OCR
Oxford Cambridge and RSA

GCSE

Mathematics A

Unit **A502/02:** Unit B (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2015

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, 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.

1 Annotations used in the detailed Mark Scheme.

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 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.

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 not from wrong working **full marks** should be awarded.

   Do not award the marks if the answer was obtained from an incorrect method, i.e. incorrect working is seen and 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, e.g. 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 e.g. 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 e.g. 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 (i.e. **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)		59 & 28 63 & 6	2	**B1** for 3 correct	
	(b)	(i)	$60 \div 0.05$ or $\frac{60}{0.05}$	1		Allow 'busstop' method with clear 60 and 0.05
		(ii)	1200	3	**M2** for full correct method or **M1** for one correct step If zero scored **SC1** for figs 12 as answer nfww	e.g. attempt at long division (60/0.05 or 6000/5) seen that would lead to correct order of magnitude and first step correct e.g. 20 per second, 20 ~ 1, 2 per 0.1 s, *their* 20 x 60, etc 20 or 60/5 alone do not score
2	(a)		6	1		
	(b)		5*m*	1	cao	
	(c)		✓ _ _ _ _ _ ✓ _ _ _ _ ✓ _ _ ✓ _	3	Allow **2** for 3 correct or **1** for 2 correct For 1st answer condone 'formula'	

Question			Answer	Marks	Part Marks and Guidance	
3	(a)		Rotation 90° anticlockwise [Centre] (3, -3)	**3**	Allow **1** each line 0 if > one transformation given	Or rotate, rotates, rotated. Condone 'turn' Or 270° clockwise Allow 'about', 'point', origin etc
	(b)		Image at (5, -1), (6, -1), (5, -3)	**2**	Allow **1** if translated $\begin{pmatrix}2\\p\end{pmatrix}$ or $\begin{pmatrix}q\\-4\end{pmatrix}$	Use overlay Condone freehand. Mark intention.
	(c)		[Lengths] × 4 [Angles] unchanged oe	**1** **1**	Do not accept "The shape" or 'measurements' for "lengths"	Condone "Lengths increase by 4" but not "Lengths increase by 4cm" Ignore comments about congruence or similarity etc See appendix for exemplar comments
4	(a)		5 points correct	**2**	**B1** for 2, 3 or 4 points correct	± one small square Use overlay Ignore any joining or extra points
	(b)		2002 to 2007	**1**		
	(c)		[Values are] rounded [Could have] increased by x	**1** **1**	Accept "[correct] to the nearest 1000" for "rounded" $0 < x < 1000$ May give any two different values from 1500 to 2500 **If 0 scored SC1** for they could rise and fall back oe or there could be a small change	Ignore comments on average Need a quantitative reason Condone 1000 See appendix for exemplar comments

Question			Answer	Marks	Part Marks and Guidance	
5	(a)		1750	**1**		
	(b)		[*their* 1750] ÷ 6	**1**		
	(c)		$1\frac{5}{16}$	**4**	**B1** for $\frac{7}{4}$ And **M1** for $\frac{7}{4}\times\frac{3}{4}$ And **A1FT** for $\frac{21}{16}$ Or if decimals used **M1A1** for 1.3125	13125/10000 oe implies 2 $1\ {}^{3125}/_{10000}$ oe implies 3

Question			Answer	Marks	Answer
6			Clear method including - DGH = 59° Angles on a straight line = 180° BDE = 59° Corresponding [angles] DEB = 74° Angles on a straight line = 180° x = 180 – 59 – 74 = 47° Angles in a triangle = 180°	**5**	'line' & either 'angles' or 180° Condone F angles
			As above but with either • no more than 2 missing/wrong reasons or • no more than 1 arithmetic slip • lack of clarity	**4-3**	For lower mark either • 47 found NFWW with more than 2 reasons missing/wrong or • full method with no more than 2 arithmetic slips or • full method with 2 missing/wrong reasons and 1 arithmetic slip
			Either • 2 correct angles found or • 1 angle found with reason	**2-1**	For lower mark 1 angle found without reason
			Nothing of any worth	**0**	

Question			Answer	Marks	Part Marks and Guidance	
7	(a)		Shading above given line	**1**		For each part shading should extend along length of line but may be of minimal width
	(b)		Dotted line $x + y = 5$ drawn Shading above *their* $x + y = 5$	**1** **1**	At least from (1, 4) to (5, 0)	Condone solid line
	(c)		$x = 1$, $y = 3$	**3**	**B1** for dotted $y = 2$ drawn And **B1FT** for shading below *their* $y = 2$	Condone solid line FT *their* horizontal line

Question			Answer	Marks	Part Marks and Guidance	
8	(a)		£11 or 1100p	1		
	(b)	(i)	$C = 0.2w + 8$	1		
		(ii)	7.5 with supporting algebra	3	**M1** for $0.6w + 5 =$ *their* $(0.2w + 8)$ **Dep M1** for *their* $0.4w =$ *their* 3 If 0, **SC1** for 7.5 as final answer	i.e. a correct equation involving w i.e. collecting w and numbers If simultaneous equations used then **M1** for $C = 9.5$ (must be clear) and **Dep M1** for substitution in either equation
		(iii)	No number of windows gives the same cost or Richard is cheaper for [up to] 7[.5] windows oe	1		FT sensible comment following any non-integer answer See appendix for exemplar comments
9			$0.3\dot{6}$ cao	2	Or **M1** for attempt at $4 \div 11$	At least 1 step Not for $11 \div 4$ Condone $0.\overline{36}$ 0.36[3..] implies **M1**
10			$55\sqrt{2}$	4	Or **B1** for $5\sqrt{2}$ or $40\sqrt{2}$ And **M1A1** for $\frac{30\sqrt{2}}{\sqrt{2}\sqrt{2}} = 15\sqrt{2}$	
11			$16x^2 + 12x + 1$ isw	3	Allow 1 per term	

Question			Answer	Marks	Part Marks and Guidance	
12	(a)		$\begin{pmatrix} 6 \\ -6 \end{pmatrix}$	1		If 'fraction lines' seen penalise 1 mark first time only
	(b)	(i)	$\begin{pmatrix} 2 \\ 10 \end{pmatrix}$	2	Or **M1** for $\begin{pmatrix} 3 \\ 7 \end{pmatrix} + \begin{pmatrix} -1 \\ 3 \end{pmatrix}$	
		(ii)	$\begin{pmatrix} 4 \\ -12 \end{pmatrix}$	2	Or **M1** for $-4\begin{pmatrix} -1 \\ 3 \end{pmatrix}$	

APPENDIX 1

Exemplar responses for question 3(c)

Response	Mark awarded
The size of L would increase by 4 x its original size	0
The lengths and angles will become 4 x bigger of triangle L. Also it will the image is not the same as the original shape	1 0
They would all increase and become 4 times larger	1 0
It will be 4 times bigger of triangle L from point (0, 0)	0
The angles will be the same after enlargement but the lengths will be different	0 1
Angles will stay the same, lengths would be divided by 4	0 1
The angles would remain the same. The lengths would increase by 4	1 1
The lengths would increase however the angles would stay the same	0 1
The sides would all multiply in size by 4 so it would be 8 high and wide	1 0
They would all increase by 4 times the size	1 0
The angles would be the same because the triangles would be congruent but the sides would be 4 times larger	1 1
It will be 4 times as large as its original size	0
The lengths would double but the angles stay the same	0 1
The angles would stay the same but the lengths would be increased by 4. You would have to multiply the existing lengths by 4 to obtain the new lengths.	1 1

Exemplar responses for question 4(c)

Response	**Mark awarded**
They could have increased between 1952 and 1957 and then decreased back to 2	SC1
The increase in price might not have been big enough to show up on this graph's scale	SC1
The prices are given to the nearest thousand, so they could have increased but just not over the £2500 mark as then it would be £3000 to the nearest thousand	1 1
Because prices are given to the nearest thousand so by saying two it can be between 1500 and 2499	1 1
It is difficult to see where exactly the points are because the *y* scale is too small	0
It is right because the price was 2000 each and it did not increase, price was constant	0
Price in 1952 is only about £2000. The change may be as small as £200 but that is a 10% increase	0 1
Because it is an average and not an exact amount	0
They increase by thousands but a house might have raised by hundreds	0 1
It may have increased because although the prices are both £2000, 1952 could have been closer £2000 and 1957 could have been nearer £3000	0 Too vague
Because an average is not always accurate at 1952 the price was 2 however in 1957 it's around 2.5 as there is a curve in the graph	0
Because from 1952-1957 it only shows the average, some houses may have increased	0
It could have increased by a different number instead of thousands	0
Because it is rounded to the nearest thousand so you don't know	1 0
Because it is rounded to thousands of pounds, so it may just not be a major increase	1 0
We know it was 2 in 1952 and 2 in 1957, but any time in between those times it could have been different	SC1
As the average house price goes up by £4000	0
The price is in thousands (to the nearest), so 1952 may have been £1500 to 57's £2500	1 1
They may of rose by a small amount, the scale is too big to see	SC1

Exemplar responses for question 8(b)(iii)

Response	Mark awarded
They can't wash a whole window for it to cost the same amount	1
That they won't be the same price	1
If they clean 7.5 windows each the charge is the same for both	0
They will never be paid the same amount as it isn't a whole number of windows	1
They will never actually have the same charge as you can't have half a window	1
If you cleaned 8 windows they would both charge the same	0
A same charge is not possible as you cannot have ¾ of a window (FT from 0.75 seen in (ii))	1
It doesn't make a difference as you won't have half a window done	0
It isn't possible for Anna and Richard to charge the same	1
How many windows can be cleaned for the same price	0
Someone would have to have 7.5 windows	0
You'll have to have half a window	0
They will never be paid the same amount as it isn't a whole number of windows	1
You can't do it as you don't get 7.5 windows	0
If you have more than 7.5 windows, Anna is cheaper	1
If there are less than 7 windows Richard is cheaper, if not, Anna is cheaper	0
If there are less than 7 windows Richard is cheaper	1
If there are less windows Richard is cheaper	1
It's more economical to use Richard until this point	bod 1
Richard makes more money with more windows, Anna makes more money with less	0

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

OCR Customer Contact Centre

Education and Learning
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