

Mathematics A

General Certificate of Secondary Education

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

Mark Scheme for June 2013

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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.

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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 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, 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 $180 \times (\text{their '37' + 16})$, or FT $300 - \sqrt{(\text{their '5}^2 + 7^2)}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \text{their (a)}$.

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.
 - **nfw** 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**.

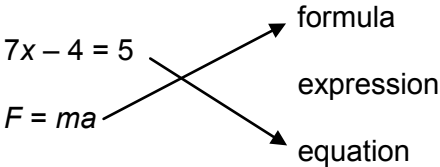
6. In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.
7. In questions with a final answer line following working space,
 - (i) if the correct answer 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			32	1		
2	(a)		(3, 4)	1		Not (3x, 4y) or $x = 3, y = 4$
	(b)		Point plotted at (1, -4)	1	Condone point not labelled	Condone no point but just letter B if it is close to the correct point
3	(a)	(i)	Kilometres or km	1		In part (a) condone spelling errors
		(ii)	Kilograms or kg	1		Accept kilos
		(iii)	Litres or l	1		
		(iv)	Metres or m	1		
	(b)	(i)	175	1		
		(ii)	102.4 oe	1		
	(c)	(i)	2 50 [pm] or 14 50 oe	1	eg 10 to 3	Condone 14 50 pm
		(ii)	80 or 1 h 20 [minutes]	1FT	Correct or FT 1610 – <i>their</i> (c)(i)	
4			340 [g], 2 [kg], 2200 [g], 2.3 [kg] oe	2	eg accept 340 [g], 2000 [g], 2200 [g], 2300 [g] B1 for 3 in correct order	
5	(a)	(i)	Evens	1		In all of (a), if probabilities given ignore if alongside correct words, otherwise penalise first occurrence
		(ii)	Impossible	1		
		(iii)	Unlikely	1		

Question			Answer	Marks	Part Marks and Guidance	
	(b)		10 10 10 10 5 5 20 1	3	B2 for any two of <ul style="list-style-type: none"> 4 tens more fives than twenties total 71 Or B1 for any one of the above	eg 10, 10, 10, 10, 20, 5, 5, 5, scores B2
6	(a)		Taxi - d because it is the steep[est] part of the graph or takes least time for distance oe Walking - a because it is the least steep part of the graph or takes more time for distance oe Bus - b because it is 2 nd steepest or has stops oe	3	B1 for each correct reason with correct choice After 0 allow SC1 for 3 correct choices with incorrect/no reasons	Ignore additional irrelevant statements alongside correct reason given but not incorrect statements Do not allow reasoning that only refers to the speed and not the graph – for d and a reasons must refer to slope or mention both <u>time</u> and <u>distance</u> See appendix for examples
	(b)		She spends time in town oe	1		Do not accept 'she is at the post office' See appendix for examples
7	(a)	(i)	8	1		
		(ii)	6	1		
	(b)		2 nd and 5 th statement ticked and no others	2	B1 for one correct and no more than one other ticked or two correct and one other ticked	Accept any indication

Question			Answer	Marks	Part Marks and Guidance	
	(c)		Right-angled triangle drawn with area 8 cm ²	2	M1 for any triangle drawn with area 8 cm ²	
8	(a)		81.8 final answer	2	M1 for 81.8..... or answer 82 or 81.9	
	(b)		5 final answer	2	M1 for 5.4[...]	
9	(a)		3	1	Accept equivalent fractions to $\frac{11}{12}$	
			$\frac{11}{12}$	1		
	(b)		$\frac{1}{10}$ final answer	2	M1 for $\frac{2}{20}$ or $\frac{1}{10}$ shown then spoiled or final answer 0.1	
	(c)		6450 6549	1 1	Condone 6550 After 0 allow SC1 for correct answers reversed	
10	(a)	(i)	D	1	Accept 0.5 oe	
		(ii)	A	1	Accept 0	
		(iii)	B	1	Accept 0.125 oe	
	(b)		5 plain and one of any other flavour	2	B1 for 7 plain packets in box so eg $\frac{7}{14}$ or for answer which includes 5 plain	

Question			Answer	Marks	Part Marks and Guidance	
11	(a)	(i)	$7p$	1		In all of part (a) do not allow poor notation eg $7 \times p$ or $p7$
		(ii)	$4ab$ or $4ba$	1		
		(iii)	p^2	1		
		(iv)	$20p$	1		
		(v)	$6b - [1]a$	2	B1 for $6b \pm$ term in a or $\pm$ term in $b - [1]a$ or for correct answer seen then spoiled	$6b + - [1]a$ gets 1 mark only For B1 , eg $-1a + 5b^2$
	(b)		8	1		Do not accept answer $x = 8$
	(c)		$7x - 4 = 5$ $F = ma$  formula expression equation	2	B1 for one correctly matched	
12			8 nfww	4	B3 for 8.2.... isw Or M2 for $970 \div (53 + 40 + 25)$ oe seen or 944 or 9.44 or 26 cm or 0.26 m seen Or M1 for figs 97 $\div$ figs 118 or figs 944 seen or for 118 or $(53 + 40 + 25)$ seen or 1.18 or $(0.53 + 0.4 + 0.25)$ or 970 seen	Allow the addition of 53, 40 and 25 to be implied by a value directly under these values in the table

Question			Answer	Marks	Part Marks and Guidance	
13	(a)		Draws 4 by 3 by 3 cuboid using isometric grid	3	<p>B2 for correct 4 by 3 by 3 cuboid drawn but with hidden edges shown as solid lines</p> <p>Or B1 for one consistent dimension error eg 4 by 3 by 2 drawn or 'correct' cuboid apart from one vertex error up to 1 cm</p>	<p>For 3 marks condone hidden edges shown as dotted lines Allow freehand if intention clear – ie just misses dot For 3 marks, B2 or B1 condone extra lines on faces drawn eg divides drawing into 1 cm^3</p> <p>For B1 condone hidden edges shown Allow part of drawing off the grid</p>
	(b)		36	2	<p>M1 for $4 \times 3 \times 3$ After 0 allow SC1 for volume of <i>their</i> cuboid with one consistent dimensional error only drawn in (a)</p>	<p>eg if 4 by 4 by 3 drawn in (a) then SC1 for 48</p>
14			128.88	5	<p>B4 for answer 827.88 or answer 128.9[0] nfw or answer 129 nfw Or M3 for $(0.12 \times 699) + (24 \times 31)$ oe Or B2 for 83.88 seen Or M1 for 0.12×699 oe or 744 seen</p>	
15	(a)		$(7 + 8 + 6.5) \times 2.7$	2	<p>Allow explanation in words with the correct values included</p> <p>B1 for $(7 + 8 + 6.5)$ shown or 21.5</p>	<p>For 2 marks accept 21.5×2.7</p> <p>Allow B1 for $7 + 8 + 6.5 \times 2.7$</p>

Question	Answer	Marks	Part Marks and Guidance	
(b)	Correct solution giving an answer of 4.3 with full supporting working showing $(7 + 7.5 + 6.5) \times 3.1 = 65.1$ and $(5 + 5.5 + 5) = 15.5$	5	Accept 4.3 obtained from trials or from division Condone omission of brackets if recovers	For 5 marks, if using trials, no need to check all values, just check that 4.3 gives 66.65 or rot to 3sf or if 4.2 is the final trial, check 4.2 gives 65.1
	Answer of 4.3 obtained with some supporting working, 65.1 shown and 15.5 nfwf soi or for answer 4.2 or 4.2... with working showing $(7 + 7.5 + 6.5) \times 3.1 = 65.1$ and $(5 + 5.5 + 5) = 15.5$	4–3	Answer 4.2 or 4.2... with 65.1 shown and 15.5 nfwf soi or shows $(7 + 7.5 + 6.5) \times 3.1 = 65.1$ and $(5 + 5.5 + 5) = 15.5$ or makes errors with Patrick's 65.1 and/or Leon's 15.5 but then follows through with the correct conclusion	For 3 marks, must show full method with <u>3 scores</u> being added and then multiplied by degree of difficulty for Patrick and 3 scores added for Leon leading to their totals eg $(7 + 7.5 + 6) = 20.5 \times 3.1 = 63.55$ then $63.55 \div (5 + 5.5 + 5) = 4.1$, answer 4.2
	Shows Patrick's overall score as $(7 + 7.5 + 6.5) \times 3.1$ or 65.1 or makes errors with Patrick's 65.1 and/or Leon's 15.5 but then follows through to give the decimal value that makes the scores equal or the decimal value given to more than 1 dp	2–1	Shows $(7 + 7.5 + 6.5)$ or 21 or $(5 + 5.5 + 5)$ or 15.5 nfwf or shows addition of any 3 of 6.5, 7, 7.5, 4.5, 8 and multiplies this total by 3.1 or answer 4.3 with no working at all	For 2 marks, must show full method with <u>3 scores</u> for Patrick and Leon leading to their totals $(7 + 7.5 + 6) \times 3.1 = 63.55$ then $63.55 \div (5 + 5.5 + 5) = 4.1$ answer 4.1 or 4.1...
	No relevant work/comment	0		

Question			Answer	Marks	Part Marks and Guidance	
16			Large number of trials	1	≥ 50 trials (if mentions a number)	Condone 'many', 'multiple' etc for 'large'
			How many 4s	1		NOT 'times it lands on each no.'
			Divide by total number of trials	1	May be by example	NOT work out % etc with no details <u>For the final mark, if 100 trials then accept the number of 4s is the [probability as a] percentage</u>
17	(a)	(i)	62.5 or $62\frac{1}{2}$	2	M1 for $6\frac{1}{4} \times 10$ oe After 0 allow SC1 for answer 31.25 or $31\frac{1}{4}$ or answer 87.5 or $87\frac{1}{2}$	5 days one way or 7 days both ways
		(ii)	18 mins 45 secs	4	B3 for 18.75 seen or for ans. 187 m 30 s Or M2 for $(\text{their } 6\frac{1}{4}) \div 20 \times 60$ [$\times 60$] oe Or M1 for $(\text{their } 6\frac{1}{4}) \div 20$ After 0 allow SC1 for answer 18 m p s ($p \neq 0$) or for 19 m 15 s	<i>Their</i> $6\frac{1}{4}$ may be 62.5 or <i>their</i> (a)(i) or <i>their</i> (a)(i) $\div 10$
	(b)		39	3	B2 for answer of 26 Or M2 for $65 - \frac{2}{5} \times 65$ oe Or M1 for $\frac{2}{5} \times 65$ oe	ie $\frac{3}{5} \times 65$
	(c)	(i)	0.12 oe	2	M1 for $1 - (0.4 + 0.33 + 0.15)$ soi by answer of 0.48 Ignore incorrect conversion after correct answer	<u>In parts (c)(i) and (ii)</u> -1 once for poor notation eg $\frac{0.12}{1}$; 1 : 0.12 etc
		(ii)	0.55 oe final answer	2	M1 for $0.4 + 0.15$ soi by answer of 0.19	

Question			Answer	Marks	Part Marks and Guidance	
		(iii)	375	2	M1 for 2500×0.15 oe	
18	(a)		29.8 to 29.9	2	M1 for 9.5π oe	
	(b)		89.4 to 89.7	1FT	Correct or FT <i>their</i> (a) $\times 3$ given to 3sf or better if appropriate	
19	(a)		2.6 oe final answer	2	eg accept $\frac{13}{5}$ as final answer M1 for one correct step eg $5x = 10 + 3$ or better or $x = \frac{7}{5}$ final answer after $5x = 10 - 3$	Accept an embedded answer provided it is not contradicted
	(b)		$11x - 23$ final answer	3	B1 for $3x - 3$ B1 for $8x - 20$ After 0 allow SC1 for $11x \pm n$ any $n \neq 0$ or $ax - 23$ any $a \neq 0$	$11x + - 23$ scores B2

APPENDIX 1

Exemplar responses for question 6(a)

For d

Response	Mark awarded
Graph is [quite] steep	1
Most distance travelled in short amount of time [and has no interruptions]	1
[No stops and] steep line	1
There is a rapid decline (implying steep gradient)	1
It is the fastest part of the graph	0
There are no stops	0
The hill is steep	0
Takes less time	0
Most distance travelled in short amount of time [and has no interruptions] as she travels down the hill	0

Exemplar responses for question 6(a)

For a

Response	Mark awarded
The least distance compared to the time	1
Not steep [so travelling slower]	1
Less steep	1
Goes up [more] gradually	1
[Much] flatter	1 BOD
It is the slowest [part of the journey]	0
Takes more time	0
Slow uphill	0
Little distance covered	0

Exemplar responses for question 6(b)

Response	Mark awarded
She stays in the same place	1
Shopping	1
Waiting for the taxi/bus	1
Having coffee, meal etc	1
She's sitting down	1
Reached destination	1 BOD
Stopped [at traffic lights]	1 BOD
Walking in town	1 BOD
She is at the post office [or in town]	0
Getting a taxi home	0
Walking	0

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