OCR
Oxford Cambridge and RSA

GCSE

Mathematics A

Unit **A501/02:** Mathematics A (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for November 2014

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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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These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

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

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.
    B marks are <u>independent</u> of **M** (method) marks and are for a correct final answer, a partially correct 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.

    -   **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 and applies as a default.
    -   **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.   In questions with no final answer line, make no deductions for wrong work after an acceptable answer (ie **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.

7.   In questions with a final answer line following working space,

     (i)   if the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

     (ii)   if the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

     (iii)   if the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✗ next to the wrong answer.

8.   In questions with a final answer line:

     (i)   If one answer is provided on the answer line, mark the method that leads to that answer.

     (ii)   If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

     (iii)   If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9.   In questions with no final answer line:

     (i)   If a single response is provided, mark as usual.

     (ii)   If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10.   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.

11. 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.

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

13. 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.

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.

Question			Answer	Marks	Part Marks and Guidance	
1	(a)		$1: 1.4$ or $1:\dfrac{7}{5}$ or $1:1\dfrac{2}{5}$	1		
	(b)		$7 : 15$ or $1:\dfrac{15}{7}$ oe	3	Must be without 'minutes' **M1** for 56 : 120 soi AND **M1** for correct partial simplification eg 28 : 60 Or **SC1** for 7 : 25 oe	
2	(a)		1.57	2	**M1** for other versions of 1.568... rot to 1 dp or more Or **SC1** for 0.85	
	(b)		$12 - (1 + 4) \times 3 = {}^{-}3$	1		p16 is attached below the image for 2b; put BP on p16 to show looked at – if relevant working for another qn, use the chain link to attach it to that qn
3			0.31(25)	2	nfww **M1** for [C] $\dfrac{50}{40}$ or 1.25 or for [D] $\dfrac{50}{32}$ or 1.5625	Common
4	(a)		48	1		Common
	(b)		$4(n + 2)$ or $4n + 8$	2	**M1** for $4 \times n$ oe soi	Condone poor notation such as $n4$ etc or $n = 4n + 8$ Common

Question			Answer	Marks	Part Marks and Guidance	
5			Perpendicular bisector of AB attempted	M1	**M0** for arcs/circles centres A and B with no line	Allow **M1** for line through midpoint of AB but at 80 to 100° to AB
			Accurately drawn bisector with correct compass arcs	A1	Line must extend at least between the circles below AB on the overlay	
			Circle centre C rad 5 cm	M1	Or arc of this circle extending through at least 3 of the seven circles for this arc on the overlay Condone arc hand drawn only if in tolerance for three consecutive circles on overlay	Tolerances 2 mm; if in doubt, use ruler Common
			Section of bisector inside circle clearly indicated	B1	FT *their* circle and line	
6			125	3	nfww **M1** for 750 / 150 [= 5] or 150 = 2 × 3 × 5^2 oe – need not be expressed as product AND **M1** for use of <u>extra</u> factor of 5 with factors of 150 – must use the 25 already there	eg **M1** for 50 × 5 May see trials with various factors × 5 – allow this second **M1** providing at least one trial earning it seen eg M1 for 125 = 5^3 seen in working but not as answer

Question			Answer	Marks	Part Marks and Guidance	
7	**(a)**		5.5 or 5 ½	3	nfww **M2** for $2x = 11$ or $[x =]$ 11/2 Or **M1** for one side of this correct AND **M1** for answer FT *their ax = b* or *their ax + b = 0* for $a \neq 1$ or 0, $b \neq 0$	Common FT dependent on at least **M1** already earned
	(b)		$7y\,(y-2)$ as final answer	2	**M1** for $7y(...)$ or for $7(y^2 - 2y)$ or for $y(7y - 14)$	
8	**(a)**	**(i)**	Using right-angled triangle with hyp 48 and side 42 $\sqrt{48^2 - 42^2}$ or 23.2(...) 11.76(...) or 11.8	M1 M2 A1	Just seeing marked on diagram is not sufficient **M1** for $48^2 - 42^2$ or for $\sqrt{48^2 + 42^2}$	For a scale drawing, only this first mark is available
		(ii)	sin C = 42/48 Inv trig fn seen or used 61 to 61.1	M1 M1 A1	Or equiv trig fns using *their* (a) Not dep on first M1	**0** for scale drawing
	(b)		$[d =]$ 31/cos 25 34.2(...)	M2 A1	**M1** for cos 25 = 31/d or $d \times$ cos 25 = 31 Accept 34 with clear evidence of method	may use sine with 65 or their (180 − 90 − 25) or tan and Pythagoras **M0** for scale drawing

Question			Answer	Marks	Part Marks and Guidance	
9	(a)	(i)	Median at 58.5 to 59	1	Accept full or dashed	Allow median mark bod if no box just line in correct position
			Box with LQ at 56.5 to 57 and UQ at 61.5 to 62.5	1		
			Whiskers with lower end at 45 to 46.5 and upper end at 68	1		
		(ii)	No + women have smaller IQR oe or Yes + women range larger with acceptable values stated	2	W IQR accept 4.5 to 6 or FT W range accept 21.5 to 23 or FT **M1** for correct range or IQR for women seen or FT their boxplot (M0 if both used in comment and one incorrect) **0** if also reference to median in comment, otherwise ignore median found (some cands finding all 3 stats for women before commenting)	Accept relevant stats shown by diagram if no other stats stated Allow FT from one error in relevant plot in box plot for both marks; also allow correct if wrong/no box plot (may go back and use cf diagram)
	(b)		2346	2	**M1** for 39 m 6 s or for 12959 or 15305 [s]	
10	(a)		(1, 4.5)	2	**B1** for each coordinate	
	(b)	(i)	58	2	**M1** for $t^2 = 9$ or $6t^2 = 54$	
		(ii)	$[t =][\pm]\sqrt{\dfrac{d-4}{6}}$ oe as final answer	3	nfww **M1** for a correct first step: $d - 4 = 6t^2$ or $d/6 = t^2 + 4/6$ oe **M1** for correctly making t^2 the subject, FT their first step **M1** for finding the square root of their expression for t^2	Square root symbol must extend below fraction line

Question			Answer	Marks	Part Marks and Guidance	
	(c)		3 and 32	2	**B1** each	
	(d)	(i)	2.5 oe	1	accept 5/2	
		(ii)	$-3 - 2t$	2	Accept $-2t - 3$ **M1** for $5 - 2(t + 4)$	
11	(a)		26	2	**M1** for $20 \times 0.7 + 30 \times 0.4$ or for 14 found	[mark for whole bars found in next part]
	(b)		Frequencies in each group soi: [6, 28], 40, 64, 38, 21, 12	M1	Allow this **M1** for four or more correct	
			Sum of frequencies attempted	M1	209 if correct	
			Frequencies × midpoints attempted: 6 × 5, 28 × 20, 40 × 40, 64 × 60, 38 × 80, 21 × 105, 12 × 135	M1	At least 3 correct or FT correct: may be 30, 560, 1600, 3840, 3040, 2205, 1620 [total = 12 895]	Allow 5, 5.005, 5.5(0) as midpoint for first group and similarly for others
			Their total of midpoints × freq ÷ *their* sum of frequencies	M1	May be implied by correct answer or by FT answer if *their* total seen; total of frequencies = 209 if correct	Allow FT from endpoints used for midpoints for this last **M1**
			61.69 to 61.70 or 62	A1	nfww	