

GCSE

Mathematics A

Unit **A502/01**: Unit B (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2015

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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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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 $180 \times (\text{their '37'} + 16)$, or FT $300 - \sqrt{(\text{their '5}^2 + 7^2)}$. Answers to part questions which are being followed through are indicated by e.g. FT $3 \times \text{their (a)}$.

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.
 - **nfw** 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)		$12 - 7 = 5$ $12 - 5 = 7$	1 1	If 0 scored SC1 for one correct calculation involving ± 12 , ± 5 , ± 7	
	(b)	(i)	9	1		
		(ii)	1	1	Accept other correct versions e.g. $\frac{6}{6}$	
	(c)		80	2	M1 for $\frac{1}{4}$ or 4 linked to 20 Or B1 for 40 seen	4 may be 2×2 or $\frac{1}{4}$ may be $\frac{1}{2} \times \frac{1}{2}$
2	(a)		(-2, 3) correctly plotted	1		Mark intention
	(b)	(i)	A point plotted on $x = -2$	1FT	FT <i>their</i> x-coordinate from (a) Accept any clear mark but not (-2, 3)	Mark intention At least one point must be labelled B or C
		(ii)	Correct coordinates for <i>their</i> (i)	1FT		
	(c)		A point plotted on $y = 3$	1FT	FT <i>their</i> y-coordinate from (a) Accept any clear mark but not (-2, 3)	Mark intention At least one point must be labelled B or C
	(d)		Third box indicated only	1FT	Strict FT <i>their</i> three points	
3	(a)		Radius	1		
	(b)		60	1		
	(c)		120	2	M1 for $360 \div 3$ oe	

Question			Answer	Marks	Part Marks and Guidance	
4	(a)	(i)	100	1		
		(ii)	20	1		
		(iii)	10	1	Condone 8 to 12	

Question		Answer	Marks	Answer	
4	(b)	<p>Fully correct solution with working, annotation and correct money conventions and containing all of</p> <ul style="list-style-type: none"> • 180 pages • Callum $18 \times £2$ oe = £36 • Elena $180 \times 15p$ oe = £27 • Callum raises more oe or No 	4	Accept p or £ form throughout	For these two alternative methods Bullets 2 and 3 may be
		<p>Fully correct solution with some annotation and correct money conventions and containing all of</p> <ul style="list-style-type: none"> • 180 [pages] • Callum = £36 • Elena = £27 • Callum raises more oe or No <p>OR</p> <p>Solution with working, annotation and correct money conventions and containing three of</p> <ul style="list-style-type: none"> • 180 [pages] • Callum $18 \times £2$ oe = £36 • Elena $180 \times 15p$ oe = £27 • Callum raises more oe or <i>their</i> No 		<p>If wrong number of days used (e.g. 200) maximum mark is 2</p> <p>Partial solution containing two of</p> <ul style="list-style-type: none"> • 180 [pages] • [Callum] <i>their</i> $18 \times £2$ oe or £36 • [Elena] <i>their</i> $180 \times 15p$ oe or £27 • Correctly identifies <i>their</i> highest or Callum raises more oe or <i>their</i> No 	<p>OR</p> <p>Callum $£4 \times 9 = £36$ or $200p \div 10 = 20p$</p> <p>Elena $20p - 15p = 5p$ and $5p \times 180 = 900p$</p>
		<p>Partial solution containing one of</p> <ul style="list-style-type: none"> • 180 [pages] • [Callum] <i>their</i> $18 \times £2$ oe correct or £36 • [Elena] <i>their</i> $180 \times 15p$ oe correct or £27 • Correctly identifies <i>their</i> highest or Callum raises more oe or <i>their</i> No following some working 		No relevant work	<p>For this method, bullets 1, 2 and 3 may be</p> <p>Callum 9 days, Elena 6 days</p> <p>Callum $£4$ a day, $£4 \times 9 = £36$</p> <p>Elena $30 \times 15p = £4.50$ a day and $£4.50 \times 6 = £27$</p>

Question			Answer	Marks	Part Marks and Guidance	
5	(a)	(i)	$y > 8$	1		
		(ii)	$w < 4$	1		
	(b)		Fourth box indicated only	1		

Question			Answer	Marks	Part Marks and Guidance	
6			Fully correct solution with working and some annotation and containing all of <ul style="list-style-type: none"> Square [number] 36 or 6^2 oe Cube [number] 27 or 3^3 oe $27 + 9 = 36$ oe Yes, it is oe with no wrong numbers referenced 	4	e.g. $36 - 9 = 27$ e.g. 64	Could be Even – odd (9) is odd Only odd cubes...1 and 27 $1 + 9 = 10$, $27 + 9 = 36$ Yes it is
			36 and “Yes” oe with no wrong numbers referenced Or <ul style="list-style-type: none"> Square [number] 36 Cube [number] 27 $27 + 9 = 36$ oe 	3-2	Two from <ul style="list-style-type: none"> Find at least three square numbers below 100 Find at least two cube numbers below 100 Add 9 to one of <i>their</i> cube numbers or subtract 9 from one of <i>their</i> square numbers Identify <i>their</i> even square numbers State, “Even – 9 must be odd” Identify 10 and 36 	1, 4, 9, 16, 25, 36, 49, 64, 81 1, 8, 27, 64 10, 17, 36, 73
			One from <ul style="list-style-type: none"> Find one square number below 100 Find one cube number below 100 Add 9 to <i>their</i> cube number or subtract 9 from <i>their</i> square number Identify <i>their</i> even square number State, “Even – 9 must be odd” Identify 10 and 36 	1-0	No relevant working	$1^3 = 1$, $3^3 = 27$ so $1 + 9 = 10$ (not square) $27 + 9 = 36$ (square)

Question			Answer	Marks	Part Marks and Guidance	
7	(a)		Rectangle that is not $4n$ by $2n$	1		Length is not double width
	(b)		<p><i>Their</i> width $\div$ <i>their</i> length correct and $\neq \frac{2}{4}$ oe</p> <p>Or</p> <p>$4 \times a = \text{their length}$ and</p> <p>$2 \times b = \text{their width}$</p>	2	<p>M1 for one correct scale factor or ratio between length and width</p> <p>$b \neq a$</p> <p>If 0 SC1 for Correct reference to “too long” or “too thin” oe or different scale [factor]</p>	<p>Fractions must be shown to be different by equivalence or reduction (correctly) to decimals</p> <p>Accept length is not double width oe for 2 marks</p> <p>Must compare both e.g. “It is too long for the width”</p>
8	(a)	(i)	[0].27	1	Allow 27% or fraction equivalent to	
		(ii)	3	1		
	(b)		<p>First row $\times$</p> <p style="text-align: center;">$+$</p> <p>Second row 3.75 or $3\frac{3}{4}$</p> <p>Third row 6</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>		
9	(a)		Estimate number of days in 3 months	1	[3 months about] $(28 \text{ to } 33) \times 3$ [days] or $7 \times (12 \text{ or } 13)$ [days] or 84 to 99 [days] seen	
	(b)	(i)	[0].3[000]	1		
		(ii)	[0].3 $\times$ 100 oe	1		Accept $0.2894 \times 100 = 28.94$ which is approximately 30 oe e.g. $0.2894 \times 100 = 30$ 1sf

Question			Answer	Marks	Part Marks and Guidance	
	(c)		[£]84 cao	5	B1 for [£]1, [0].9 and [£]2 seen And M1 for $30 \times \textit{their}$ (1 or 1.05 or 1.04) And M1 for $30 \times \textit{their}$ ([0].9 or [0].91) oe And M1 for $\textit{their} 27 \times \textit{their}$ (2 or 2.1 or 2.08) If B0 M1 for correctly adding <i>their</i> water supply and sewer costs	Allow 90% for 0.9 soi 30 or 31.5 or 31.2 soi 27 or 27.3 or 28.39[2] soi 54 or 56.7 or 56.16 or 56.78[4] For ' <i>their</i> 27' allow a value seen from STEP 2 rounded (may be 30) STEP 1 + STEP 3
10	(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 $\times 4$ 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

Question			Answer	Marks	Part Marks and Guidance	
11	(a)		5 points correct	2	B1 for 2, 3 or 4 points correct	±1 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
12	(a)		Zero oe	1		Accept None, no, nothing, 0 but not scattered
	(b)		8 more points to show down left to right	1	Accept sufficient points to show downward trend	Ignore line of best fit

APPENDIX 1

Exemplar responses for question 10(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 11(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

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