OCR
Oxford Cambridge and RSA

GCSE

Mathematics A

Unit **A503/01:** Unit C (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2015

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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.

1. 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 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, i.e. 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, e.g. 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 e.g. 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 e.g. 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 (i.e. **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)		6	**1**		
	(b)		4.5[0] and 3[.00]	**3FT**	4.5 and FT *their* (a) × 0.5 **M2** for 4.5[0] **or** 3[.00] FT or for 450 **and** 300 FT *their* (a) × 50 seen in working **Or M1** for answer with figs 45 **or** figs 3[00] FT *their* (a)	Accept in either order
2	(a)		C	**1**		
	(b)		B	**1**		
	(c)		A	**1**		
	(d)		E	**1**		
3	(a)		(2, 1)	**1**		
	(b)		Plot at (-4, 0)	**1**		Mark intention
	(c)		270°	**1**	Accept 267° to 273°	
4	(a)		17.2	**2**	**B1** for 17.15 to 17.16 or $\frac{4289}{250}$	
	(b)		16	**2**	**B1** for 16.2 to 16.3 or $\frac{70\sqrt{74}}{37}$	

Question			Answer	Marks	Part Marks and Guidance	
5	(a)	(i)	6.7	**1**		
		(ii)	7050	**1**		
		(iii)	[0].47 [p]	**1**		
		(iv)	6440 millilitres or 6.44[0] litres or 6 litres and 440 ml	**2**	**B1** for 6440 or 6.44[0] without units or with wrong units	Accept ml, mils, *l* for units
	(b)		10000 cm, 110m, 1 km, 1 mile	**2**	**B1** for 3 correctly ordered	Accept equivalents, condone omission of units, transcription slips if order is clear
6	(a)		5.2 oe	**1**	Accept 26/5 isw	Accept embedded answers in (a), (b) and (c)
	(b)		96	**1**		
	(c)		11	**2**	**M1** for $3x = 29 + 4$ or $x - \frac{4}{3} = \frac{29}{3}$	
7	(a)	(i)	68	**1**		
		(ii)	820	**1**		
		(iii)	-5.25 or -5¼	**1**		
	(b)	(i)	8	**1**		
		(ii)	-11	**1**		
8			7.74 [p]	**2**	**M1** for 12.04 ÷ 14 × 9 oe **Or B1** for [1 bottle] = 86[p] oe seen	

Question			Answer	Marks	Part Marks and Guidance	
9	(a)		Unlikely Certain Likely Evens	**4**	**B1** for each correct	
	(b)		[Red] 9 or 9 [Orange] 2 1 [Blue] 2 1 [Green] 5 7	**3**	**B1** for Red = 9 **and B1** for more green than blue or for orange = blue	
10	(a)	(i)	220	**1**		
		(ii)	12p	**2**	**M1** for (*their*220 – 100) ÷ 1000 oe or clear correct attempt to find gradient of line After 0 scored **SC1** for answer 22[p] or 15[.3.][p] or 17[p]	0.12 implies M1
	(b)	(i)	240, 280, 320	**2**	**B1** for 2 correct	
		(ii)	Plots (0, 200), (1000, 240), (2000, 280) and (3000, 320) and joins with a ruled line	**2**	**B1FT** for 3 or 4 correct plots FT *their* table	Use template Accuracy ½ small square on FT plots
	(c)		Power4less by 100	**2FT**	FT *their* graph readings at 2500 **B1** for 100FT *their* readings	Accept Power4less by 90 to 110 Accuracy ±10 from *their* difference on graph
11			Shows one correct trial and outcome Shows an improved correct trial and outcome or 33 × 37 = 1221 37	**B1** **B1** **B1**	Accept correct divisions of 1221 by 10 or greater as trials, with answers rot to 1 dp	See Appendix for list Ignore incorrect trials

Question			Answer	Marks	Part Marks and Guidance	
12	(a)	(i)	20*a*	**1**		Not for 20 × *a* or *a*20 etc
		(ii)	5	**1**		
		(iii)	$x + 4y$ final answer	**2**	Condone 1*x* used **B1** for [1]$x + ky$ or $kx + 4y$ ($k \neq 0$) as answer Or for correct answer shown then spoilt	
	(b)		250	**1**		
13	(a)	(i)	62.4	**2**	**M1** for 12 × 5.2	12 × 5.2 + 5.2 score M0
		(ii)	37	**1**		
	(b)	(i)	67.5	**2**	**M1** for ½ ×18 × 7.5 oe	
		(ii)	6750	**1FT**	**FT** *their* (b)(i) × 100	
14	(a)		2325	**4**	**B3** for 17025 **Or M2** for 2999 + 4673 + 47 × 199 soi **Or M1** for 47 × 199 [9353] or 12352 or 14026 or 4673 + 2999 [7672] seen	Condone M1 for 47 × 199 × 12 soi by 112236
	(b)		671.58 to 672	**3**	**M2** for 8000 ÷ 15 × 1.26 oe **Or M1** for 8000 ÷ 15 [533. [3..]] or for [1 mile costs [£]0.084 or 8.4p	

Question			Answer	Marks	Answer
15*			Fully correct answer of 280 showing the divisions of 95 ÷ 19, 54 ÷ 13.5 and 17 ÷ 1.2 and 5 [×] 4 [×] 14. (For divisions throughout accept 19 × 5 = 95, 13.5 × 4 = 54 and 1.2 × 14 = 16.8 or better)	**5**	No need for a proof that this is the maximum by trying other combinations
			Gives answer 280 from limited correct working OR Correct method with division steps shown but with incorrect/no rounding e.g. 5 × 4 × 15 = 300 or 5 × 4 × 85/6 oe = 283 to 284	**4-3**	Uses false volume method and shows working i.e. 95 × 54 × 17 = 87210 then 19 × 13.5 × 1.2 = 307.8 then divides to get 283 to 284 OR gives answer 280 from no working or 3 correct divisions shown but then wrong method
			2 correct divisions soi OR 95 × 54 × 17 soi [87210] **and** 19 × 13.5 × 1.2 soi [307.8]	**2-1**	95 × 54 × 17 soi [87210] **or** 19 × 13.5 × 1.2 soi [307.8] OR 1 correct division soi
			No worthy work	**0**	

Question			Answer	Marks	Part Marks and Guidance	
16	(a)		1.40[p]	**3**	**B1** for 7.34 seen **And B1** for 4.68 or 2.66 seen	Answer 1.4 implies B1B1
	(b)		173 or 174	**3**	**B2** for answer 173.4 to 173.5 **Or M1** for 0.83 × 209 oe soi	Condone For M1 0.17 × 209 oe soi
17	(a)		e.g. - No, there could be another colour - No, he has not seen all the counters - No, he may have picked the same counter/colour multiple times	**1**		Condone e.g. - Yes, large number of (or 2000) trials - Yes, would have picked another colour by now - Yes, 2000 trials and only got red, blue and yellow See appendix for exemplar comments
	(b)	(i)	0.3265 0.2545 0.419 rot to at least 2dp	**2**	**B1** for one of these values rot to 1 dp or better oe	
		(ii)	e.g. - Large number of trials oe	**1**		Ignore other comments Condone: - Done it enough times oe - Done it 2000 times oe
		(iii)	0.581[0] or 0.58 oe	**2**	**M1** for *their* (0.3265 + 0.2545) or for 1 – *their* (0.419)	
		(iv)	10	**2**	**M1** for 24 × *their* (0.419) soi	For M1, if no working, check back – condone rounding up or down
18	(a)		7×2 + 3×1 soi OR 6×2 + 5×1 soi OR 7×5 − 3×6 soi	**2**	**M1** for **any one** of 7×2, 3×1, 6×2, 5×1, 7×5, 3×6 soi	

Question			Answer	Marks	Part Marks and Guidance	
	(b)		130	**3**	**M2** for 17; 17; 4×1; 4×2; 4×3; 4×5; 4×6; 4×7 oe soi with at most one incorrect, one extra or one missing **Or M1** for **any five** of these sides soi	M2 for 17×2; 5×4×2; 7×4×2 Or M1 for **any two** of these
19	(a)		$\frac{1}{40}$	**2**	**B1** for $\frac{25}{1000}$ or $\frac{5}{200}$ or $\frac{0.025}{1}$ or $\frac{1}{40}$ seen	
	(b)		9	**4**	**B3** for 9.1 to 9.2 oe **Or M2** for 13 ÷ ($\frac{2}{3}$ + $\frac{3}{4}$) soi **Or M1** for $\frac{2}{3}$ + $\frac{3}{4}$ soi	OR Using daily totals **B3** for $1\frac{5}{12}$ $2\frac{10}{12}$ $4\frac{3}{12}$ $5\frac{8}{12}$ $7\frac{1}{12}$ $8\frac{6}{12}$ $9\frac{11}{12}$ $11\frac{4}{12}$ $12\frac{9}{12}$ oe **Or B2** for $1\frac{5}{12}$ $2\frac{10}{12}$ $4\frac{3}{12}$ oe **Or B1** for $1\frac{5}{12}$ oe For B1,B2,B3 rot correct to 1dp OR after zero scored **SC2** for [Tibbs] [9 days] $6\frac{3}{4}$ tins oe **And** [Fluff][9 days] 6 tins oe

APPENDIX 1

List of values for trials in question 11

Trial		Outcome
11	15	165
12	16	192
13	17	221
14	18	252
15	19	285
16	20	320
17	21	357
18	22	396
19	23	437
20	24	480
21	25	525
22	26	572
23	27	621
24	28	672
25	29	725
26	30	780
27	31	837
28	32	896
29	33	957
30	34	1020
31	35	1085
32	36	1152
33	37	1221
34	38	1292
35	39	1365
36	40	1440
37	41	1517
38	42	1596
39	43	1677

Exemplar responses for question 17(a)

Response	Mark awarded
No – there could be different colours at the bottom of the bag	1
No – he could have picked up the same counter multiple times	1
No – there could be a chance of other colours	1
No – there may be one or two of another colour	1
No – every time he picks a counter he puts it back in – he could be choosing the same one over and over	1
No – although he does this 2000 times, he may have picked up one more than once	1
No – he replaces each counter so he has not seen all of the counters	BOD1
No – he is picking at random	0
No – he put the counters back in the bag	0
No – because it's down to chance	0
No – you can't see in the bag	0
No – we don't know how many counters are in the bag – there could be 10000	0
Yes – he did not get any others in a test of 2000 counters	1
Yes – he would not have done it 2000 times without realising there was more than 3 colours	1
Yes – he performed the test 2000 times so the data would be correct	1
Yes – he has counted up all the colours and they add to 2000	0
Yes – the number of times he did it add up to 2000	0

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