OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics C (Graduated Assessment)

General Certificate of Secondary Education

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

Mark Scheme for January 2012

Oxford Cambridge and RSA Examinations

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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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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.

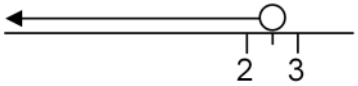
If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

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	(a)		15	1	Accept –15 or ±15	
	(b)		89	2	**B1** for 125 **or** 36 shown	
	(c)	(i)	1.3	1		
		(ii)	24.8	2	**B1** for figs 248	
2	(a)		(24, 3) and (27, 2.1) plotted correctly	1	Acc ½ small square [1mm]	Acc from centre of point
	(b)		Negative	1	Ignore embellishments	
	(c)		Circles the point (16, 3.1)	1		Accept any indication
3	(a)		Shows 4 – 3(1), 4 – 3(2) and 4 – 3(3) with no errors seen	2	**B1** for one term correctly obtained by substitution	For **1** or **2** marks accept 4 – 3 , 4 – 6 and 4 – 9 following 3*n* = 3, 6 and 9
	(b)		5*n* – 3 oe	2	eg 2 + 5(*n* – 1) gets **2** marks Mark final answer **B1** for 5*n* seen	*n* = 5*n* – 3 gets 1 mark only
4	(a)		0.14	1		
	(b)		0.14 or 7/50 or indication of 50 plays **and** 'most trials' oe	1FT	FT *their* 0.14	Must not spoil the reason by eg 'highest number of wins'
	(c)		140	1FT	Correct or FT *their* (b) × 1000 correctly evaluated or *their* (a) × 1000	Not 140/1000

Question			Answer	Marks	Part marks and guidance	
5	(a)	(i)	x^8	1	Mark final answer	
		(ii)	x^4	1	Mark final answer	
	(b)	(i)	$x < 2.5$	2	Mark answer line **B1** for 2.5 seen in answer Or **M1** for $10x < 22 + 3$ Or FT to solution on answer line from $ax < b$ for $a \neq 1, -1$ or b and $b \neq 0$)	Accept $x < 25/10$ oe for **2** marks For FT if b/a is an integer then it must be evaluated
		(ii)		1FT	Correct or FT *their* <u>inequality</u> in (b)(i) Accept arrow any length or a line at least 3 units long	Must have circle or line on the value 2.5 Condone closed (shaded) circle Condone shading to left of 2.5 over complete line rather than arrow
6			Arc drawn, centre D, radius 10 cm Angle bisector of B drawn with correct arcs T indicated as intersection of *their* arc, centre D, and *their* angle bisector of B	1 2 1FT	isw Allow 9·5 to 10·5 cm isw **B1** for within overlay lines but no/wrong arcs FT provided an arc centre D intersecting a ruled line from B.	Does not have to be full length Must have correct arcs/ dots on lengths AB and BC as well as the other correct intersecting arcs

Question			Answer	Marks	Part marks and guidance	
7	(a)		115 Corresponding [angles]	1 1	 Dep on 1st mark Accept complete alternative descriptions eg [angles] on a line [=180] **and** allied [angles] or interior [angles]	Accept 'F' [angles] Beware choice of reasons eg alternate and corresponding scores **0**
	(b)		73	2	**M1** for 180 – 82 – 25 oe	For **M1** accept 360 – (65 + *their* (a)+ 82 + 25) implied by answer. 188 – *their* (a)
8			690	3	**M2** for 2415 ÷ 3.5 oe Or **M1** for 2415 ÷ *their* time [in hrs or mins]	 **M1** implied by answers 731 to 732 or 11.5 or 7.31 to 7.32
9	(a)		3.25 oe	3	eg 26/8 isw or better **M1** for $8x - 4$ [= 22] or $2x - 1 = 22/4$ **M1** for $8x = 22 + 4$ FT *their* bracket expansion or first step **M1** for $x = b/a$ FT correctly from *their* $ax = b$ (provided $a \neq 1, -1$ or b and $b \neq 0$); can be implied from solution after one line of working shown	Not 26 ÷ 8 alone For collecting constants correctly Allow decimal answers to 1 dp to imply final FT method mark
	(b)		$x^2 + 7x - 4x - 28$	2	Or better; isw **M1** for 3 correct terms seen of 4 term expression After **0** scored allow **SC1** for 2 correct terms from $x^2 + 3x - 28$ provided 3 term answer	$x^2 + 3x - 28$ isw

Question			Answer	Marks	Part marks and guidance	
	(c)		$p = \frac{w+3}{5}$ oe	2	nfww Mark final answer **M1** for $5p = w + 3$ Or **M1** for correct FT to answer line from *their* 1st step After **0**, allow **SC1** for $p = w + \frac{3}{5}$ final answer	
10			747	4	**M3** for 74700/100 or $\sum fx/100$ with correct mid-values; allow 1 slip on mid-values/products Or **M2** for 74700 or at least 3 of 5500, 16900, 22500, 21250, 8550 seen or their $\sum fx$ where x is in the correct interval (including both boundaries). Or **M1** for at least 3 of 550, 650, 750, 850, 950 soi After **M0**, allow **SC2** for 797 or 697 final answer	NB isw
11			25.5	3	**M2** for $\sqrt{22.5^2 + 12^2}$ oe Or **M1** for $22.5^2 \pm 12^2$ soi (650.25 or 362.25)	If longer trig methods used – **M2** for correct explicit trig statement for AC, **M1** for correct implicit trig statement
12			Betterfly by £1.3(0)	4	Or **B3** for <u>both of</u> 211.2[0] **and** 212.5[0] Or **B2** for 211.2[0] **or** 212.5[0] Or **M1** for 240 × 0.88 oe or for 250 × 0.85 oe After **0**, allow **SC1** for one of 28.80 or 37.50	

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