OCR
Oxford Cambridge and RSA

GCSE

Mathematics A

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

General Certificate of Secondary Education

Mark Scheme for June 2016

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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.

SUBJECT-SPECIFIC MARKING INSTRUCTIONS

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.

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 not 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 $300 - \sqrt{their\ '5^2 + 7^2'}$. Answers to part questions which are being followed through are indicated by eg FT 3 × *their* (a). For questions with FT you must ensure that you refer back to the relevant previous answer. You may find it easier to mark follow through 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.

   i.   **cao** means **correct answer only.**
   ii.   **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.
   iii.   **isw** means **ignore subsequent working** (after correct answer obtained).
   iv.   **nfww** means **not from wrong working.**
   v.   **oe** means **or equivalent.**
   vi.   **rot** means **rounded or truncated.**

vii.   **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.

viii.   **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'. If the answer is missing, but the correct answer is seen in the body allow full marks. If the correct answer is seen in 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.

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.

A503/01 Mark Scheme June 2016

MARK SCHEME

Question			Answer	Marks	Part Marks and Guidance	
1			Likely Unlikely Impossible	3	**B1** for each	In this order
2	(a)		22 × 35 = 770 or 35 × 22 = 770	1		
	(b)	(i)	83.05	1		Accept 83.1 after 83.05 seen
		(ii)	$\dfrac{1}{12}$ cao	1		Do not accept equivalents
		(iii)	2.7 cao	2	**B1** for 2.69[...] or 2.70 or $\dfrac{520}{193}$ After 0 scored **SC1** for answer 1.7	
3	(a)		(−3, −4)	1		
	(b)	(i)	Point marked at anything directly south of (1, −4)	2	**B1** for point marked at (1, y) where −4 ≤ y < 0	Allow non-integer points If no point marked allow feedback marks from their coordinates in part (b)(ii). Mark intention if F used only and no 'dot'
		(ii)	Coordinates written for their marked point	**1FT**	If no point marked then allow mark for (1, y) for y < −4	

	Question		Answer	Marks	Part Marks and Guidance	
4	(a)	(i)	Correct cube	2	**B1** for 3 additional correct lines added to drawing	2mm acc Condone dotted or fainter hidden edges shown for 2 marks
		(ii)	answer should be 27 or explains clearly the error in the calculation oe units should be cm³ oe	1 1		See appendix 1
	(b)		6 8 12	3	**B1** for each	
5	(a)	(i)	–4	1		
		(ii)	33	1		Condone £0.33
	(b)		–7 and 11	2	**B1** for a pos and neg value with a sum of 4 or a difference of 18	
6	(a)	(i)	2650	1		
		(ii)	[0].53[0]	1		
	(b)		13 and 50	3	**B2** for 13 with remainder less than 150 or no remainder or 13. …. Or **M1** for 2000 or [0].15[0] seen	
7	(a)	(i)	F	1		
		(ii)	E	1		
		(iii)	B	1		

Question			Answer	Marks	Part Marks and Guidance	
	(b)		No orange and total = 60 and red = blue where 10 ≤ red ≤ 16	3	**B1** for number of red = number of blue where 10 ≤ red ≤ 16 And **B1** for no orange	e.g. 3 for Red 16 Blue 16 Green 28 2 for Green 26 Blue 10 Red 10 1 for Green 30, Orange 2, Red 12, Blue 12
8	(a)	(i)	18b	1	Mark final answer	In part (a), penalise first occurrence of poor notation e.g. 18×b, b18 etc
		(ii)	8x	1	Mark final answer	
		(iii)	4m^2	1	Mark final answer	
		(iv)	9y	1	Mark final answer	
	(b)	(i)	36	1		Throughout (b), accept answers embedded in original equation
		(ii)	3.5 oe	1		
		(iii)	−4	2	**M1** for 7x = −23 − 5 or 23 + 5 = − 7x or better	
9	(a)	(i)	4	1		
		(ii)	10.2 to 10.7	1		
	(b)		2 2 4	3	**B1** for each	
	(c)		Size of angles	1	Accept both have a right angle	Condone 'angles' Not 'same shape'
10			4 [h] 29 [min]	2	**M1** for 4 hrs k mins (0 < k < 60) or for p hrs 29 mins ((0 < p < 6)	

Question			Answer	Marks	Part Marks and Guidance	
11			5	3	**M2** for $\sqrt{\dfrac{200}{8}}$ or **M1** for 200 ÷ 8 oe	soi by 25
12	(a)		48	1		
	(b)		12x – 4	1	Mark final answer	
13			42.38 or 42.39	5	**B4** for answer 42.388......... or answer 42.4[0] or 42 Or **M3** for (720 × 1.19 – 800) ÷ 1.34 isw Or **M2** for 720 × 1.19 – 800 isw Or **M1** for 720 × 1.19 or a division by 1.34 soi	soi by 56.8[0] soi by 856.8[0]oe
14	(a)		12.5	3	**M2** for 63 ÷ 1.12 ÷ 4.5 oe Or **M1** for 63 ÷ 1.12 or 1.12 × 4.5 or for division by 4.5 soi	soi by 56.25 or 5.04
	(b)	(i)	8.00 to 8.30 Uneven line oe or speed not constant oe	1 1	 Indep	 Must refer to the uneven line or speed not constant oe in some way isw incorrect statements
		(ii)	31	1		
		(iii)	30	1		
	(c)		Any line starting at (0930, 40) and finishing at (10.36, 0)	2	**B1** for any line starting at (0930, 40) and finishing at (k, 0) where k > 10 30	Line can be curved, wiggly, stepped etc, but not vertical

	Question		Answer	Marks	Part Marks and Guidance	
	(d)	(i)	80 × 1.6 oe [=128] Or 128 ÷ 1.6 oe = 80	1	Accept use of 1.60[9] or 1.61	eg Accept $80 \div \dfrac{5}{8}$ oe **Not** 128 ÷ 80 = 1.6 or from using 128 ÷ 80 = 1.6
		(ii)	11 nfww	3	**B2** for 10.66.... rot to at least 3 sf Or **M1** for 128 ÷ 12 After 0 scored **SC1** for answer 7	from 80 ÷ 12 rounded to nearest integer
15	(a)		3.70	1		
	(b)		5 : 4 or 1.25 : 1 or 1 : 0.8	2	**M1** for 2.7[0] : 2.16 or better <u>After zero scored</u> **SC1** for answer 4 : 5	For M1 ignore units
16	(a)	(i)	$\dfrac{3}{8}$	2	**M1** for $\dfrac{12}{32}$ oe	
		(ii)	5 nfww	3	**M1** for 27×0.18 oe **And A1** for 4.86	
		(iii)	12	2	**M1** for $\dfrac{2}{5}$ ×30 soi	
	(b)	(i)	0.18 oe	2	**M1** for 1– (0.4 + 0.17 + 0.25) soi by answer 0.54	In (b)(i), (ii) : ignore qualifying words : ignore any conversion attempts : −1 once for poor notation e.g. $\dfrac{0.42}{1}$ ratio etc

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	0.42 oe	2	**M1** for 0.25 + 0.17 oe	
		(iii)	255	2	**M1** for 0.17×1500 oe	Ignore rounding after correct answer

Question	Answer	Mark	Answer
17*			Eg. Rectangle oe = 9×6 　　[Semi-]circle oe = ½×π×3^2 oe 　　　[Total area] = 2×(9×6) − ½×π×3^2 oe 　　　　　= 93.86 to 94 cm^2
	93.86 to 94 with commentary	**5-4**	93.86 to 94 with no/poor commentary
	2×(9×6) − ½×π×3^2 oe	**3-2**	½×π×3^2 oe **OR** 9×6 <u>and</u> π×3^2 oe
	9×6 <u>or</u> π×3^2 oe	**1-0**	No worthy work.
		AND	
	cm^2 with *their* final answer	**1**	

	Question		Answer	Marks	Part Marks and Guidance	
18	(a)		Large number of trials oe	**1**		
	(b)		$\dfrac{123}{500}$ isw or 0.246 or 24.6%	**2**	**B1** for 500 seen **Or M1** for $\dfrac{123}{their500}$	
	(c)		-Fair <u>and</u> frequencies approx. same oe - All approx. ¼ of 500 (125)	**1** **1indep**	Or -Fair <u>and</u> all probabilities approx. same oe -All approx. 0.25 oe	See appendix 2

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