correctly interprets *their* result	2 – 1	5000 ÷ (125 to 200) oe **Or** 30 × (125 to 200) oe **Or** 5 to 8 [potatoes per kilogram] oe **Or** 5000 ÷ 30 oe **Or** 40 seen	
			No relevant working or unsupported statement	0		
	(c)		120 or 121 or 122	2	**B1** for 360, 363 or 366 soi If **0** scored, allow **SC1** for 365 ÷ 3 soi	soi eg by 300 then 60 in two calculations

Bag table:

	Bag
Maximum number	40
Minimum number	25

Question			Answer	Marks	Part Marks and Guidance	
	(d)	**(i)**	8 and 8 or 2 and 188	1	Ignore other correct pair	One right pair and one or two wrong score **0** marks
		(ii)	More in family, more [potatoes] eaten oe	1		More family more weight
		(iii)	Positive	1	Ignore qualifiers eg weak or strong with positive	**0** for weak or strong only
6	**(a)**	**(i)**	6	1		
		(ii)	 [The] sides [are all the] same length oe or [the] angles [are all the] same size oe or six lines of symmetry or rotation symmetry [order] 6 or 3 sets [of] parallel sides	2	Each correct statement for **1** mark, maximum 2 Mark the best statement(s) Do not accept **corners** for **angles** Each interior angle [is] 120$^{[\circ]}$ or each exterior angle [is] 60$^{[\circ]}$ Condone opposite sides parallel If **0** scored, allow **SC1** for "It's symmetrical" oe	Ignore superfluous, correct, information such as six sides or specific length measurements. Accept "All" for "Each" Accept "Size" for "Length" Both can score if seen together If only "angles" mentioned assume interior unless one statement qualifies angles (int/ext). Then do not **also** award "All angles are the same" eg All exterior angles = 60 ✓ All angles are the same ×

Question			Answer	Marks	Part Marks and Guidance	
	(b)		120	2	If no response, award if unambiguously seen in previous answer **M1** for 180 – 60 isw	**0** for wrong answer here but correct in previous answer
	(c)		Greater than and mention of 90 **and** 60	1 1		
7	**(a)**		$x \geq 27$	1	Condone $x > 27$	
	(b)		$x < 8$	1	Condone $x \leq 8$	
	(c)		6	2	**M1** for $x > 4.6 + 1$ or better or for one correct substitution of an integer in LHS and evaluation eg 8 – 1 = 7 Or **B1** for 5.6 seen	
8	**(a)**		Correct reflection (⁻1, 3), (⁻3, 4), (⁻3, 1)	2	**B1** for reflection in $x = 0$	Use overlay
	(b)		Correct rotation (1, 1), (3, 1), (3, 4)	2	**B1** for rotation 90° or wrong centre	
	(c)		Correct translation (4, 2), (⁻1, 1), (⁻3, 4)	2	**B1** for translation 7 right or 3 up	Use overlay
9	**(a)**		6 correct points plotted	2	**B1** for at least 3 correct	Tolerance 2 mm Ignore any connecting lines

Question			Answer	Marks	Part Marks and Guidance	
	(b)		Correct response 1	1	Allow **1** for each distinct comment to a maximum of 2	Picking out individual points scores **0** eg '88 ice creams were sold on Sat week 1'
			Correct response 2	1	Thurs sales generally increasing Sat sales usually more than Thurs Sat sales fall then rise From week 5 the trend in sales is upwards Sat week 4 very low or anomaly oe As the amount of weeks increase the difference between sales decreases	Inverse statements credited only once eg Sat good then Thurs not so good
10	(a)		6 4 1	2	**B1** for one correct value	
	(b)		Correct ruled graph	2	**M1** for 2 of *their* points correctly plotted or for correct line any length	Graph from 0 to 6 for **2**
	(c)		⁻0.8 to ⁻0.5	2FT	**M1** for use of $\frac{\Delta y}{\Delta x}$ soi or rearranging to $y = mx + c$ or 0.5 to 0.8 Or **SC1** for ⁻2 to ⁻1.25	$\frac{-2}{3}$, $\frac{2}{-3}$, $\frac{-4}{6}$, $\frac{4}{-6}$ all score **2** If *their* line is incorrect and has negative gradient, allow **M1A1FT** for correct gradient of *their* line found (± 15%) or **M1** for the absolute value of its gradient. If *their* line has $m > 0$ then max **M1**

APPENDIX 1

Question 9(b) exemplars
Comments should apply to the whole data set.
General comments should say 'usually' or 'generally' if they are not always true.

He usually sells more on Saturdays	1	
The no. sold on a Sat decrease then start to increase	1	
After about 6 weeks he sells more on average	1	
Week 1 had the biggest range of sales	1	
The data becomes more consistent at the end	1	
It keeps going up and down	0	Not always
She doesn't sell much on Thurs	0	Compared to what?
The number sold on Thurs always increases	0	Not always
He sells more on Saturdays	0	Not always
He sells more on Sat week 1 than Sun week 1	0	Doesn't apply to all the data (and not Sunday)
As the weeks went on he sold more and more each week	0	Not true
He is **starting** to sell more ice creams	0	When?
There is an anomaly in his data on Week 4	1	
It's fluctuating each Sat & Thurs except Week 4	1	
On Thurs week 4 more sold than on Sat	1	
There is a positive correlation	0	Irrelevant

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