

Mathematics A (Two Tier)

General Certificate of Secondary Education

Component **J512/01**: Paper 1

Mark Scheme for January 2011

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2011

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL


Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

MARKING INSTRUCTIONS

- 1 Mark strictly to the mark scheme.
- 2 Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
- 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.
B marks are independent of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.
- 5 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).
- 6 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.
- 7 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. If the answer is missing, but the correct answer is seen in the body allow full marks. If the correct answer is seen in working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would normally be given.
- 8 For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work.
- 9 For answers scoring no marks, you must either award NR (no response) or 0, as follows:
Award NR (no response) if:
 - Nothing is written at all in the answer space
 - There is any 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.)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.
- 10 Where a follow through 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.

General comments

- Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures seen. Eg answer on 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.
- Anything in the mark scheme which is in brackets (...) is not required for the mark to be earned, but if present it must be correct.
- Ranges of answers given in the mark scheme are always inclusive.
- Where you see **oe** in the mark scheme it means **or equivalent**.
- Where you see **isw** in the mark scheme it means **ignore subsequent working** (after correct answer obtained), provided the method has been completed.
- 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 **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 the answer line, even if it is not in the method leading to the final answer.
- Figs: for example **figs 237** means any answer with just these digits with leading or trailing zeros disregarding any decimal point. Eg 237000, 2.37, 2.370, 0.00237 but not 23070 or 2374.

1	(a)	4	1		
	(b)	12	1		
	(c)	Half a symbol eg 	1		Must be in the 'Swimming' line on the pictogram
	(d)	14	1	ft <i>their</i> $(a) \times 3\frac{1}{2}$	If key wrong ft on d and f
	(e)	Football	1		
	(f)	52	2	M1 for $20 + 6 + 12 + 12 + 2$ or their $5a + 1\frac{1}{2}a + 3a + 3a + \frac{1}{2}a$ ft <i>their</i> $(a) \times 13$ for 2	At least 4 values added, at least 3 correct using their key
2	(a)	1304	1		Allow 1,304 but not 1.304
	(b)	Forty	1	Accept 40, ten(s) or 10 (s)	Ignore units
	(c)	Two hundred (and) ninety four thousand	1		0 if any digits used
	(d)	(i) 800	1	Allow words	Allow a mixture of words/figures 0 for 8
		(ii) 12 (minutes) 51 (seconds)	2	B1 for 12 min or 51 s	Seen as their answer. If either answer space blank, look back for answer
	(e)	104	1		
	(f)	42	1		

3	(a)	88	1		Condone 88.0 etc in (a) and (b)
	(b)	156	2	M1 for $7 \times 8 + 100$ or 56 seen	
	(c)	10 hrs and 5 cars or 35 hrs and 1 car	3	M2 for $(330 - \text{any multiple of } 50)/8$ Or $(330 - \text{any multiple of } 8)/50$ or M1 for $330 - \text{any multiple of } 50$ Or $330 - \text{any multiple of } 8$	The 'division' could be repeated addition/subtraction aiming for their $330 - 50n$ Or if a trial and imp approach M1 for $8 \times n + 50 \times m$ (any positive integer m, n) eg $280 + 50$ and M1 if 10, 5 or 35, 1 used for m, n
4	(a)	Metres or m	1		
	(b)	Millimetres or mm	1		
	(c)	Grams or g	1		
	(d)	Sq(uare) centimetres or cm^2	1		^2cm does not score
5	(a)	(i) Quadrilateral clearly indicated	1		ie not with another shape as well
		(ii) Obtuse angle marked O	1	Angles must be clearly indicated and have labels to earn marks	
		(iii) Acute angle marked A	1	Accept if marked on triangles in (b)	
	(b)	Congruent triangles ticked	1		
	(c)	Cube	1	Condone cuboid	
6	(a)	112	2	M1 for 14×8 and an attempt to evaluate	In (a) and (b) eg repeated addition / subtraction aiming towards correct total scores M1
	(b)	17	2	M1 for $102 \div 6$ and attempt to evaluate	

7		D E B # C (A)	4	1 for each correct label	
8	(a)	2 correct lines only drawn	2	1 if 1 correct line only drawn or if 2 correct and 1 incorrect line drawn	Condone dotted and/or freehand Clear intention of correct positioning
	(b)	Correct reflection drawn	2	1 if only one incorrect, missing or extra vertex	Condone dotted and/or freehand. 2mm tolerance
	(c)	40 "Line" with either "angles" or "180" or both	B1 B1	'180' can be implied by correct answer/working	Eg "Angles =180" 0 . "Line" with answer of 40 1 Reason independent of correct working Condone poor spelling If total quoted it must be correct – eg 'Angles on a line =360' 0
	(d)	(i) "Quad(rilateral)" with "angles" or "360"	1	'4-sided shape' etc does not score	Eg "Angles in quad" 1 . "Angles in shape = 360" 0 "Angles in quadratic = 360" 0 If total quoted it must be correct– eg 'Angles in a quad = 180' 0
		(ii)Opposite	1		Ignore extra words unless contradictory Eg Opposite corresponding scores 0 "X angles" alone scores 0
9	(a)	(i) 1/3	2	1 for 120/360 oe fraction	
		(ii) 60	1		
	(b)	108	1	Allow 106 –110 inc	
	(c)	7° represents 3.5 people oe	1	See list of responses	

10	(a)	5	1		
	(b)	12	1		
	(c)	-10	1		
11	(a)	121	1		
	(b)	5	1		0 for 5^3
	(c)	32	1		
12	(a)	(i) 60	1		Not 60^2
		(ii) 2	2	M1 for evidence of \div by 3 or 25	Division need not be evaluated Eg 50 or 6 seen gets M1
	(b)	$3r^2$	1		Condone $3R^2$ but NOT $3 \times r^2$, $3 \times R^2$ etc
13	(a)	-5, -1, 3	2	1 if any 1 correct in correct place	
	(b)	Correct ruled line within overlay from $x = -1$ to $x = 5$	2	1 for at least 2 of <i>their</i> four points correctly plotted (tolerance 2mm)	Not dotted or dashed
	(c)	1.3 to 1.7 cao	1		Line not necessary
14		297	5	B1 for (1/4 of 600) 150 www B1 for (1/5 of 600) 120 www M1 for $600 - \text{their } (150 + 120)$ M1 dep for subtracting 10% of <i>their</i> 330 Or SC3 for 324	<i>Their</i> (150 + 120) may also include the 10% value Dep on seeing a subtraction from 600 <i>Their</i> 330 to be the result of subtracting <i>their</i> (150 + 120) from 600 Evaluation of 10% of <i>their</i> 330 must be correct

15	(a)	(i) 5 : 2 isw	1	Accept 5/2 oe : 1 or 1 : 2/5 oe	
		(ii) 3 : 8 isw	1	Accept 3/8 oe : 1 or 1 : 8/3 oe	Condone 3p : 8p or £3 : £8 but NOT 3p : £0.08 For 3/8 accept 0.37 to 0.38 For 8/3 accept 2.6 to 2.7
		(iii) 7 : 10 isw	1	Accept 7/10 oe : 1 or 1 : 10/7 oe	For 10/7 accept 1.42 to 1.43
	(b)	A - 320, K - 800, P - 480 www	3	B2 for two correct values in correct positions www Or M1 for 1600 ÷ <i>their</i> (2 + 3 + 5) soi	One correct value in correct position www can imply M1
16		4:45 (pm)	3	Condone 16:45 for 3 marks B2 for 2½ or 2.5 (ignore units) or 2h 30m or 150 <u>min</u> seen Or M1 for 150 ÷ 60 soi	B2 implied by answers 4:65 or 5:05 M1 for Eg counting in 60s (either adding or subtracting at least one 60) Can be implied by seeing eg 120 miles = 2 hours etc
17		1.93 isw	3	M1 for intention to multiply number and frequency seen or implied by 193 or 201 And M1 for ÷ 100 soi indep.	<u>For this second (indep) M mark</u> Eg. 202 with answer 2 scores M1 (÷ 100 implied) Eg. 100 ÷ 195 with answer 1.95 scores M1 (bod ÷ 100) Eg. 100 ÷ 191 with answer of 19.1 scores M0

18	(a)	Reflect(...) cao $y = -1$	1 1	No other transformation soi	Eg. reflected, reflecting etc
	(b)	Image at (-1,2) (-1,5) (-2,5)	3	B2 for correct orientation, wrong position or for correct 90° clockwise rotation about O Or B1 for two correct vertices or for correct image with other attempts Or SC2 for correct rotation of B Or SC1 for correct 180 rotation	Ignore label. Clear intention, condone freehand. (1, -2) (1, -5) (2, -5) (3,2) (3,5) (4,5) (-2,-1) (-5,-1) (-5,-2)
19	(a)	$3(x - 3)$ cao final answer	1	Condone $3(1x - 3)$	Condone missing final bracket
	(b)	$16x - 13$ cao final answer	2	B1 for $6x + 2$ or $(+)10x - 15$ seen	Condone $+16x - 13$

20	(a)	4, 7	2	B1 for one value correct in correct position Or SC1 for 3, 4	
	(b)	$4n - 2$ oe	2	B1 for $4n$ oe seen	Accept $n \times 4 - 2$ etc Condone $4x - 2$ etc Condone $n = 4n - 2$ etc
	(c)	$\frac{T-5}{2}$ or $\frac{T}{2} - \frac{5}{2}$ oe final answer	2	M1 for $T - 5 = 2n$ oe or $\frac{T}{2} = n + \frac{5}{2}$ Or SC1 for final answer $\frac{T}{2} - 5$ or $\frac{T+5}{2}$ or $T - \frac{5}{2}$ or $T - 5 \div 2$ or $T - \frac{5}{2}$ or $\frac{5-T}{2}$ oe	
21		$2 \times 0.6 \times 7$ 8.4 cm^3	M1 A1 B1	May be in steps	NOT $1 \times 2 \times 0.6 \times 7$

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity



OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2011