

Mathematics C (Graduated Assessment)

General Certificate of Secondary Education

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

Mark Scheme for June 2011

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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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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.
W marks are workless marks, which are independent of **M** (method) marks and are awarded for a correct final 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.
 - **cao** means **correct answer only**.
 - **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 **W** marks. Deduct 1 mark from any **A** or **W** 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'. 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.
 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.

Section A

Question		Answer	Marks	Part marks and guidance	
1	(a)	$(-1, 4)$	1		Do not accept any incorrect form eg $(x^{-1}, y 4)$
	(b)	C plotted at $(-4, 1)$	1		Condone missing label if intention clear Mark intent
	(c)	D marked <u>and</u> $(-1, -2)$	2	<p>W1 for D plotted to make square or correct coordinates of 'their D' or $(-1, -2)$ with D not marked</p> <p>If 0 scored, award SC1 for consistent reversed coordinates in (a) and (c)</p>	Condone missing label if intention clear Ignore any extra points/lines if D is clearly indicated 2 marks only for correct answer, no ft their C
2	(a)	Decimal between 0.2 and 0.3	1		Range <u>not</u> inclusive Do not accept eg 0.2.5
	(b)	$\frac{48}{100}$ o.e.	1	NB isw wrong cancellation	Do not penalise for incorrect cancelling if correct fraction seen in either part
	(c)	$\frac{70}{100}$ o.e.	1	NB isw wrong cancellation	
3	(a)	$\frac{3}{10}$ or 0.3 or 30%	2	W1 for 3 as numerator or 10 as denominator	Ignore words such as 'likely' if correct probability seen In (a) or (b): Wrong form ('in', 'out of', 3 : 10, or 'to' etc) –1 once
	(b)	$\frac{4}{10}$ o.e. or 0.4 or 40%	1	Or FT 4/their denominator from (a)	
4	(a)	(i) 65°	1		
		(ii) 115°	1		No FT from incorrect (i)
	(b)	70°	2	M1 for $180 - 40$ or 140 seen	

Question			Answer	Marks	Part marks and guidance
5	(a)	(i)	10	1	
		(ii)	Line steeper after	1	Accept reference to gradient or distance and time
		(iii)	13:15	1	Accept any equivalent time Accept 1:15pm or 1:15 but not 1:15am
		(iv)	3	2	M1 for 3· (...) hours oe or complete method to find time difference with or without stops Accept 180 minutes if hours crossed out Eg repeated addition of 15 min time intervals from start to finish of journey
	(b)		Gina, a mile is further than a km	1	
6			23 with correct working	3	M1 for complete attempt at division W1 for answer in range $20 < x < 30$ or 28(0) or 42 seen Or W1 only for 23 with no working M1 for a complete method which, if no arithmetic errors were made, would lead to correct solution Possible methods: $14 \overline{) 324} \begin{array}{r} 23 \\ 28 \\ 42 \end{array}$ $14 \times 10 = 140$ $14 \times 10 = 140$ $14 \times 3 = 42$ $14 \overline{) 322} \begin{array}{r} 23 \\ 28 \\ 42 \end{array}$ Repeated subtraction of 14/chunks of 14 Repeated addition, 23 lots of 14 must be seen for M1 For 'bus stop' method, 2 on top line with carry (correct or incorrect) must be seen for M1 Answer 23 remainder ... scores W1
7			$3n + 10$ or $n + n + n + 10$ o.e.	2	M1 for $n + 10$ or $2n$ seen These may be seen as part of an expression, eg $n + 10 + n$ scores M1

Section A Total: 25

Section B

Question		Answer	Marks	Part marks and guidance	
8	(a)	r q G	1 1 1		
	(b)	3 2	1 1		
9	(a) (i)	16 to 18 4 to 6	1 1		
	(ii)	Any valid change described	1	e.g. % with broadband increasing % with dial up decreasing	
	(b) (i)	33	3	M1 for attempt to add M1 (dependent) total \div 10 Or SC2 for answer 298-5	Attempt to add may be implied by 320 – 340 seen
	(ii)	Description of a possible difference in mean	1	e.g. bigger, not at school on Saturday smaller, don't do homework on Sat	Award 0 if effect on mean or increase/decrease in time on internet not stated
10	(a)	250 butter 750 flour 250 peanuts 5 eggs 250 sugar 5 baking 375 peanut powder	3	M1 any one value correct M1 for another <u>different value</u> correct If 0 scored, SC1 for consistent use of incorrect multiplier	eg 5 eggs, 5 baking powder only correct scores M1 5 eggs, 250 butter only correct scores M1 M1

Question		Answer	Marks	Part marks and guidance																																																													
	(b)	25 soi 0.75 x 'their 25' 6.80 + 2.35 or 9.15 (£)9.60	W1 M1FT M1 A1	Or 75 x 'their 25' Or 'their 18.75' – 'their (6.80 + 2.35)'	18.75 or 1875 seen implies W1M1 'their 25' cannot be 4 Method marks can be implied by correct answer 9.6 scores 3																																																												
11	(a)	14, 17	1	Both correct																																																													
	(b)	77 add 3 another 20 times or 'keep on adding 3' oe or 25 x 3 [+ 2]	W1 W1	Do not accept 'add 3' alone Implied by 75 seen																																																													
12		Correct trial with width > 15 Further improved correct trial 27	1 1 1	SC1 for correct answer with no trials	<table border="1"> <tbody> <tr><td>16</td><td>21</td><td>336</td></tr> <tr><td>17</td><td>22</td><td>374</td></tr> <tr><td>18</td><td>23</td><td>414</td></tr> <tr><td>19</td><td>24</td><td>456</td></tr> <tr><td>20</td><td>25</td><td>500</td></tr> <tr><td>21</td><td>26</td><td>546</td></tr> <tr><td>22</td><td>27</td><td>594</td></tr> <tr><td>23</td><td>28</td><td>644</td></tr> <tr><td>24</td><td>29</td><td>696</td></tr> <tr><td>25</td><td>30</td><td>750</td></tr> </tbody> </table> <table border="1"> <tbody> <tr><td>26</td><td>31</td><td>806</td></tr> <tr><td>27</td><td>32</td><td>864</td></tr> <tr><td>28</td><td>33</td><td>924</td></tr> <tr><td>29</td><td>34</td><td>986</td></tr> <tr><td>30</td><td>35</td><td>1050</td></tr> <tr><td>31</td><td>36</td><td>1116</td></tr> <tr><td>32</td><td>37</td><td>1184</td></tr> <tr><td>33</td><td>38</td><td>1254</td></tr> <tr><td>34</td><td>39</td><td>1326</td></tr> <tr><td>35</td><td>40</td><td>1400</td></tr> </tbody> </table>	16	21	336	17	22	374	18	23	414	19	24	456	20	25	500	21	26	546	22	27	594	23	28	644	24	29	696	25	30	750	26	31	806	27	32	864	28	33	924	29	34	986	30	35	1050	31	36	1116	32	37	1184	33	38	1254	34	39	1326	35	40	1400
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