GCSE

Mathematics C (Graduated Assessment)

General Certificate of Secondary Education **B278**

Module M8 (Sections A&B)

Mark Scheme for June 2010

Marking instructions

1.   Mark strictly to the mark scheme. If in doubt, consult your team leader using the messaging system within *scoris*, e-mail, or by telephone.

2.   Make no deduction for omission of units except as indicated on the mark scheme (although if this leads to a later error this will of course be penalised).

3.   Work crossed out but not replaced should be marked.

4.   **M** (method) marks are not lost for purely numerical errors.
        A (accuracy) marks depend on preceding M (method) marks. Therefore M0 A1 cannot be awarded.
        W (workless) marks are independent of M (method) marks and are awarded for a correct final answer or a correct intermediate stage.

5.   Subject to 4, two situations may be indicated on the mark scheme conditioning the award of A marks or independent marks:
        i.   Correct answer correctly obtained (no symbol)
        ii. Follows correctly from a previous answer whether correct or not ("ft" on mark scheme and on the annotations tool).

6.   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).

7.   Always mark the greatest number of significant figures seen, even if this is then rounded or truncated on the answer line, unless the question asks for a specific degree of accuracy.

8.   i.   Allow full marks if the correct answer is seen in the body and the answer given in the answer space is a clear transcription error, unless
                the mark scheme says 'mark final answer' or 'cao'.
        ii.   Allow full marks if the answer is missing but the correct answer is seen in the body.
        iii.   Accuracy marks for an answer are lost if the correct answer is seen in the working but a completely different answer is seen in the
                answer space. Method marks would normally be given.

9.   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.

10.   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.

11.   For answers scoring no marks, you must either award NR (no response) or 0, as follows:

        Award NR if:
        •   Nothing is written at all in the answer space
        •   There is a comment which does not in any way relate to the question being asked ("can't do", "don't know", etc.)
        •   There is any sort of mark that is not an attempt at the question (a dash, a question mark, etc.)

The hash key [#] on your keyboard will enter NR.

Award 0 if:
- There is any attempt that earns no credit. This could, for example, include the candidate copying all or some of the question, or any working that does not earn any marks, whether crossed out or not.

12.   Where a follow through (ft) mark is indicated on the mark scheme for a particular part question, you must ensure that you refer back to the answer of the previous part question if this is not shown within the image zone. You may find it easier to mark follow through questions candidate-by-candidate rather than question-by-question.

13.   In cases where there is clear evidence that a calculator has been used in section A, mark the script as normal then raise an exception (malpractice) in *scoris*. <u>All suspected malpractice should be flagged using exceptions</u>.

14.   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.

15.   Holding the F2 key on your keyboard displays the annotations toolbar next to your cursor. The following annotations are available:

✓and ✗
(highlight)	Highlighter
BOD	Benefit of doubt
FT	Follows through
ISW	Ignore subsequent working (after correct answer obtained)
M0, M1, M2	Method mark awarded 0, 1, 2
A1	Accuracy mark awarded 1
W1, W2	Workless mark awarded 1, 2
SC	Special case
^	Omission
MR	Misread

These should be used whenever appropriate during your marking. **The A, M and W 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.

16.   The comments box will be used by the Principal Examiner to explain his or her marking of the practice scripts for your information. Please refer to these comments when checking your practice scripts. **Please do not type in the comments box yourself.** Any questions or comments you have for your team leader should be communicated using the *scoris* messaging system, e-mail, or by telephone.

17.   As far as possible you should mark roughly equal numbers of RIGs from sections A and B. It is helpful to mark some in each section as you go, rather than marking all RIGs in one section, then all RIGs from the other.

Abbreviations

The following abbreviations are commonly found in GCSE Mathematics mark schemes.

- Where you see **oe** in the mark scheme it means **or equivalent.**

- Where you see **cao** in the mark scheme it means **correct answer only.**

- Where you see **soi** in the mark scheme it means **seen or implied.**

- Where you see **www** in the mark scheme it means **without wrong working.**

- Where you see **rot** in the mark scheme it means **rounded or truncated.**

- Where you see **seen** in the mark scheme it means that you should award the mark if that number/expression is seen anywhere in the answer space, including on the answer line, even if it is not in the method leading to the final answer.

- Where you see **figs 237**, for example, this means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point e.g. 237000, 2·37, 2·370, 0·00237 would be acceptable but 23070 or 2374 would not.

Viewing tips for this paper

In general, set your screen to 'fit width.'

You may find it helpful to set to 'fit height' for the following questions: 2a, 10a, 10bi, 10biii (+ zoom in once for 10bi and 10biii to focus on relevant part of graph and see more clearly! – similarly for 11)

Section A

1	(a)	$3\dfrac{1}{6}$	2	**M1** for evidence of equivalent fractions attempted: two fractions with a correct common denominator with at least one of the numerators correct
	(b)	$6\dfrac{2}{3}$ www	3	condone $6\dfrac{8}{12}$ oe mixed number, since lack of simplifying is penalised in (a) **M1** for $\dfrac{5}{4}\times\dfrac{16}{3}$ oe seen or implied **M1** for attempt to multiply numerators and denominators, ft *their* top heavy fractions
2	(a)	Δ with vertices at (5, −2) (10, −2) and (5, 8)	3	**M2** for two vertices correct or for enlargement with sf 2·5 but wrong centre Or **M1** for enlargement centre (0, 3) with wrong sf
	(b)	centre (0, 3) sf 0·4 or 2/5	1 1	
3	(a)	$4\cdot2 \times 10^{-3}$	1	do not accept poor notation
	(b)	$9(\cdot0) \times 10^{4}$	2	condone poor standard form notation; **M1** for $84\,000 + 6000$ or $90\,000$ or for $8\cdot4 \times 10^{4} + 0\cdot6 \times 10^{4}$ or for $84 \times 10^{3} + 6 \times 10^{3}$ or for $9(\cdot0) \times 10^{n}$ with $n \ne 4$

4	(a)	(i) [3x + 1 =] 8x − 6 or 1·5x + 0·5 = 4x − 3	M1	**M1** for each of three correct constructive steps (expanding brackets or dividing both sides by 2; collecting terms and simplifying to form $ax = b$ or $b = ax$; division by x coefft), ft from previous error; no ft for final M1 if *their x* coefft is already ±1 after collecting terms
		7 = 5x or 3·5 = 2·5x oe or ft	M1	
		[x =] 7/5 isw or 1$\frac{2}{5}$ or 1·4 or ft	M1	if ft fractional answer simplifies to an integer it must be given as such to earn final M1 for **M3** <u>must</u> reach 7/5 or −7/−5 oe isw allow **W3** for 1·4 oe as final answer following trials
		(ii) x > 7/2 oe	2	**M1** for 7/2 oe found with wrong inequality or equation or for 2x > 7 or for −7 > −2x
	(b)	(x − 1)(x − 4) oe	2	isw expansion to check, or finding roots; may be seen in grid **M1** for other versions of (x ± 1)(x ± 4) or for other factorisation giving two terms of expansion correct
5	(a)	C or y = 2x − 2	1	
	(b)	A and D or y = 3x − 1 and y = 3x + 4	1	
6	(a)	0·7 on both unlabelled branches and 'go to cinema' oe on blank 0·3 branch and 'do not go to cinema' oe on last branch	1	accept 7/10 or 70% oe
	(b)	0·07 or 7/100 or 7% or ft *their* tree	2	**M1** for 0·1 × *their* 0·7

Section A Total: 25

Section B

7	(a)	75 560 ÷ 0.65 oe	M2	allow **M2** for $\dfrac{75560}{65}[\times 100]$ or for 1% = 1162 to 1163 Or **M1** for 65% of ? = 75560 or better
		116 000 to 116 300	A1	or **W3** for answer in range www
	(b)	8500 × 1.04^3 oe	M2	or for at least two years of correct values seen (may be rot to 3sf or more) or for equivalent method of repeated calculation of 4% of previous year with addition, condoning errors in calculation if **M0**, allow **SC2** for answer of 9193.6 rounded or truncated to 3 sf or more or 9940 to 9944·… or for answer of 1060 to 1062
		9560 to 9562 or 9600	A1	allow **W3** for answer of 9560 to 9562 or 9600 www if **0,** allow **SC1** for 8840 seen or for 9520 or 23324 as answer
8		380 www	2	**M1** for 612+718+301+177+201+265+386 or for 2660
9		6x − 4y = 8 and 6x − 9y = 0 or 9x −6y = 12 and 4x − 6y = 0	M1	for multiplication to make coefficients of one variable the same; condone one error
		5y = 8 or 5x = 12	M1	for subtraction, dependent on one pair of coefficients the same; condone one error
		x = 2·4 and y = 1·6	W2	**A1** for one correct NB if no algebraic method seen, both correct answers gain **W2,** but **W0** for just one correct

10	(a)	$18 \cdot 5 \times \tan 34$	M2	or for $18 \cdot 5 \times \dfrac{\sin 34}{\sin 56}$ oe or for complete method using Pythagoras + appropriate trig function Or **M1** for $\tan[34] = \dfrac{h}{18 \cdot 5}$ or for correct sine rule statement without *h* as subject
		their h + 1·7	M1	ft *their* attempt (involving trig) at height of triangle [may be implied by *their* answer]
		14·09 to 14·2	A1	**W4** for 14·09 to 14·2 www Or **W3** for 12·39 to 12·5 www
	(b)	(i) plots with correct heights 12, 35, 62, 78, 86, 90 and plots at 5, 10, 15, 20, 25 and 30	1	condone one error or omission allow ±1 mm may be implied by curve through correct points
		join with smooth curve or straight line segments	1	within 2 mm of *their* plots; ft ascending plots only; ignore curve for *h* < 5
		(ii) 11.5 to 12.5	1	
		(iii) [reading at 18 =] 71 – 73 seen	M1	or ft from graph; may be implied by 36 to 38 or ft used in division calculation
		(*their* reading – 35) ÷ 90 [× 100] or (*their* reading – *their* reading at 10) ÷ 90 [× 100]	M1	after subtraction seen, division may be implied by correct answer; allow 2nd M1 for (36 to 38)/90 [× 100] or ft
		40 – 42·2… cao	A1	**W3** for 40 – 42·2… www if **M0**, allow **SC1** for 47 to 48%
11		[sf =] 1·5 or 2/3 oe shown with correct calculations for both pairs of sides	2	or for scale factor used implicitly to show this eg $4 \cdot 2 \times \dfrac{8 \cdot 1}{5 \cdot 4} = 6 \cdot 3$ or for $\dfrac{5 \cdot 4}{4 \cdot 2} = \dfrac{8 \cdot 1}{6 \cdot 3} = 1 \cdot 28$ to $1 \cdot 29$ or for $\dfrac{4 \cdot 2}{5 \cdot 4} = \dfrac{6 \cdot 3}{8 \cdot 1} = 0 \cdot 77$ to $0 \cdot 78$ or for 5·4 × 6·3 = 4·2 × 8·1 = 34·02 Or **M1** for [sf =] 1·5 or 2/3 stated or seen
		∠ACB = ∠DCE [and [vertically] opposite oe]	1	allow if marked the same on diagram; condone 'the angles at C are the same'

Section B Total: 25