OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics B (Linear)

General Certificate of Secondary Education

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

Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

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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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OCR Publications
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Annesley
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NG15 0DL

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Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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 – √(*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).
   - **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. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

7. 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).

8. 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.

9. 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.

10. If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

    If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

    If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation × next to the wrong answer.

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)		435	1		
	(b)		570	1		
	(c)		24	1		
2	(a)	(i)	21	1		
		(ii)	47	1		
		(iii)	37	1		
	(b)		8	2	**M1** for 400 ÷ 50	Any indication of division such as repeated subtraction acceptable
3	(a)	(i)	47[.0]	1		
		(ii)	5.38	1		
	(b)	(i)	metres or m	1		Ignore spelling
		(ii)	litres or l	1		Ignore spelling
		(iii)	kilograms or kg	1		Ignore spelling
4	(a)		A (0, 3) B (2, $^{-}$2) C ($^{-}$3, $^{-}$4)	3	**B1** for each correct answer Or **SC2** for three correct pairs of coordinates in wrong place	No marks for reversed coordinates
	(b)		point plotted at ($^{-}$5, 1)	1		Award if intention is clear

Question			Answer	Marks	Part Marks and Guidance	
5	(a)	(i)	19.22	1		
		(ii)	1.6[0]	1		
	(b)		0.05 0.16 0.4 0.59	2	**M1** for one error	One error when 3 other decimals are in the correct order
6	(a)	(i)	32[.0]	1		
		(ii)	128[.0]	1	**FT** *their* (a)(i) × 4 (providing answer is not 32)	
		(iii)	16[.0]	1	**FT** *their* (a)(i) ÷ 2 (providing answer is not 32)	
	(b)		112[.0]	2	**M1** for *their* (a)(ii) – *their* (a)(iii) or *their* (a)(i) × 3 + *their* (a)(iii) or *their* (a)(iii) × 7 or 320 ÷ 100 × 35 oe	**FT** for **M1** only but method must be seen
7	(a)	(i)	13	1		
		(ii)	5	1		Do not accept $\frac{10}{2}$
		(iii)	4	1	**SC1** for both (ii) $\frac{10}{2}$ and (iii) $\frac{12}{3}$	Condone $\frac{4}{1}$ but do not accept $\frac{12}{3}$
	(b)	(i)	Any correct single calculation, with the four numbers, with an answer of **8**	1	For example: $4+3+2-1$ $4\div 2\times(3+1)$ $4\times(3+1-2)$ $(1+3)\times 4\div 2$	Ignore superfluous brackets; give BOD where possible if closing bracket missing

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	Any correct single calculation, with the four numbers, with an answer of **15**	1	$4\times3+2+1$ $(4+2-1)\times3$ $(4+3)\times2+1$ $14+3-2$	Ignore superfluous brackets; give BOD where possible if closing bracket missing
8	(a)	(i)	48.6	2	**M1** for putting at least 6 times in order of size soi	
		(ii)	0.8	1	Mark final answer	Accept 00.8
	(b)		Sadiq is faster [than Josh] Josh is more consistent [than Sadiq]	2FT	**Strict FT** Can be in either order **B1** for each comment	Must be some interpretation of the median and range See exemplars Ignore incorrect comment or calculation with a correct answer
9	(a)	(i)	12*g* oe	1	Mark final answer	Accept P = 12*g* Condone *g*12 Tolerate capitals in this question Ignore units in this question
		(ii)	9*x* + 3 oe (must be simplified)	1	Mark final answer **SC1** for both expressions in **(a)(i)** and **(ii)** correct but unsimplified, seen	Accept P = 9*x* + 3 Do not accept *x*9 + 3
	(b)		*c* – 5*d* oe (must be simplified)	2	Mark final answer **B1** for *c* in final simplified expression or for – 5*d* in final simplified expression	Accept 1*c* – 5*d* etc Do not accept *c* – *d*5 for **2 marks** 1*c*5*d* is **0 marks**
	(c)		2*y*	2	Mark final answer **M1** for 5 seen **M1** for polygon drawn with 5 sides	Do not accept *y*2 Mark intent

Question			Answer	Marks	Part Marks and Guidance	
10	(a)		East or E	1		
	(b)	(i)	60	1	±2m	
		(ii)	[0]53	1	±2°	
	(c)		Cross (for T), 75 mm from Q on bearing 115°	1 1	±2mm ±2°	If no cross marked take the middle of the vertical line in 'T' as the point
11	(a)		49	2	**M1** for 7^2 or 7 × 7	
	(b)		6	3	Mark final answer **M2** for $t^2 = 36$ or $t \times t = 36$ or $\sqrt{36}$ Or **M1** for 4 × 9 or 36 seen If **M0, SC1** for answer of 6.5 **(nfww** using perimeter instead of area)	
12	(a)	(i)	1 correct line of symmetry only	1	Line must be straight; intention must be clear	Line can be dotted
		(ii)	Kite	1		
	(b)		140	3	**M2** for (360 – 2 × 40) ÷ 2 or 180 – 40 Or **M1** for 360 used If **M0**, **SC1** for 50 (using sum of angles in quadrilateral as 180°)	
	(c)	(i)	120	2	Mark final answer **M1** for interior angle of equilateral triangle is 60° soi	If no answer given on answer line, accept angle marked on diagram

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	50	2	Mark final answer **M1** for 180 – (60 + 70) or 360 – (70 + 120 + *their* '120')	If no answer given on answer line, accept angle marked on diagram
13	(a)	(i)	$\frac{5}{11}$ or 0.45(45…) or 0.455 or 45.(45…)% or 45.5%	2	**M1** for $\frac{5}{n}$ or $\frac{n}{11}$	No marks for ratios Accept $\frac{5}{11}$ with 'unlikely' on the answer line but $\frac{5}{11}$ with 'likely' is **M1** only
		(ii)	$\frac{6}{11}$ or 0.54(54…) or 0.55 or 54.(54…)% or 55%	1	**FT** $\frac{6}{\textit{their } n}$ provided $n > 6$ Allow **SC1** for 5 out of 11 **and** 6 out of 11 or for 5 in 11 **and** 6 in 11 in (i) and (ii)	Accept $\frac{6}{11}$ with 'likely' on the answer line
		(iii)	0	1		Accept zero, nought, 0%, $\frac{0}{\textit{their } n}$ or $\frac{0}{11}$ (only) Do not accept 'none' or 'impossible' unless acceptable answer also seen
	(b)		6	2	**M1** for a fraction equivalent to $\frac{3}{5}$ or 25 or $\frac{10 \times 5}{2}$ seen	
14	(a)		40	1	Mark final answer	
	(b)		7	2	Mark final answer **M1** for $3x = 26 - 5$ or better or $3 \times 7 + 5 = 26$	

Question			Answer	Marks	Part Marks and Guidance	
	(c)		4.5 oe	3	**M2** for $2x = 9$ Or **M1** for $5x - 3x - 2 = 7$ or better collecting x or $5x = 3x + 7 + 2$ or better collecting constants AND **M1** for $x = \frac{b}{a}$ after $ax = b$ seen **If M0**, **SC2** for $5 \times 4.5 - 2 = 3 \times 4.5 + 7$ as final answer	Implied by $2x = b$ Implied by $ax = 9$ $a \neq 1$
15	(a)		4 points plotted correctly	2	**M1** for 2 points plotted correctly	Tolerance half a square
	(b)		Positive or 'The taller a girl is the more she weighs' oe	1		Ignore 'strong' / 'weak' etc
	(c)	(i)	Line of best fit drawn between parameters	1	Line must be ruled, continuous and as long as parameter lines	See overlay
		(ii)	Weight estimated correctly	1	**FT** from *their* line of best fit (line must be a single straight continuous line)	Tolerance half a square
16	(a)	(i)	[0].06	1		
		(ii)	$0.\dot{2}$ or 0.222[…]	1		Condone poor notation eg $0.2\dot{2}$

Question			Answer	Marks	Part Marks and Guidance	
	(b)	(i)	125	2	**M1** for 5^3 Or **SC1** for $\frac{25\times3125}{625}$ or $\frac{78125}{625}$ or $\frac{5\times5\times5\times5\times5\times5\times5}{5\times5\times5\times5}$ soi	For **SC1** the <u>full</u> method may be done in stages but must all be present Note 12.5 is a possible wrong answer and scores **0 marks**
		(ii)	$\frac{3}{2}$ or $1\frac{1}{2}$ or 1.5	3	**M2** for $\frac{9}{6}$ or other equivalent unsimplified fraction or mixed number Or **M1** for $\frac{20}{6}$ and $\frac{11}{6}$ or $3\frac{2}{6}$ and $1\frac{5}{6}$ or other conversion to common denominator with at least one correct numerator After **M0**, **SC1** for conversion of the result of *their* subtraction to lowest terms if improper fraction or mixed number	If $1\frac{3}{6}$ then $1\frac{1}{2}$ on answer line award **3 marks** $\frac{10}{3}-\frac{11}{6}$ scores **0 marks**
17			Correct arcs and bisector of angle DAB 53° ± 2°	2	**B1** for bisector, without correct arcs	Use overlay Line from A to minimum 5cm from C
			Arc centre C radius 5 cm ± 2 mm	1		Arc must meet BC and DC within tolerance and be correct by eye or meet *their* bisector within tolerance if short arc
			Correct area shaded	1	**FT** *their* bisector and arc	Must be intersection of *their* line from A and any arc centre C

Question			Answer	Marks	Part Marks and Guidance	
18	(a)		750 250	2	**M1** for figs 75 and 25 seen or 1000 ÷ 4 seen	Implied by 250 seen

Question			Answer	Marks	Answer
18	(b)*		Correct final answer of £32.60 with clearly expressed and annotated supporting method showing calculation of quantity and cost of each type of juice, cost of cups and takings	5	
			Correct final answer of £32.60 without clear supporting method but not from wrong working Or Answer of 32.6(0) with no units or £33.60 (with cost of cups omitted) with clearly expressed and annotated supporting method Or Complete method with annotation with one or two arithmetic slips	4-3	For lower mark: Calculation of takings (E), costs of *their* quantities of each type of juice (C and D, totalling 20 litres) and calculation of takings – costs (F) with one or two arithmetic slips Some annotation **or** units must be seen
			At least two correct values from A – F calculated Or One correct value from A – F clearly annotated	2-1	For lower mark: One correct value from A – F calculated
			No relevant calculations seen	0	
			A: 0.25 × 80 = 20 litres drink B: 15 litres apple, 5 litres mango required C: Cost Apple: 15 × 0.56 = £8.40 FT *their* 15 D: Cost Mango: 5 × 1.20 = £6 FT *their* 5 E: Takings: 0.60 × 80 = £48 F: Donation: £48 – £8.40 – £6.00 – £1 = £32.60 **FT** *their* takings – *their* costs (condone omitting cups)		For 2 or 1 marks units are not required and working may be in pounds, pence, ml or litres B correct implies A for 2 marks For 2 or 1 marks allow any quantity of juice ≤ 20 for C and D Only allow F if takings > costs, and takings and costs each result from a calculation seen

Question			Answer	Marks	Part Marks and Guidance	
19	(a)		$3n + 5$ oe	2	Mark final answer **M1** for $3n$ soi not $^{-}3n$	Condone any letter in place of n $8 + 3(n - 1)$ scores **2 marks** as final answer $n = 3n + 5$ scores **1 mark** but eg $t = 3n + 5$ scores **2 marks**
	(b)		7, 2, $^{-}3$	2	**M1** for 2 correct in correct position Or **SC1** for 12, 7, 2 or $^{-}7$, $^{-}2$, 3	

APPENDIX 1

Exemplar responses for question 8(b) median comment

Response	Mark awarded
Sadiq ran faster than Josh (by 0.9 seconds)	1 ignore the comment in brackets
Josh took longer in seconds than Sadiq to complete a run (yet his range was shorter)	1
Sadiq completed the run quicker than Josh did	1
Sadiq's median is lower than Josh so he seems to be quicker	1
Compare to Josh it must take him less time to do the race	1
(Josh has a lower median than Sadiq) due to Sadiq being slightly quicker	1
Sadiq's median is 0.9 seconds faster than Josh'	1
Josh has a slower median	1
Sadiq ran faster (because his range is smaller)	1
They are both high 40s	0
Sadiq's median is lower than Josh's	0
There is a 0.9 second difference between their medians.	0
Josh has the quickest time of all	0
Sadiq was better	0

Exemplar responses for question 8(b) range comment

Response	Mark awarded
Sadiq's times were more spread out	1
Sadiq's times (biggest and smallest) must be very different to have a range number that is bigger than Josh's	1 borderline
Joshs range is lower which means his results are closer	1
Sadiq had a bigger range so his runs weren't equal, one was slower and the others were faster	1 borderline
Sadiq's range was greater than Josh's	0
Sadiq's range was greater than Josh so he has made more improvement in his running	0
Sadiq's range is 0.4 seconds less than Sadiq's	0

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1 Hills Road
Cambridge
CB1 2EU

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Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

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Facsimile: 01223 552553