GCSE

Mathematics C (Graduated Assessment)

General Certificate of Secondary Education

Unit **B277:** Module M7 (Sections A&B)

Mark Scheme for June 2011

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.
     W marks are <u>workless</u> 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 <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.

     -   **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)**		11 : 12	**2**	isw; allow **2** for $1:\dfrac{12}{11}$ or $1:1\frac{1}{11}$ or $\dfrac{11}{12}:1$ isw **M1** for partial simplification eg 22 : 24;	isw 11: 12 seen and then further simplified to eg 5·5:6 M1 for eg $1:\dfrac{120}{110}$
	(b)		15	**2**	**M1** for 9 shares used eg 1 share = 3 found or for 15 : 12	M0 for just 9 seen but not used, but M1 for 9 used even if incorrectly
2	**(a)**	**(i)**	(44·3, 920) and (41·6, 720) plotted	**1**	tolerance 1 mm	a generous 1 mm both horizontally and vertically, but centre of cross for (41·6, 720) must not touch next gridlines;
		(ii)	positive + strong/high	**1**	condone positive + medium/moderate	
		(iii)	ruled line of best fit drawn	**1**	passing between (34, 320) and (34, 440) and between (40, 620) and (40, 740) inclusive	
		(iv)	FT from *their* line of best fit, reading off at 36·5	**1FT**		FT non-acceptable lines as well as acceptable ones; eg FT curve, but no FT for zig-zag join of points
	(b)		541·5	**1**		

Question			Answer	Marks	Part marks and guidance	
3	(a)		$x > ½$ o.e.	2	isw **M1** for ½ or 0·5 obtained with equation or wrong inequality or for $2x > 1$ or for answer FT their $2x > k$	isw after $x > ½$ oe, eg then [$x =$] 0·5 on ans line
	(b)		$5n + 16$	2	**M1** for $5n$ or for $kn + 16$, $k \neq 5$ or 0	condone 5×n, $n5$; ignore '$n =$ ' allow M1 for $5n$th + 16, $5x + 16$ M0 for $-5n$
4	(a)	(i)	0·2	2	**M1** for 1/5 seen	M1 for attempt to divide 1 by 5
		(ii)	$0·\dot{5}$	2	**M1** for 0·55(…)	allow 2 marks for $0·5^r$ or $0·5\dot{5}$ etc; must have a recurring symbol for two marks
	(b)	(i)	5^6	1		
		(ii)	5^4	1		
5			$x^2 + 5x - 3x - 15$ o.e.	2	isw; **M1** for three of these terms seen (eg in grid) **2** for $x^2 + 2x - 15$	

Question			Answer	Marks	Part marks and guidance	
6	**(a)**		50/200 o.e.	**1**	isw wrong cancelling, but **0** if attempted calculation of 200/50 following 50/200 o.e.	accept fraction eg ¼, or decimal or percentage 0 for ratio etc
	(b)		[greater than usual and comparison with] 1/6 eg 0·16 to 0·17 seen or 30 to 35 (throws) seen	**1**		mention of 1/6 can earn the mark, independently of their answer in (a); condone informal notation such as 1 in 6, 1 : 6 allow '6 × 50 = 300 not 200' oe condone mention of 6 faces (or another 5 faces) and their ¼
7			Correct construction arcs	**1**	Check by eye;	allow this mark for correct method for construction arcs if compasses have slipped so bisector is inaccurate and second mark is not gained NB spurious arcs put in afterwards do not gain credit; ignore other arcs on the diagram
			Correct ruled bisector drawn	**1**		condone a broken line

Section A Total: 25

Section B

Question			Answer	Marks	Part marks and guidance	
8	(a)		$C = 8n + 10$	2	**M1** for $8n$	must have $C =$ for **2** marks; ignore £ signs; accept $8 \times n$; condone $n8$
	(b)		25	2	**M1** for $150 = 6n$ or $150/6$	allow M1 for $6 \times 25 + 50 = 200$ or similar as answer
9			81	1		
			angles in a **triangle** add to **180**	1	words in bold required as minimum except condone omission of 180 if answer is 81	
			corresponding angle with *ABC*	1	condone omission of 'with ABC' if $p =$ their ABC	allow opposite angle [at a point] <u>and</u> alternate angle
						or angles on a straight line add to 180 <u>and</u> allied (or co-interior) angles add to 180
						or angle AED = 42° (corresponding with ACB) then angle sum of triangle = 180
						condone Z, F, C used appropriately
					if 0, allow **SC1** for ABC = 81 found or for AED = 42 found	eg may be on diagram.

Question			Answer	Marks	Part marks and guidance	
10	(a)		203 to 204	3	evidence of correct method needed to accept 200	
					M1 for $\pi \times 9^2$ [= 254 to 255]	allow this M1 for $\pi \times 9^2$ even if multiplied by 7 [1778 to 1785]
					M1 for *their* area $\times$ 8/10 or *their* area $\div$ 1·25; o.e.	allow FT for second M1 from sensible rounding of their area or from πd or from 18 or (18 × 7) etc used; may be implied by an answer of 14·4 or 45·2 to 45·3 or 100.8 or 101 or 1422 to 1428
					A1 for 203 to 204 or for 208 or 200	
	(b)		197 to 198	3	**M1** for $\pi \times 18 \times 7$ [= 395 to 396]	evidence of correct method needed to accept 200
					M1 for *their* area × 5/10 o.e.	allow FT for second M1 from sensible rounding of their area or eg allow second M1 for 7 ÷ 2 or (18 × 7) / 2; may be implied by an answer of 3·5 or 63
					A1 for 197 to 198 or 200	
11	(a)		−3, −3	1		
	(b)		(2, −3) and (3, −3) plotted	1	correct or FT *their* table entries	tolerance a generous 1 mm both horizontally and vertically, but centre of cross must not touch next gridlines; if plots not seen, allow if curve goes through their points
			join of all six points with smooth curve	1	no FT from wrong pts for curve mark	be fairly generous on quality of curve. Must see 'daylight' between *y* = −3 and bottom of curve without zooming in, and pass within 2 mm of correct points; must have some attempt at slight curve at minimum, not a V. **0** for straight line segments

Question			Answer	Marks	Part marks and guidance	
	(c)		0·5, 0·6, 0·7 or 0·8 and 4·2, 4·3, 4·4 or 4·5	2	**1** each	Allow even if no FT from curve; condone coordinates; apply isw for correct answers seen then further work
12	(a)		1·68 to 1·69	4	**M1** for midpoints 0·75, 1·25, 1·75 etc or 0·755, 1·255, 1·755 etc seen or used	at least three of them seen
					M1 for *their* midpoints × freq (1·50, 15, 22·75, 15·75, 5·50; total 60·50) or (1·51, 15·06, 22·815, 15·785, 5·51; total 60·68)	at least 3 correct or total seen; accept 1·5 etc; allow first two M1s if seen even if another method used for answer on answer line
					M1 for (*their* sum of midpoints × freq) ÷ *their* 36 ; FT *their* (2 + 12 + 13 + 7 + 2)	second and third Ms are available for 'their midpoints' being an attempt using other points in interval, or endpoints (at least 3 seen)
					A1 for 1·68 to 1·69; accept 1·7[0] for **A1** if M3 earned	answers of 1·93 to 1·94 or 1·43 to 1·44 imply second and third M1s
	(b)		6·7	3	**W2** for 6·6 ≤ answer < 6·7 **M2** for $\frac{15}{225}[\times 100]$ o.e. or for 106·6 to 106·7 Or **M1** for $\frac{240}{225}[\times 100]$ or for 1·066 to 1·067 if 0, allow **SC1** for answer of 7	

Section B Total: 25