OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics C (Graduated Assessment)

General Certificate of Secondary Education

Unit **B274:** Module M4 (Sections A&B)

Mark Scheme for January 2012

Oxford Cambridge and RSA Examinations

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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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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Annotations

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

i. **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.

ii. 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.

iii. 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.

iv. 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.

v. 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**.

vi. 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'.

vii. 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).

viii. 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.

ix. 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.

x. 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'. Place the annotation ✓ next to the correct answer.

If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

If the correct answer is seen in the 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. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

xi. Ranges of answers given in the mark scheme are always inclusive.

xii. 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.

xiii. 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			3 6 0 or zero 3 6 1 or zero or 0	4	**B3** for 4 or 5 correct Or **B2** for 3 correct Or **B1** for 2 correct	
2	(a)		4.65	4	**B1** for 13 × 5 or 65 seen **B1** for 25 × 10 or figs 25 seen **B1** for 11 × 20 or figs 22 seen If less than **B3** scored then **B1** for **FT** on their total seen.	
	(b)	(i)	$20x$	1	Condone $20 \times x$ or $x20$	
		(ii)	$T = 20x + 10y + 5z$	2	**B1** for just 3 correct terms Or **B1** for complete correct word equation.	ie "T = " omitted Condone non-standard notation as above
3			6(g) copper 2(g) nickel	1 1	If 0 scored, allow **B1** for total of 8 if and only if two masses ≠	
4	(a)		A ($^{-}4$, 2) B ($^{-}4$, $^{-}4$)	1 1		
	(b)	(i)	(5, $^{-}1$) indicated	1	Condone lack of letter	
		(ii)	isosceles	1	**FT** *their* (b)(i).	eg scalene for ($^{-}1$, 5) Be liberal with spelling
5	(a)		Wrong (oe) Sides (or angles) not all equal - supported by approximate measurements	2	**B1** "wrong" **and** correct statement regarding angles or sides of the triangle relevant to equilateral triangles but not supported by measurement	(Measurements may be on the given diagram) No credit for merely "wrong"

Question			Answer	Marks	Part marks and guidance	
	(b)		Correct 135° angle	1	A drawn angle sufficient	Mark for intent, but if obviously drawn with aid of protractor ±2°. The angle needs to be defined by two lines
6			17	2	**M1** for attempt to calculate 510 ÷ 30 soi Or figs 17 seen	May be evidenced by attempt at repeated subtraction or other strategy
7	(a)		24 000 to 24 500 (metres)	1		Be liberal regarding spaces, comas etc. as separators
	(b)		175 to 190 (minutes)	1		
	(c)		Yes (oe) **and** mention of less time to descend or steepness of line/curve	1		If specific time up and time down given, be liberal in the quoted accuracy
8	(a)		19	1		
	(b)		12.5 oe	1		
	(c)		4	1		
	(d)	(i)	5	3	**M1** for 35 seen **M1** for *their* '35' ÷ 7	Check answer nfww
		(ii)	7	1		
		(iii)	4	1		

Question			Answer	Marks	Part marks and guidance	
		(iv)	Any relevant comparison	1	Allow FT on figures from parts (i), (ii) and (iii) (visible in marking window)	eg 9 am or mornings have greater mean/median/range, mornings are more windy (i.e. allow general as well as specific comparisons – without specific reference to the actual measure being used). Condone figures are similar/close am/pm, morning/afternoon.
9	(a)	(i)	$\frac{8}{11}$ oe	1		0.72 / 0.73 / 72% / 73%
		(ii)	$\frac{3}{11}$ oe	1	If 0 scored in (i) and (ii), allow **SC1** if both responses have a denominator of 11 (but must be different probabilities) Or **FT** 1-part(i)	0.27 / 0.28 / 27% / 28%
	(b)		Eight 5p coins and two 10p coins with at least one correct trial evident	3	**B2** for at least 2 correct trials Or **B1** for 1 correct trial	3/7 = 55.25 4/6 = 52 5/5 = 48.75 6/4 = 45.5 7/3 = 42.25 8/2 = 39 9/1 = 35.75
10	(a)		10	1		
	(b)	(i)	2	2	**B2 FT** on (a) Or **M1** for 0.2 × "10" seen or implied	
		(ii)	170	3	**FT** on *their* "roof area" **M2** for *their* '46 + 39' × "area" x 0.2 Or 17 seen **M1** for 46 + 39 Or 85 seen	Will need to look back at response to part (a)

Question			Answer	Marks	Part marks and guidance	
11	(a)	(i)	[2] 4 6 8	1		
		(ii)	even	1		
	(b)		No **and** a counter example (eg 6 → 35, 11 → 65, 13 → 77)	3	**M2** for evidence of at least 2 correct trials Or **M1** for just one correct trial	(First two terms: 5 and 11 have already been given) 3 → 17 4 → 23 5 → 29 6 → 35 7 → 41 8 → 47 9 → 53 10 → 59 11 → 65

APPENDIX

Exemplar responses for Q.7(c)

Response	Mark
Yes, gravity has a stronger effect	**0**
Yes, because the line is longer as it goes down	**0**
Yes, as when its highest it drops like a stone	**0**
No, it took 170 up and 25 down	**0**
Yes, goes up slow, comes down fast	**0**
Yes, steeper line more speed	**1**
Yes, it took over a 100 minutes to go up, but came down in less time	**1**

Exemplar responses for Q.8(d)(iv)

Response	Mark
Allow follow through on candidates' calculations (these will be visible in the marking window)	
Both (or all) are odd	**0**
The mean, range and median all double in the morning (not true for all three)	**0**
Cloud cover is less in the afternoon/pm	**1**
The mean is more in the morning	**1**
The mean is a lot more in the morning (following through on a wrong but very large morning mean)	**1**
Less cloud later on	**1**
Bit higher in the morning (just)	**1**
Only a little bit different (just)	**1**

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Facsimile: 01223 552553

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