

GCSE

Mathematics B (Linear)

Component **J567/01**: Mathematics Paper 1 (Foundation)

General Certificate of Secondary Education

Mark Scheme for June 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.

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

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Annotations used in the detailed Mark Scheme.

Annotation	Meaning
	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	Correct
	Incorrect
	Benefit of doubt
	Follow through
	Ignore subsequent working (after correct answer obtained), provided method has been completed
	Method mark awarded 0
	Method mark awarded 1
	Method mark awarded 2
	Accuracy mark awarded 1
	Independent mark awarded 1
	Independent mark awarded 2
	Misread
	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.
 - **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 (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.

MARK SCHEME

Question		Answer	Marks	Part marks and guidance	
1	(a)	190 g	1		
	(b)	450 cm	1		
	(c)	5 ml	1		
2		Correct reflection (± 2 mm)	2	B1 for 2 vertices correct	excluding those on the mirror line see overlay condone freehand
3	(a)	11 correct rows no repeats	2	B1 for 6 or more additional correct rows, condone repeats	accept 1, 2, 3 and 4 used if intention is clear for B1
	(b)	(i)	1		
		(ii)	1		
4	(a)	(i)	1		
		(ii)	1		
		(iii)	2	M1 for attempt to divide Or figs 24 as answer	
		(iv)	2	M1 attempt at complete method allow 1 arithmetic error ft their first percentage SC1 52 as final answer	
	(b)	(i)	1		must be fraction

Question			Answer	Marks	Part marks and guidance	
		(ii)	0.6	2	M1 for $3 \div 5$ oe	
5	(a)	(i)	29	1		
		(ii)	+ 6	1		need direction and quantity, $6n - 1$ Maybe on diagram
	(b)		37	2	M1 for 10×4 soi by 40	
6			4.02, 4.024, 4.042, 4.2, 4.202	2	B1 for 1 not in correct order SC1 order reversed	
7	(a)		6	1		
	(b)		Jelly	1	FT toffee ≥ 13	Condone Jelly with 13
	(c)		Linear scale for frequencies starting from 0 Fully correct bar chart 7, 13, 6, 2, 12	1 2FT	FT <i>their</i> value for toffee in the table B1 for <i>their</i> 4 correct heights or bars of equal widths and gaps	0 need not be marked if no scale FT implied consistent linear scale Do not condone extensions to grid. Heights must be in correct half of square. Do not follow through incorrect scale for heights Condone freehand
8	(a)	(i)	(-4, -1)	1		
		(ii)	Point plotted at (-4, 3)	1		

Question			Answer	Marks	Part marks and guidance	
		(iii)	Correct name of their triangle in (a)(ii)	1FT	Strict FT from <i>their</i> (-4, 3)	
	(b)		Radius drawn	1		Allow within 1mm of the circumference and/or centre by eye Allow freehand
9	(a)	(i)	$3a$	1		
		(ii)	$5c - 7d$	2	B1 for $5c$ or $-7d$	
		(iii)	b^8	1		
	(b)	(i)	12	1		
		(ii)	$\frac{9}{6}$ oe	2	M1 for a correct step eg $13 - 4 = 6x$ or $x = b/a$ after $ax = b$ ($a \neq 1, b \neq 0$) from <i>their</i> equation	
	(c)		$P = 6h$	2	M1 for $6h$ oe or $h = \frac{p}{6}$ or $\frac{p}{h} = 6$	Accept $6 \times h$, $h6$, $h+h+h+h+h+h$ oe

Question	Answer	Marks	Answer
<p>10(a)*</p>	<p>Group ticket, 2 children and 2 over 60's and cost of £104 selected after showing values of [£111], £109, £106 and £104 with complete working to show how these prices have been obtained. ie 8 individual tickets at £109 and 2 group tickets at £106 and 1 group ticket and 2 over 60s and 2 children at £104 [and 1 group ticket and 2 adults and 2 children at £111]</p> <p>Values of [£111], £109, £106 and £104 with complete working to show how these prices have been obtained. ie 8 individual tickets at £109 and 2 group tickets at £106 and 1 group ticket and 2 over 60s and 2 children at £104 [and 1 group ticket and 2 adults and 2 children at £111] with no or incorrect conclusion.</p> <p>Showing two costs of entry for 8 people with working (condone 1 arithmetic error per combination) or one fully correct cost of entry for 8 people with working</p> <p>No worthwhile work attempted</p>	<p>5</p> <p>4 – 3</p> <p>2 – 1</p> <p>0</p>	<p>Showing three costs of entry for 8 people with working (condone 1 arithmetic error) or two fully correct costs of entry for 8 people with working and correct conclusion for their calculations</p> <p>Showing one cost of entry for 8 people with working (condone 1 arithmetic error)</p> <p>NB Group of 8 people must contain 4 children</p>

Question			Answer	Marks	Part marks and guidance	
10	(b)	(i)	55	1		
		(ii)	27	2	M1 for ordered list of 8 values or 23 and 31 identified	List could be seen in earlier part of the question, unless alternative method leads to an incorrect answer
	(c)		6.04	1		
	(d)	(i)	36	2	M1 for 11 + 11 + 7 + 7 or better	Ignore extra units given
		(ii)	77 m ²	2 1	M1 for 11 × 7	
	(e)		8	1		
	(f)		1635 or 4:35pm	1		Do not accept 4:35 am or 0435 condone 4:35 or 1635pm

Question		Answer	Marks	Part marks and guidance	
11		400 nfw	4	<p>M1 for $10 \times 20 \times 5$ soi by 1000</p> <p>M1 for $200 \times 50 \times 40$ soi by 400000</p> <p>M1 for attempt at division of <i>their</i> '$200 \times 50 \times 40$' ÷ <i>their</i> '$10 \times 20 \times 5$'</p> <p>-----</p> <p>or</p> <p>M3 for $10 \times 5 \times 8$</p> <p>or</p> <p>M2 for 10 and 5 and 8</p> <p>or</p> <p>M1 for 10 or 5 or 8 clearly linked to 200(2m) or 50 or 40</p>	<p>accept equivalent</p> <p>numbers being divided must be volumes and division must be seen</p> <p>Check diagram for numbers</p> <p>Accept alternative orientations of the small cuboids</p>
12	(a)	$\frac{6}{11}$	1		Penalise incorrect form once
	(b)	$\frac{5}{11}$	1	FT 1 – <i>their</i> (a)	
	(c)	0	1		Accept $\frac{0}{11}$ or words zero, nil or nought only
13	(a)	$\frac{3}{4}$	2	B1 for $\frac{9}{12}$ oe	Must be fraction
	(b)	$\frac{7}{8}$ oe	2	M1 correct common denominator with 2 numerators	Condone 1 error in numerators

Question		Answer	Marks	Part marks and guidance	
	(c)	$3\frac{5}{6}$	1		
	(d)	$\frac{13}{8}$	1		
	(e)	$3\frac{13}{30}$ or $\frac{103}{30}$ or any equivalent fraction isw	3	<p>M2 for $\frac{13}{30}$ oe from a subtraction</p> <p>or $\frac{18}{30}$ and $\frac{5}{30}$ oe or $\frac{168}{30}$ and $\frac{65}{30}$ oe</p> <p>allow an error in one of the two numerators with a correct common denominator</p> <p>or</p> <p>M1 for any correct attempt to get a common denominator</p> <p>or $\frac{28}{5}$ and $\frac{13}{6}$ oe</p>	<p>eg $\frac{36}{60}$ and $\frac{11}{60}$ scores M2</p> <p>eg two fractions with common denominators of a multiple of 6×5</p>
14		48	2	M1 for $60 \div (1 + 4)$ or 12	<p>answer of 12:48 or 48:12 implies M1</p> <p>note: 48 out of 60 scores 2</p> <p>48/60 scores M1</p>
15		Correct octagon with all vertices on circumference	2	<p>M1 for $360 \div 8$ or 45</p> <p>SC1 for any octagon with at least 5 vertices on circle</p>	

Question		Answer	Marks	Part marks and guidance	
16	(a)	4 points correctly plotted (± 1 mm)	2	B1 for any two points correctly plotted	
	(b)	negative	1		Ignore any extra statements such as 'strong'
	(c)	ruled line of best fit between 1.60 and 2.10	1	tolerance on 1.60: 45 – 55 and on 2.10: 20 – 30	use overlay and ignore any lines joining up the points
	(d)	(1.81, 15) indicated on graph	1		
	(e)	<u>Strict</u> follow through from <i>their</i> line of best fit tolerance ± 2 for answer nfww	2FT	M1FT for a correct reading from their single ruled line	allow tolerance ± 1 on number sold no FT from a zig-zag line
17		7.5 or $7\frac{1}{2}$ oe	4	M1 for $3 + x + 5$ or $2x + x + 5$ soi nfww M1 for $4x + 13 [= 43]$ or better or <i>their</i> linear expression = 43 M1 for correct first step from <i>their</i> linear equation, eg $4x = 43 - 13$ or better M1 for $x = b/a$ after $ax = b$ ($a \neq 1$, $b \neq 0$) from <i>their equation</i> to a maximum of 3 marks	$4x + 13 [=43]$ implies the first M1 Their linear expression may not be simplified if you see trial-and-improvement then award M1 for each correct attempt, with input and output clearly linked, up to a maximum of 3 marks on the function $4x + 13$ eg trial of 6 result 37 scores M1

Question		Answer	Marks	Part marks and guidance	
18		bisector of angle A ($\pm 2^\circ$)	1	must be ruled, condone dotted	on or within the two lines on the overlay meets bisector 'near A' and use the ruler to check tolerance whole region must be within park for 4 marks the bisector through A has to intersect BC
		two pairs of correct supporting arcs	1	intersection arcs on AB and AD could be short lines or a single arc	
		arc of circle, centre C, radius 4 cm (± 2 mm)	1	not freehand, condone dotted and arc must meet their bisector and the line BC, if no bisector where it should have been	
		<i>their region</i> indicated	1FT	FT dep on any ruled line through A and an arc, centre C, intersecting with their line and BC	
19	(a)	$\bar{3} \ 1 \ 3$	1		
	(b)	correct ruled line from $x = -2$ to $x = 4$	2	B1 for 4 points correctly plotted FT their table for points only	For points and line tolerance is $\frac{1}{2}$ small square horizontally

Question			Answer	Marks	Part marks and guidance	
20			62	4	<p>M1 for $60 \div 40$ or 1.5 oe seen</p> <p>M1 for $184 - 60$ or 124 or $3.5 - 1.5$ or 2 seen</p> <p>M1 for <i>their</i> '124' \div <i>their</i> '2'</p>	<p>equivalents include 1[h] 30 [m] oe allow h or hr or hour[s] and 1.30 etc not 1.3</p> <p>for distance \div time, <i>their 2</i> has to be a time eg 2, 2.45, 120 <i>their 2</i> cannot be 3.5 or 210 and <i>their 124</i> cannot be 184</p>

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

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

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