OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics A

General Certificate of Secondary Education

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

Mark Scheme for June 2012

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 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 <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).
    -   **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   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 of working

     i.   and the answer given in the answer space 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.   but the answer space is blank, allow full marks. Place the annotation ✓ next to the correct answer.

     iii.   but a completely different answer is seen in the answer space, 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.

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)	(i)	44	1		
		(ii)	7	1		
		(iii)	8	1		
	(b)		2.54	2	**B1** for answer figs 254 Or **M1** for 5 – 0.47 – 1.99 oe	For **M1** accept 500 – 47 – 199
2	(a)		Any 2 positive values that add to 12	2	**M1** for attempts to add 2 pairs of equal positive values to make 24	
	(b)		16	1		
3	(a)	(i)	kilograms, kilos or kg		Condone spelling errors providing intention clear in parts (i) to (iv)	
		(ii)	millilitres or ml		Accept cubic centimetres or cm^3	Accept mils
		(iii)	kilometres or km			
		(iv)	metres or m	4	**B1** for each correct answer	
	(b)	(i)	45	1		
		(ii)	4 50 oe	1	Ignore am pm, any separators Accept 16 50	oe eg ten to five
4	(a)		Moscow	1	Accept ⁻15	Not M
	(b)		23	1	Accept ⁻23	
	(c)		Toronto then Chicago	1	Must be that order	Accept any clear indication eg T then C
	(d)		⁻15	1		

Question			Answer	Marks	Part Marks and Guidance	
5	(a)	(i)	Likely			Condone spelling errors in (a)
		(ii)	Evens			Allow any clear indication e.g. use of arrows to the correct words
		(iii)	Impossible			
		(iv)	Certain	4	**B1** for each correct answer	

	(b)		Both cards bigger than 7 <u>and </u>only one a multiple of 3	2	**B1** if one of the criteria satisfied ie both cards bigger than 7 **or** only one card a multiple of 3	eg 8, 9 scores **2** marks
						    3, 8 scores **1** mark
						    9, 12 scores **1** mark
						    10, 11 scores **1** mark
						    3, 9 scores **0** marks

6	(a)		($^-$2 , 3)	1		
	(b)		Plots B (3, 3) and C ($^-$3, $^-$1)	1+1	Condone no labels but if incorrect labels and both plotted correctly allow **SC1**	
	(c)		(2, $^-$1) or ($^-$8 , $^-$1)	1	FT (4, $^-$3) or ($^-$6, $^-$3) only if C plotted at ($^-$1, $^-$3)	
7	(a)		1060	2	**M1** for 450 + 450 + 160 oe If **0** scored then **SC1** for answer 960 or 1040	**SC** marks cover using East stand prices, 2 adults from West and 1 child from East

Question			Answer	Marks	Part Marks and Guidance	
	(b)		612	3FT	FT 1672 – *their* (a) **M2** for 19 (36 + 36 +16) – *their*1060 oe Or **M1** for 19 (36 + 36 + 16) or 1672 seen If **0** scored then **SC2** for answer 512.5[0] or 584.5[0] or 378 Or **SC1** for 1472.5[0] or 1624.5[0] or 988 seen	**SC** marks cover using East stand prices, 2 adults from West and 1 child from East, 1 adult and 1 child
8	(a)		RD RB PC PD PB SC SD SB	2	**B1** for 9 correct, including the one given, with one repeat or 8 correct, including the one given, with or without one repeat	For **2** marks or **1** mark condone RC repeated
	(b)		$\frac{1}{9}$ oe dec/% only [0.11[1..]]	2FT	isw cancelling/conversion correct or FT *their* table do not accept equivalent fractions seen **B1** for fraction with *their* number of combinations as denominator oe After **0** scored and table is correct, allow **SC1** for $\frac{1}{8}$	Not ratio/words alone in (b) and (c) If fraction and ratio given eg 1/9 and 1 : 9 condone 1 : 9 here $\left[\frac{1}{9}+\frac{1}{9}=\right]\frac{2}{18}$ scores **0**
	(c)		$\frac{3}{9}$ or $\frac{1}{3}$ oe dec/% only [0.33[3..]]	1FT	isw cancelling/conversion correct or FT *their* table do not accept equivalent fractions seen After **0** scored and table is correct, allow **SC1** for $\frac{3}{8}$ only after $\frac{1}{8}$ in part **(b)**	If fraction and ratio given eg 1/3 and 1 : 3 here then do not condone 1 : 3
9	(a)	(i)	450	1		
		(ii)	[0].3 oe	1		

Question			Answer	Marks	Part Marks and Guidance	
	(b)	(i)	1.1[0..]	1		
		(ii)	640 and grams (g) **or** 0.64(0) and kilogram (kg)	1+1	First mark for 640 or 0.64 Second mark for grams with value in range 190 to 790 **or** kg with value in range [0].19 to [0].79	eg 640 kg scores **1**+**0**
10	(a)		$3(a + 1)$ joins to $3a + 3$ $2a - a - 3$ joins to $a - (6 - 3)$ $a \div 3$ joins to $\dfrac{a}{3}$	3	**B1** for each pair correctly joined	
	(b)	(i)	36	1		Condone $x = 36$
		(ii)	⁻6	2	**M1** for $(^-3)^2 = 9$ soi	Condone $x = ^-6$ **M0** for $(9)^2$
11	(a)	(i)	74.088	1	Accept 74.1 or 74.09	Not 9261/125
		(ii)	8.1	1		Not 81/10
		(iii)	0.7125	1		Not 57/80
	(b)	(i)	3.6	1		Not 3.60
		(ii)	7000	1		Not 7000.0
12	(a)	(i)	$12a$ final answer	1		Not $12 \times a$ etc, applies throughout question

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	16a final answer	1		
		(iii)	4a final answer	1		

		(iv)	2a + 5b final answer	2	**B1** for either 2a ± kb or ±ka + 5b in final answer
					or 2a + 5b spoiled
						eg 12a + 5b gets **B1**
						   2a + 5b = 7ab gets **B1**
						   12a – 5b gets **0**

	(b)		40 + 16x final answer	1	Condone 40 + 16a or 40 +16b	
13			5.16	4	**M3** for 6 × [0].86 Or **B3** for figs 516 seen or answer in range 4.81 to 4.82 Or **B2** for 6 cartons are needed Or **M2** for 14 × $\frac{2}{5}$ × [0.] 86 oe Or **M1** for 14 × $\frac{2}{5}$ oe [5.6 oe] seen After **0** scored then **SC1** for rounding up *their* decimal or fraction or pictures to a whole number of cartons	Allow **M2** or **M1** for use of 400 [ml] instead of $\frac{2}{5}$ For **M1** accept clear use of pictures approach showing $5\frac{3}{5}$ oe
14	(a)		0.6	1		
	(b)		48 and 72	3FT	**FT** 72 *their* 0.6 × 120 **B2** for 48 or 72FT *their* 0.6 × 120 Or **M1** for 0.4 × 120 or *their* 0.6 × 120	No **FT** if probability ≥ 1

Question	Answer	Marks	Part Marks and Guidance	
15	Fully correct solution leading to an answer of [£]314.55 showing breakdown of cost of glass as [£]42.35 and frame as [£]147.20 and adding [£]125 for the fitting	6-5	For lower mark – finds cost of window as [£]314.55 without showing full working or breakdown of costs **or** has errors in spelling, punctuation or grammar **or** good approach leading to an answer of [£]320.95 from frame cost of [£]153.6[0] (using 0.8 m)	For marking look for figures seen in the scheme first
	Cost of glass and correct figs for cost of frame Shows [£]42.35 or [£]26.18 <u>and</u> [£]16.17 **and** [£]147.2[0] or figs 1472 or [£]153.6[0] or figs 1536	4-3	**Cost of glass or correct cost of frame** For lower mark shows [£]42.35 or [£]26.18 <u>and</u> [£]16.17 **or** [£]147.2[0] or [£]153.6[0]	
	Area of glass or correct length of frame or perimeter of outer frame or number of 0.1 m lengths Shows 0.29[4], 0.47[6] or 0.48 or 0.77 or shows [price of glass as] figs 4235 or figs 2618 **and** 1617 **Or** shows 3.9 [m] or 39 [lengths] **or** shows [plastic needed in total is] 4.6 [m] or 46 [lengths] or shows [cost of frame as] figs 1472 or figs 1536	2-1	For lower mark attempts to find the area of one of the windows using a correct pair of products condoning incorrect units conversion eg 0.7 × 0.42 or figs 29[4] or 0.7 × 0.68 or figs 47[6] or figs 48 or 0.7 × 1.1 or figs 77 **or** <u>writes</u> a value multiplied by 3.2 or a value multiplied by 55 **or** a value + [£]125 clearly implied provided this is not then spoilt	eg 5 + 125 = 130 then 130 × 3 gets **0**
	No relevant or correct work seen	0		

Question			Answer	Marks	Part Marks and Guidance	
16			£490	5	nfww **M1** for 850 × 1.6 **A1** for 1360 **M1 dep** for *their* 1360 – 625 (=735) **M1 indep** for *their* 735 ÷ 1.5	Dep on first **M1** Accept 225 for *their* 735
17			882[.00] 216.65 6.19 222.4[0] 1334.40	1 1 1FT 1 1FT	*Their* 216.65 ÷ 35 rot to 2dp Must be correct money notation for final mark 1112 + *their* 222.4[0]	If VAT is blank but answer 1334.4[0] then VAT mark can be implied
18	(a)		Correct front elevation <u>with or without</u> join lines or other interior lines Correct plan <u>including</u> two hidden edges only	2 2	**M1** for 9cm by 1cm rectangle seen or for a 3cm by 1cm rectangle seen **M1** for 9cm by 3.5cm rectangle seen *For reversed answers, mark as scheme and then –1*	Condone freehand Allow 3.5 ± 0.2 cm Hidden edges dotted or solid

Question			Answer			Marks	Part Marks and Guidance	
	(b)		52 500 or 0.0525			3	isw after a correct answer if attempt to convert to other units **M2** for complete correct method Or **M1** for correct method for one relevant volume Or **SC2** for answer 52.5 from using measurements from part (a)	*Accept lengths in metres, consistent and correct* **eg** **M2** for 90 × 35 × 10 + 30 × 35 × 10 × 2 Or **M1** for 90 × 35 × 10 (31500) or 30 × 35 × 10 [×2] (10500, 21000) **OR** **M2** for 90 × 40 × 35 – 70 × 30 × 35 Or **M1** for 90 × 40 × 35 (126000) or 70 × 30 × 35 (73500) etc
			cm^3 or m^3 or in words or in words			1	Independent	
19			Correctly evaluates one value from 2 to 3 inclusive			1	*Ignore incorrect trials*	*Their values rot to at least 1dp*
			Correctly evaluates one more value between 2 and 3 exclusive			1	*Correct trials for 2.7 and 2.8 **only** or 2.7 and 2.75 **only** or 2.7 and 2.74 **only** implies the first 3 marks*	2 ⁻4 2.1 ⁻3.339 2.2 ⁻2.552 2.3 ⁻1.633
			Correctly evaluates 2.7 to 2.732 **and** 2.7321 to 2.8			1		2.4 ⁻0.576 2.5 0.625 2.6 1.976
			Answer 2.7 with justification			1	**Final mark dependent** on 3 scored. Indicating outcome for 2.7 is closer to 4 **or** evaluating a value between 2.71 and 2.75 inclusive	2.7 3.483 2.71 3.6425 2.8 5.152 2.72 3.8036 2.9 6.989 2.73 3.9664 3 9 2.74 4.1308 2.75 4.2969
20	(a)		Large number of observations oe			1	Ignore extra statements	

Question	Answer	Marks	Part Marks and Guidance
(b)	$\dfrac{\textit{Their}(\text{total of } 275, 255 \text{ and } 241)}{\textit{Their}(\text{total of all 6 values})}$ $\dfrac{771}{1310}$ isw Or 0.58 to 0.59 or 58% to 59% Or 0.6 or 60%	M2 A1	For **M2**, allow rounded or truncated values **B1** for 771 <u>or</u> 1310 seen Dependent on **M2** scored	<u>**Also allow**</u> **M2** for $\dfrac{275}{449}$ and $\dfrac{255}{450}$ and $\dfrac{241}{411}$ [0.61.., 0.56 to 0.57, 0.58 to 0.59 oe] Or **M1** for $\dfrac{275}{449}$ or $\dfrac{255}{450}$ or $\dfrac{241}{411}$ oe <u>**OR**</u> **M2** for $\dfrac{257}{436 \text{ to } 437}$ oe Or **M1** for $(275 + 255 + 241) \div 3$ soi by 257 or for $(449 + 450 + 411) \div 3$ soi by 436 to 437