

**Mathematics A**

General Certificate of Secondary Education

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

**Mark Scheme for November 2012**

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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.

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

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 for example 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. 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).
9. 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.
10. 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.
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	Part Marks and Guidance																	
1	(a)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td></td> <td>8</td> <td>10</td> </tr> <tr> <td></td> <td></td> <td>56</td> <td>70</td> </tr> <tr> <td></td> <td>15</td> <td>24</td> <td></td> </tr> <tr> <td></td> <td>45</td> <td></td> <td>90</td> </tr> </table>	x		8	10			56	70		15	24			45		90	3	1 for each correct column	
x		8	10																		
		56	70																		
	15	24																			
	45		90																		
	(b)	(i)	43	1																	
		(ii)	12	1																	
		(iii)	7	1																	
2	(a)	Plots (3, -1) on grid	1	Condone no label but not incorrect label																	
	(b)	(3, 3) and (1, 3) plotted or (1, -5) and (3, -5) plotted  (3, 3) and (1, 3) or (3, -5) and (1, -5)	2FT  2FT	<b>FT</b> for rectangle of area 8 if B plotted at (-1, 3)  <b>SC1</b> for two incorrect coordinates that form any rectangle <b>or</b> a shape with area 8 squares  Strict <b>FT</b> <i>their</i> C and D  <b>B1FT</b> for either C or D correct	If plot for B is at (-1, 3) then both marks possible for C and D at (-1, -1) and (1, 3)  Condone no labels for C and D																
3	(a)	B	1	If probabilities given then penalise the first occurrence only $\frac{1}{6}$ or 0.16 to 0.17																	
	(b)	C	1	0.5 oe																	

Question		Answer	Marks	Part Marks and Guidance	
	(c)	A	1		0, not $\frac{0}{6}$
	(d)	E	1		$\frac{5}{6}$ or 0.83
4	(a)	5	1		
	(b)	2.2	1		
	(c)	4.5 litres	1 + 1	Both marks independent	
5		15 80p or £0.80[p]	2 1	<b>M1</b> for $20 \div 1.28$ oe soi (15.625) <b>Must</b> include correct units	Not £0.8 or 0.80 p
6	(a)	(i) 180	1		
		(ii) 72	1		
		(iii) 38.75 oe	1		
	(b)	59 mm 579 mm 58 cm 0.582 m	2	<b>B1</b> mark for 3 correctly ordered	For <b>2</b> marks or <b>1</b> mark accept correct equivalents eg For <b>2</b> marks 5.9 cm, 57.9 cm, 58 cm, 58.2 cm
7	(a)	(i) 1	1		
		(ii) Unlikely oe	1	Accept $\frac{1}{6}$ oe, least likely oe	
		(iii) Any number apart from 1, 3 or 6	1		
	(b)	Eight values given with a mode of 8 Four different numbers altogether More odd numbers than even numbers	1 1 1		For <b>3</b> marks eg 888 1 33 55 There must be three 8's and 2 pairs of equal odd numbers with one more odd number

Question		Answer	Marks	Part Marks and Guidance	
8	(a)	129.05	4	<b>M1</b> for $(2 + 2 + 4.5 + 2 + 3) \times 5.80$ [78.3[0]] oe or answer 118.90  AND <b>M2</b> for $7 \times 5.80 \times 1.25$ oe [50.75] Or <b>M1</b> for $5.80 \times 1.25$ oe [7.25]	Allow <b>M1</b> for pay on weekdays listed as 11.60, 11.60, 26.10, 11.60, 17.40
	(b)	4	3	<b>M2</b> for $(133.40 - 18 \times 5.80) \div 7.25$ oe Or <b>B1</b> for 104.40 or 29 seen nfw	
9	(a)	(i) 21a	1	<b>Final answer</b> Do not accept $21 \times a$ , $a21$	
		(ii) 10x	1	<b>Final answer</b> Do not accept $10 \times x$ , $x10$	
		(iii) $2a + 5b$	2	<b>Final answer</b> <b>B1</b> for $2a \pm kb$ or $\pm ka + 5b$ as final answer Or $2a + 5b$ seen and then spoiled	
	(b)	$3b - 1$ and $bc + a$ with value $-10$	2	<b>B1</b> for either expression associated with $-10$ seen	
		$ac$ and $c^2 - 8$ with value 8	2	<b>B1</b> for $c^2 - 8 = 8$ seen	
10	(a)	$\frac{3}{35}$	1		
	(b)	1	1		Accept equivalent fractions
		$\frac{1}{5}$	1		
11	(a)	0.2 oe	2	<b>M1</b> for $1 - (0.5 + 0.3)$	



Question		Answer	Marks	Part Marks and Guidance																			
	(b)	225	2	M1 for $0.5 \times 450$ oe																			
12	(a)	165	2	M1 for $18/12 \times 110$ oe																			
	(b)	27	3	M1 for $450/200 \times 12$ soi [27] M1 for $125/50 \times 12$ soi [30]  After 0 scored, then SC1 for 2.25 and 2.5 seen	Accept 27 or 30 as evidence provided no wrong working																		
13*		<p>Fully correct solution shown with at least 3 different correct rectangular patios drawn of 36 squares and correct perimeters shown. No incorrect rectangles drawn (ignore rotations) or incorrect perimeters shown and chooses 6 by 6 rectangle. Accept other convincing arguments of why the 6 by 6 square gives the maximum perimeter</p> <p>At least three correct rectangles drawn with correct perimeters shown (no decision or wrong decision)</p> <p>At least one correct rectangle drawn with a correct perimeter shown Or two correct rectangles drawn with no perimeters shown and selects correctly from their drawings</p> <p>No relevant comment or drawings</p>	<p>6-5</p> <p>4-3</p> <p>2-1</p> <p>0</p>	<p>For the lower mark – selects the 6 by 6 rectangle with an almost correct justification in working either by drawing at least 3 correct rectangles with correct perimeters shown or has additional incorrect rectangle[s] or perimeter[s] Or explanation/method is clear enough but contains spelling errors/poor grammar</p> <p>At least two correct rectangles drawn with correct perimeters shown Or three correct rectangles drawn with no perimeters shown and chooses 6 by 6 or 4 by 9</p> <p>For one mark – draws one correct rectangle</p>	<p>Allow 'lists' instead of drawings throughout</p> <p>Condone good freehand</p> <p>Allow written dimensions to overrule incorrect drawings for 5 marks or less</p> <p>Ignore incorrect rectangles drawn for 4 marks and less</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>L</th> <th>W</th> <th>Perimeter</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>36</td> <td>74</td> </tr> <tr> <td>2</td> <td>18</td> <td>40</td> </tr> <tr> <td>3</td> <td>12</td> <td>30</td> </tr> <tr> <td>4</td> <td>9</td> <td>26</td> </tr> <tr> <td>6</td> <td>6</td> <td>24</td> </tr> </tbody> </table>	L	W	Perimeter	1	36	74	2	18	40	3	12	30	4	9	26	6	6	24
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Question			Answer	Marks	Part Marks and Guidance	
14	(a)	(i)	Shows 116 and 87 with no error seen	2	<b>B1</b> for 116 or 87 given as one of two values	
		(ii)	1.45	4	<b>M3</b> for $42.05 \div (203 \div 7)$ oe Or <b>B2</b> for 29 seen or 0.207... seen Or <b>M1</b> for $203 \div 7$ or $42.05 \div 203$	eg $42.05 \div 203 \times 7$
	(b)		52.5	3	<b>M2</b> for $(71 + 34) \div 2$ oe Or <b>B1</b> for dist = 105 Or <b>M1</b> for <i>their</i> 'sum of 2 distances' $\div 2$	Allow <b>M2</b> for answers 52 or 53 nfww
15			$\begin{array}{r} 7 \\ 7 \\ 53 \quad 7 \quad 10 \quad 33 \\ \quad \quad 22 \end{array}$	3	<b>B2</b> for 5 correct Or <b>B1</b> for 2 correct	
16			11.7 to 13.2 or 1170 to 1330 cm <sup>2</sup> mm <sup>2</sup>	2 1	<b>M1</b> for $(4.9 \text{ to } 5.1) \times (2.4 \text{ to } 2.6)$ oe Indep	eg rectangle and two triangles with correct ( $\pm 1$ mm) measurements
17	(a)		6 correct rectangles, correctly joined	3	<b>B2</b> for 6 correct rectangles only, incorrectly joined or 5 correct rectangles only, correctly joined or 4 correct rectangles in a 'correct' net of 6 sides Or <b>B1</b> for any correct 3 of <i>their</i> 6 rectangles in an attempt at a net Or <b>SC1</b> for a correct net of any closed cuboid	Condone freehand. Condone outline only  ie open top cuboid
	(b)		A (4, 0, 0) B (4, 3, 2)	1 1	<b>SC1</b> for reversed answers	

Question		Answer	Marks	Part Marks and Guidance	
18	(a)	$10x - 3$	3	<b>Final answer</b> <b>B1</b> for $4x + 12$ soi <b>B1</b> for $6x - 15$ soi  After <b>0</b> , then <b>SC1</b> for $10x + k$	
	(b)	$5x(y + 2)$	2	<b>Final answer</b> <b>B1</b> for $5(xy + 2x)$ or $x(5y + 10)$ seen Or <b>SC1</b> for $2x(2.5y + 5)$ or $10x(0.5y + 1)$ seen	Allow for <b>2</b> marks $(5x + 0)(y + 2)$ etc Allow for <b>1</b> mark $(x + 0)(5y + 10)$ Condone missing final bracket
19		(No) Trial repeated a lot of times $315 \div 600$ soi by 0.525 Comparing 0.5 and '0.525' soi	1 1 1	Allow Yes oe Or $600 \times 1/2$ oe soi by 300 Or comparing 300 and 315 soi or 300 and 285	<b>All three marks independent</b>  Or mention of 50/50, evens etc soi Or comparing 315 and 285 soi
20	(a)	-1	1		
	(b)	Fully <u>correct</u> smooth curve through 7 points	3	<b>B2FT</b> for correctly plotting <i>their 7</i> points Or <b>B1FT</b> for correctly plotting <i>their 6</i> points  After <b>B1</b> earned, allow <b>SC1</b> for smooth parabola shaped curve through <i>their 7</i> points	Acc – points within 1 mm and curve to be within 1 mm of points. No more than 2 sections slightly feathered No ruled sections
	(c)	-2.4 to -2.2 1.2 to 1.4	1FT 1FT	<b>FT</b> <i>their</i> graph at $y = 0$ if 3 marks not earned in (b)	FT accurate to $\frac{1}{2}$ small square [0.1] of reading  If incorrect graph has more than two roots then need to give all of them for <b>2</b> marks – accept one solution correct for <b>1</b> mark

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