

**Mathematics A**

General Certificate of Secondary Education

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

**Mark Scheme for January 2013**

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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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## Annotations

Annotation	Meaning
	Correct
	Incorrect
<b>BOD</b>	Benefit of doubt
<b>FT</b>	Follow through
<b>ISW</b>	Ignore subsequent working (after correct answer obtained), provided method has been completed
<b>M0</b>	Method mark awarded 0
<b>M1</b>	Method mark awarded 1
<b>M2</b>	Method mark awarded 2
<b>A1</b>	Accuracy mark awarded 1
<b>B1</b>	Independent mark awarded 1
<b>B2</b>	Independent mark awarded 2
<b>MR</b>	Misread
<b>SC</b>	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, ie 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, eg FT  $180 \times (\textit{their '37'} + 16)$ , or FT  $300 - \sqrt{(\textit{their '5^2 + 7^2'})}$ . Answers to part questions which are being followed through are indicated by eg FT  $3 \times \textit{their (a)}$ .

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 for example 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. 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).
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 **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.
10. 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.
11. Ranges of answers given in the mark scheme are always inclusive.
12. 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.
13. 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)		61	1		
	(b)	(i)	48	1		
		(ii)	80	1		
	(c)		92	4	<p><b>M3</b> for <math>20 + 42 + 30 =</math> answer, with one numerical error</p> <p>Or <b>M2</b> for <math>20 + 42 + 30 =</math> answer, with two numerical errors or for <math>(5 \times 4) + (6 \times 7) + (3 \times 10)</math></p> <p>Or <b>M1</b> for any one of 20, 42 or 30</p>	<p>20 must NOT come from <math>4 + 6 + 10</math></p> <p>eg <math>20 + 42 + 30 = \mathbf{102}</math> or <math>\mathbf{40} + 42 + 30 = 112</math></p> <p>eg <math>20 + 42 + \mathbf{40} = \mathbf{92}</math> or <math>\mathbf{30} + 42 + \mathbf{40} = 112</math></p>
2	(a)	(i)	Any 2 squares indicated	1		
		(ii)	$\frac{3}{5}$ oe, mark final answer	1	May be $\frac{15}{25}$	
	(b)		$\frac{7}{15}$	2	<b>M1</b> for $\frac{14}{30}$ seen	If both appear on answer line, in any order, condone for <b>2</b> marks
	(c)		75	2	<p><b>M1</b> for 25 seen or <math>100 \times 3 \div 4</math> oe</p> <p>Or <b>SC1</b> for 75% given as answer</p>	If marked as 25% then no marks but if seen as 25 award <b>1</b> mark
3	(a)	(i)	Square root	1		
		(ii)	Cube	1		

Question		Answer	Marks	Part Marks and Guidance	
	(b) (i)	8	1		
	(ii)	13	1		
4	(a)	Rectangle Parallelogram Trapezium	3	<b>B1</b> for each correct answer	
	(b)	Acute	1		
	(c)	25	2	<b>M1</b> for 180 – <i>their</i> (95 + 60)	95 + 60 = 155

Question		Answer	Marks	Answer
	(d)*	<p>Completely correct answer, well expressed and using correct geometrical terms and including <b>all of</b>:</p> <ul style="list-style-type: none"> <li>• [Angles of] quadrilateral = [angles of] two triangles</li> <li>• Angles of triangle = 180</li> <li>• 180 + 180 = 360 oe</li> </ul> <p>Correct answer, poorly expressed including <b>two from</b>:</p> <ul style="list-style-type: none"> <li>• Two triangles</li> <li>• Triangle = 180 (may be on diagram)</li> <li>• 180 + 180 = 360 oe</li> </ul> <p>No relevant comments</p>	<p>3</p> <p>2-1</p> <p>0</p>	<p>Answer contains no errors such as “a triangle is half the quadrilateral”</p> <p>Minimum case: Angles, triangle, 180</p> <p>oe is a calculation or a calculation in words such as <math>2 \times 180 = 360</math> or “2 lots of 180 make 360” or “half 360 is 180” BUT NOT “two triangles put together make 360”</p> <p><b>Must</b> be from <b>angles of triangles</b> and NOT formula for sum of angles in polygon</p> <p><b>One from</b>:</p> <ul style="list-style-type: none"> <li>• Two triangles</li> <li>• Triangle = 180 (may be on diagram)</li> <li>• 180 + 180 = 360 oe</li> </ul>

Question		Answer	Marks	Part Marks and Guidance	
5	(a)	Indicate last letter	1	0 if other letters indicated	eg 1 and 5 indicated scores 0
	(b)	Indicate 2 <sup>nd</sup> and 3 <sup>rd</sup> G only	2	B1 for either 1 correct only or 1 correct and only 1 wrong or 2 correct and only 1 wrong	
6	(a)	(i)	20	1	
		(ii)	30	2	M1 for $120 \div 4$ oe  Full method required for M1 but condone one numerical error 10% ( $\div 10$ ) 20% ( $= 10\% \times 2$ ) 5% ( $= 10\% \div 2$ ) 25% = 20% + 5%
	(b)	87	1		NOT 87.00 or 87.0
7	(a)	3 points correctly marked	1	Ignore any other points	Use overlay and centre of mark to be within or on circle
		Last given point and <i>their</i> points joined in correct order by lines	1	Lines intended straight Must be at least 2 points plotted	
	(b)	25 <sup>th</sup> Feb	1		

Question	Answer	Marks	Answer
(c)*	<p>Completely correct answer, well expressed and using correct terms and including <b>all of</b>:</p> <ul style="list-style-type: none"> <li>• 1.11</li> <li>• (€)111</li> <li>• €9</li> <li>• Clear statement that it is better to pay in pounds</li> </ul> <p>Clear working and <b>3 from</b>:</p> <ul style="list-style-type: none"> <li>• 1.11</li> <li>• <i>Their</i> <math>1.11 \times 100</math></li> <li>• <math>120 - \textit{their} 111</math></li> <li>• Clear statement correctly interpreting <i>their</i> converted £100 to euros or €120 to pounds</li> </ul> <p>Or €9 and clear indication of paying in pounds but without working</p> <p><b>1 from</b>:</p> <ul style="list-style-type: none"> <li>• 1.11</li> <li>• <i>Their</i> <math>1.11 \times 100</math></li> <li>• <math>120 - \textit{their} 111</math></li> <li>• Clear statement correctly interpreting <i>their</i> converted £100 to euros or €120 to pounds</li> </ul>	<p>4</p> <p>3-2</p> <p>1-0</p>	<p><b>Accept equivalent methods and figures in pounds throughout</b>  <b>€120 = £108[.1]</b>  <b>108.1 – 100 or £8[.1] (= €9 difference)</b></p> <p>Any statement to the effect that the phone is cheaper by £20 is invalid  In any statement, credit may only be given if an attempt has been made to convert the full price of the phone to a different currency eg be convinced that <math>120 \times 1.11</math> is then considered to be in pounds (either by use of £ or usage)</p> <p><b>2 from</b>:</p> <ul style="list-style-type: none"> <li>• 1.11</li> <li>• <i>Their</i> <math>1.11 \times 100</math></li> <li>• <math>120 - \textit{their} 111</math></li> <li>• Clear statement correctly interpreting <i>their</i> converted £100 to euros or €120 to pounds</li> </ul> <p>No relevant working</p>

Question		Answer	Marks	Part Marks and Guidance	
8		30	3	<b>B1</b> for $EBA = 75$ soi <b>M1</b> for $180 - (2 \times \textit{their EBA})$	May be seen on diagram or may be implied by 150 180 – 150 scores <b>M1B1</b>
9	(a)	(4, 5)	1		
	(b)	Completely correct reflection	2	<b>B1</b> for correct reflection in $x$ -axis or $x = k$	Accept good freehand and mark vertices of lines within overlay circles
10	(a) (i)	30 (30) 30 (30) 32 34 36 (38) 40	2	<b>B1</b> for all 30s correct or 32 to 40 correct	
	(ii)	Correct ruled graph from 60 to 140	2	<b>B1</b> for 4 points from <i>their</i> table plotted or either straight line section correct	Overlay available Allow top of histogram to imply points so long as consistently top left, right or middle
	(b) (i)	Correct ruled graph from 60 to 140	2	<b>B1</b> for at least 2 correct (and not more than one incorrect) points plotted or for part of the correct line	Overlay available Covering a range of at least 40 Ignore labels
	(ii)	120 ( $\pm 2$ )	1FT	Correct or FT <i>their</i> single point of intersection from (b)(i) ( $\pm 2$ )	
11	(a)	4 correct points	2	<b>B1</b> for 1 correct	Overlay available Accuracy: vertical - to within one division; horizontal - intention is on the line Condone any 'joining'
	(b)	No correlation	1		
12	(a)	(0, 4)	1		

Question		Answer	Marks	Part Marks and Guidance	
	(b)	2	1	<b>B0</b> for $2x$	
	(c)	$y = 2x + 1$	2FT	Correct or FT <i>their</i> (b) <b>B1</b> for $y = (\textit{their } 2)x + k$ or $y = kx + 1$  or $(\textit{their } 2)x + 1$	Condone $y = 1$ but not $y = k + 1$ Hence $y = 0 + 1$ scores <b>0</b> but $y = 0x + 1$ scores <b>1</b> mark  No subject

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