OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics B (Linear)

General Certificate of Secondary Education

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

Mark Scheme for November 2013

Oxford Cambridge and RSA Examinations

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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.

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, 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 × (*their* '37' + 16), or FT 300 – $\sqrt{}$(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by eg 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 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 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.

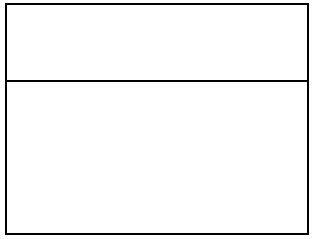
Question			Answer	Marks	Part Marks and Guidance	
1	(a)		centre radius diameter	1 1 1		ignore spelling
	(b)		143	1	accept 141 to 145	
2	(a)	(i)	5	1		
		(ii)	Banana	1		
		(iii)	36	2	**M1** for adding *their* frequencies (four sensible figures, two of which must be correct) of the four fruits	
	(b)	(i)	3	1		
		(ii)	(banana) 5 circles (orange) $1\frac{2}{3}$ circles	1 1	condone shaded or unshaded **1 mark** 1 circle unshaded 2/3 unshaded 1 circle unshaded 2/3 shaded 1 circle shaded 2/3 shaded **0 marks** 1 circle shaded 2/3 unshaded	ignore shading in complete circles.
3	(a)	(i)	27	1		
		(ii)	10	2	**M1** for 5 × 4 or 20 seen following M0 **SC1** for answers of 100 or ¯10	
	(b)	(i)	15 − (6 − 4) = 13	1		ignore superfluous brackets
		(ii)	2 + 2 × (3 + 8) = 24	1		

Question			Answer	Marks	Part Marks and Guidance	
4	(a)		67	1		
	(b)		26	1		
	(c)		6	2	**M1** for $5x = 30$ **soi** or $5 \times 6 + 4 = 30$ seen AND **M1** for $x = \frac{b}{a}$ after $ax = b$ **seen** **max 1 mark if answer incorrect**	$5x = 30$ can be implied by $34 - 4 = 30$ seen or 30 seen in a flow diagram $a \neq 1$, $b \neq 0$
5	(a)		pentagon	1		ignore spelling
	(b)		5	1		
	(c)		5	1		
	(d)		$5x$	1		Accept $x + x + x + x + x$ or $3x + 2x$, $x + 4x$, etc or $5 \times x$ or $x \times 5$, etc Condone $x5$ Ignore units or expression written as a formula but do not accept $5x = x$
6	(a)	(i)	trapezium	1	any clear indication	ignore spelling
		(ii)	6	1		
	(b)		Correct Reflection	1		See overlay Accept freehand if **intention is clear**, does not need to be accurate
	(c)		Correct Reflection	1		

Question			Answer	Marks	Part Marks and Guidance	
7			$\frac{37}{100}$ 20[%] 0.25 **and** 25[%] $\frac{7}{100}$ **and** 0.07	1 1 2	 **B1** for two of these	
8	(a)	(i)	24	1		
		(ii)	24.2	1		
	(b)		5	2	mark final answer **M1** for 1 litre = 1000ml **soi**	
9	(a)		32, 34, 36, 38	1	with no extras	
	(b)		35	1	with no extras	
	(c)		31, 37	2	**1** each with no extras **SC1** for two correct and one incorrect	one correct and one incorrect scores no marks
10	(a)		36	1		
	(b)		27	2	**M1** for 3^3 or 3 × 3 × 3 or 3 × 9 **oe**	do not accept 3 × 3 × 3 ÷ 2 for **M1**

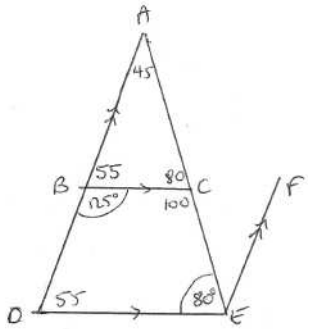
Question			Answer	Marks	Part Marks and Guidance	
11	(a)	(i)	$3p$	1	mark final answer	Accept $3 \times p$ or $p \times 3$ Condone $p3$
		(ii)	$8x + 3y - 4$	2	mark final answer **M1** for [+]$8x$ seen or [+]$3y$ seen	Accept $8 \times x$ or $x \times 8$, etc Condone $x8$ or $y3$
	(b)		9	1	mark final answer	
	(c)		2	2	mark final answer **M1** for $2 \times 7 - 3 \times 4$ or 14 or 12 seen	look for incorrect working $(2 + 7) - (3 + 4) = 2$ or $9 - 7 = 2$ are incorrect and score no marks
12	(a)		B(3, 2), C(5, 3) and D(7, 4)	2	**B1** for 2 correct pairs	
	(b)		x coordinate of 39	3	**M2** for $2n - 1$ **oe** seen or $1 + 19 \times 2$ **oe** Or **M1** for difference of 2 in the sequence for x coordinates **soi** Or **SC2** for correct reversed coordinates Or **SC1** for x coordinate of 20 following all coordinates reversed in **(a)**	working may be seen in the table difference of two can be implied by $2n + 1$ or answer of 41 or (9, 5) and (11, 6) **soi**
			y coordinate of 20	1		

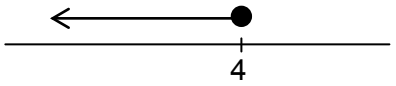
Question			Answer	Marks	Part Marks and Guidance	
13			7.5 **oe**	3	mark final answer **M2** for (42 − 3 × 4) ÷ 4 **soi** or 42 ÷ 4 – 3 seen or 4(*y* + 3) = 42 **soi** or 4*y* = 30 **soi** Or **M1** for 42 − 3 × 4 or an area of 30 **soi** or 42 ÷ 4 or 10.5 **soi**	30 may be in diagram
14	**(a)**	**(i)**	27	1		
		(ii)	13.5 **oe**	1	**FT** from *their* 27 Not strict FT	
	(b)		240	3	**isw** **M2** for (1700 − 500) ÷ 10 × 2 **oe** or 10% of 1200 = 120 **soi** Or **M1** for 1200 seen or ÷ 10 × 2 **oe soi**	for example M1 could be scored by 1700 ÷ 10 × 2 or 10% of 500 = 50 20% of 500 = 100
15	**(a)**		9	1		
	(b)		6	1		
	(c)		8	2	**M1** for attempt to find the middle number when marks are in order	any indication where correct median is to be found is acceptable

Question			Answer	Marks	Part Marks and Guidance	
16	(a)		Sensible reason	1	because they may have cycled or come in a bus **and** a car etc	**See further exemplars** With a correct reason, ignore further explanations correct or otherwise
	(b)		If they took exactly 10 minutes they would not know which box to tick, etc They may have taken longer than 50 minutes.	1 1		
	(c)		Responses will be biased towards train travellers	1	reason why sample is not appropriate	
17			15	3	**M1** for 10° represents 1 person **soi** AND **M1** for 360 − (120 + 90) or 150 seen.	for example 30° represents 3 people scores **M1**
18	(a)		Cylinder	1	Condone Circular [based] Prism	Do not accept prism on its own Ignore spelling
	(b)			3	**B1** for a rectangle of any height with 4 cm width AND **B2** for a rectangle of any width with a height of 3 cm and horizontal line of height 2 cm Or **B1** for rectangle of any width with height 3 cm **or** with height 2 cm **or** with any other height and horizontal line of height 2 cm or 3 cm	no marks for 3D drawings or different orientations

Question			Answer	Marks	Part Marks and Guidance	
19	(a)	(i)	$2^5 \times 3$ Or $2 \times 2 \times 2 \times 2 \times 2 \times 3$ or better	2	**M1** for correct factor pair or product seen or attempt at factor tree/ladder with at least two steps or answer $2^k \times 3$ **oe** OR **SC1** for 2, 2, 2, 2, 2, 3 identified but not as product	Condone 3^1 for 2 or 1 marks May be part of factor tree or e.g. $4 \times 8 \times 3$ May contain errors
		(ii)	12 final answer	2	**B1** for 2, 2, 3 clearly identified for both 96 and 108 or answer of 2, 3, 4 or 6 **oe**	e.g. in a Venn diagram e.g. accept 2^2 for B1
	(b)		$5\frac{1}{6}$ final answer	3	**B2** for $5\frac{2}{12}$ or $\frac{62}{12}$ seen or other unsimplified equivalent OR **M1** for $1\frac{3}{4}$ converted to $1\frac{9}{12}$ or $\frac{21}{12}$ AND **M1** for correct addition of *their* two improper fractions/mixed numbers with common denominator AND **M1** for *their* improper fraction/mixed number correctly converted to a mixed number in its lowest terms **max 2 marks if answer incorrect**	M1 may be implied by $\frac{3}{4}$ converted to $\frac{9}{12}$ but not $3\frac{9}{12}$ Or M1 for other conversion to common denominator with at least one correct numerator allow this M1 even if no simplification required

Question			Answer	Marks	Part Marks and Guidance	
20			97.28 [p]	4	**B3** for 24.32 seen from 12.8 × 1.9 or answer £97.28 or **figs** 9728 OR **M1** for 1.9 × 4 × 12.8 **soi** AND **B1** for **figs** 76, 512, 38, 152, 1152 896, 768, 608, 4608 or 95 seen AND **B1** for answer in range 87 to 104	allow rounding of 97.28 seen for 4 marks May be seen in stages, may be done in any order but not using rounded values. Condone additional multiplication by 7

Question			Answer	Marks	Answer
21			$x = 45°$ with correct and clearly laid out solution. All required angles clearly identified in working with a correct reason given for each angle found. Correct mathematical terminology and notation throughout	5	e.g. $\angle CED = \angle ACB = 80°$, corresponding angles $\angle ABC = 180° – 125° = 55°$, angles on a line $\angle CAB = 180° – 55° – 80° = 45°$, angles in a triangle $x = 45°$, alternate angles equal
			4a correct answer of $x = 45°$ with at least two correct angles and related reasons stated	4–3	For the lower mark **3a** correct answer of $x = 45°$ with insufficient solution/reasons seen
			4b complete solution with full reasons and maximum one arithmetic slip to reach incorrect value for x		**3b** at least two relevant angles stated with correct reasons, may **FT** arithmetic slip **3c** at least three relevant angles found, may be indicated in correct position on diagram, may **FT** arithmetic slip
			2a one relevant angle stated with correct reason, allow **FT**	2–1	For the lower mark **1a** one relevant angle found, may be indicated on diagram, allow **FT**
			2b two relevant angles found, may be indicated in correct position on diagram, allow **FT**		**1b** one relevant reason stated, need not be linked with appropriate angle
			2c two relevant reasons stated, need not be linked with appropriate angles		**Acceptable reasons:** Alternate angles equal Corresponding angles equal
			No correct work seen	0	[Co-]interior/allied [angles] = 180 [angles in a] triangle = 180 [angles on a straight] line = 180 [angles in a] quadrilateral = 360 Similar triangles (only if correct angle pairs used)
					180 may be implied in above reasons by a correct calculation seen and equal by a correct pair **soi** Condone use of Z (in place of alternate), F (in place of corresponding), C/U (in place of interior/allied) for up to 4 marks Supplementary angles alone is not sufficient, needs some context

Question			Answer	Marks	Part Marks and Guidance	
22	(a)		$\frac{74}{120}$ **oe**	1	accept 0.616[…] or 0.617 or 61.6[…][%] or 61.7% or better	do not accept ratio as answer **isw** for incorrect cancelling or 74 in 120 or 74 out of 120 etc after correct fraction seen Condone 'likely' after correct fraction seen
	(b)		600 final answer	2	**M1** for $\frac{30}{120} \times 2400$ **oe** or for 600 seen with 2400	e.g. $\frac{600}{2400}$ or 600 out of 2400
23	(a)		$x \leq 4$	2	**M1** for $3x \leq 8 + 4$ or better AND **M1** for $x \leq \frac{b}{a}$ after $ax \leq b$ **seen** **max 1 mark if answer incorrect** OR **SC1** for answer 4 or x … 4 with any incorrect equality or inequality symbol or answer $3 \times 4 - 4 \leq 8$	Condone use of = or incorrect inequality symbol in place of ≤ for all method marks $a \neq 1$, $b \neq 0$ condone e.g. '4 or less' as answer for SC1
	(b)			1	**FT** *their* inequality in **(i)**	Condone any indication at 4 Condone missing arrow at other end but do not accept indication of the line terminating Accept any length line

APPENDIX 1

Exemplar responses for question 16(a)

Response	Mark awarded
Some people may not use them for transport	1
There isn't an other box	1
Doesn't give options of none or other.	1
There isn't enough possible answers	1
He could have cycle and a other box to say why do you walk or car.	1
How you get there could vary	1
Somebody might travel to work a different way and won't be able to say how	1
You should be able to tick more than one box.	1
It should not say tick one box only because you might take multiple types of transport to work.	1
They may work at home	0
They may not work	0
Because walking is not a form of transport	0
He didn't mention during the week	0

Exemplar responses for question 16(b)

Response	Mark awarded
People may not know the exact time it takes to travel to work	1
They don't time themselves	1
It may vary how long it takes them to get to work each day	1
There isn't an other box	1
Some people may take longer than 50 minutes	1
There isn't a 50+ box	1
The ranges **overlap**	1
Overlapping times	1
Questions **overlap**	1
The numbers are mentioned twice which some people may find it difficult to tick a box	1
Because some days there may be traffic	1
They may vary their use of transport	1
They could get different train or bus times on different days	1
The numbers in the boxes need to be more accurate.	0
They might have to take a child to school	0
The options are too small it should be hours and minutes to make it easier to decide	0
There is not enough time gap between each option	0
It should be in hours	0

Exemplar responses for question 16(c)

Response	Mark awarded
The sample is **biased**	1
Results may be **biased** towards the train option	1
They are only going to tick trains as they are at the train station	1
Because everyone will be getting the train if they're at the station.	1
Because people travels by trains there	1
Because he might be **biased** to who he picks.	1
Because there's different ways to travel to work	1
He should do it every day to get more results and all day	1
People may not be using the train on that day	1
Not everyone gets the train	1
Not many people could take the train on a Tuesday morning	1
Some of the people are not going to work on the train plus missing out on other information.	1
Some people might go to work at noon and at night time.	1
Because people will want to catch their train so that they are not late for work	1
As no one will want to fill it in as they are on the way to work	1
Because they may be busy going to work.	1
Most people will need to be getting to work and on a weekday morning this is not a sensible idea.	1
He could miss his train	1
Not everyone will get on the train to work	1
Some people may not be going to work.	1
Not everyone goes to work on Tuesdays or in the morning so it's not a good enough time scale	1
He is going to get a lot the same because they may get on the same train	1
Everybody will use a bus	0

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