OCR
Oxford Cambridge and RSA

GCSE

Mathematics B (Linear)

Component **J567/02:** Mathematics Paper 2 (Foundation)

General Certificate of Secondary Education

Mark Scheme for November 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.

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 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.

MARK SCHEME

Question			Answer	Marks	Part Marks and Guidance	
1	(a)		E[ast] N[orth] W[est]	2	1 for each Accept 090 (only) Accept 315 **SC1** for W[est] then S[outh] E[ast]	Ignore any measurements given **Don't** accept West North (WN)
	(b)		2 1.25[0]	4	**B3** for correct answers reversed Or **B3** for one correct answer or 2000 **and** 1250 **seen** Or **M2** for 8 ×2 50 **or** 5 × 250 or **figs** 2 **and figs**125 **seen** or 2000 **or** 1250 **seen** Or **M1** for **figs** 8 **and figs** 5 **seen**	Accept 1.95 to 2.05 and 1.2 to 1.3 for four marks 1950 to 2050 and/or 1200 to 1300 for three or two marks figs 7.8 to figs 8.2 and figs 4.8 to figs 5.2 for one mark
2	(a)	(i)	(0 , 3)	1		
		(ii)	(2 , $^{-}$5)	1		
	(b)		C marked at ($^{-}$2 , $^{-}$5)	2	**M1** for a right-angled triangle or a triangle of area 12 cm^2	at (-1,-2) or (5,-2) also others answers of (-2, __) or (6, __) give an area of 12
3	(a)		$^{-}$17, $^{-}$5, 6, 13	1		
	(b)		1.06, 1.21, 1.4[0], 1.79	2	**B1** for one incorrect (3 others to be in the correct order) **or** correct order reversed	
4			metres litres or l grams or g[ms]	3	1 for each	

Question			Answer	Marks	Part Marks and Guidance	
5			108	4	**M2** for (200 × 40 + 100 × 106 + 50 × 88 + 20 × 116 + 10 × 168) or (2 × 40 + 1 × 106 + 0.5 × 88 + 0.2 × 116 + 0.1 × 168) **soi** or **figs** 27 **seen** **Or** **M1** for 8000 or 80 or 4400 or 44 or 2320 or 23.2 or 1680 or 16.8 **seen** **And** **M1** for *their* **sum** ÷ 2.5 or 250	Units must be consistent for M2 Can be implied by **at least 4** figures in table correct and an implication that the 5 values are added
6	(a)		3 2	2	1 for each	
	(b)		8	1		
	(c)		2 squares in correct position	2	**B1** for each correct square If 3 squares shaded allow **B1** only For 4 or more shaded **B0**	See overlay
7	(a)		12	1		
	(b)		33	1		
	(c)		-10	2	**M1** for 2 × 4 – 18 Or **SC1** for 10	

Question			Answer	Marks	Part Marks and Guidance	
8	(a)	(i)	6 000 or 6 thousand	1		
		(ii)	4 400 or four thousand four hundred	2	**B1** for sight of **figs** 44 or answer of 4200 or four thousand two hundred	No marks for 4.2 thousand
	(b)		[Q]3	1	Accept Q3 2013	
	(c)		Increasing or stays [about] the same	1	If statement has correct part, ignore the remainder, but do not accept goes up then down	See exemplars
9	(a)	(i)	3	1		
		(ii)	345	2	**M1** for 230 × 18 ÷ 12 **oe** or SF 1.5 **soi**	
	(b)		48	2	**M1** for 300 ÷ 75 [× 12] or 4 lots of the recipe needed **soi**	
10	(a)	(i)	82, 83	1		
		(ii)	22, 23, 24	1		
	(b)	(i)	20, 21	1		
		(ii)	863 is an odd or a prime number **oe**	1		See exemplars

Question	Answer	Marks	Answer
11*	**a** States Oliver with full and correct working for Sophia's (£46) and Oliver's (£48.30) savings. **b** States Oliver and **compares** 0.13(3) and 0.14 **or** 13.(3)% and 14% **or** 13/100 and 14/100	**4**	
	a Finds 46 or 44.85 **and** 48.3[0] with no or incomplete method **b** Finds Sophia or Oliver's savings correctly with a full method and shows a correct method for other calculation **c** States Oliver with 0.13(3) and 0.14 **or** 13.(3)% and 14% **or** 13/100 and 14/100 with no comparison	**3-2**	**a** Finds Sophia or Oliver's savings correctly with a full method **b** 0.13(3) and 0.14 **or** 13.(3)% and 14% **or** 13/100 and 14/100 with no comparison
	a Finds Sophia's or Oliver's savings correctly with incomplete or no method **b** Shows a correct method for finding Sophia or Oliver's savings **c** Two partially correct methods **d** 0.13(3…) or 13.(3…)% or 13/100 **or** 0.14 or 14/100	**1**	**Notes** 1/15 of 345 = 23 Correct method for finding 14% - non calculator method eg Find 10% of £345 correctly Finds 1% correctly 10% + 4 × 1% **oe**
	a No relevant calculations	**0**	

Question			Answer	Marks	Part Marks and Guidance	
12	**(a)**	**(i)**	7	**1**		
		(ii)	2.4[0] or $2\frac{2}{5}$ or $\frac{12}{5}$	**1**		
	(b)		1.52 or $1\frac{13}{25}$ or $\frac{38}{25}$	**2**	Mark final answer **M1** for 2.6 or 2 3/5 or 13/5 or 1.5[2] **oe** seen or final answer 1.304	

Question			Answer	Marks	Part Marks and Guidance	
13	(a)		20.5	2	**M1** for (18 + 25 + 18 + 21) ÷ 4	Condone missing brackets for M1
	(b)		No after 19.9(2….) **seen**	3	**M1** for 19.7 × 10 or 197 **soi** **M1** for (*their*(197) + *their*(82))÷ 14 **soi**	
14			2.8	4	Mark final answer **M3** for 2.7(552) or 2.76 or $2\frac{472}{625}$ or $\frac{1722}{625}$ **Or** **M1** for figs 96 × figs 287 or figs 27552 **M1** for *their* area ÷ 10000 **soi**	*their* area can be a perimeter but do not accept 10000 ÷ *their* area
15	(a)	(i)	$\frac{1}{6}$ or 0.167 or 0.166(…) or 16.7% or 16.6(6…)%	1		Do not accept ratios on this question Accept $\frac{1}{6}$ with unlikely or 0.16 or 0.17 or 17% on the answer line
		(ii)	$\frac{3}{6}$ or $\frac{1}{2}$ or 0.5 or 50%	1	**SC1** for 1 in (out of) 6 3 in (out of) 6 **oe** in (i) and (ii)	accept $\frac{3}{6}$ or $\frac{1}{2}$ or 0.5 or 50% with fifty fifty or evens on the answer line
		(iii)	0 or $\frac{0}{6}$ or 0% or zero	1		do not accept ‘impossible’ or ‘none’ unless a correct numerical value is shown on the answer line

Question			Answer	Marks	Part Marks and Guidance	
	(b)		$\frac{4}{20}$ or $\frac{1}{5}$ or $\frac{2}{10}$ or 0.2 or 20%	**3**	**B2 for** $\frac{16}{20}$ or $\frac{4}{5}$ or 0.8 or 80% **seen** **Or** **M1** for 3/20 + 1/4 + 2/5 **oe** **And** **M1** for 1 – *their* sum **oe** **Or** **B1** for 5/20 and 8/20 or 0.15 and 0.25 and 0.4 or 15% and 25% and 40% **seen**	*Their* sum must be less than 1 or 100%
16	**(a)**		72	**2**	**M1** for 360 ÷ 5	
	(b)		54	**2**	**FT** from *their* (a) providing it is not 60 **M1** for 180 − *their* 72	
	(c)		540	**2**	**M1** for 10 × *their* 54 **soi** or 180 × 3 Or **SC1** for answer of 108	
17	**(a)**		65	**2**	**M1** for 16 or 49 **seen**	
	(b)		20.9	**2**	Mark final answer **B1** for 20.8[8] or 20.87[7…] or for answer 5.9 or for *their* answer to more than 1dp correctly rounded to 1dp	Condone answer $20.\dot{8}$ for B1 Both unrounded and rounded value must be seen
	(c)		90	**1**		Condone answer 90^3
	(d)		0.8 or 8/10 or 4/5	**1**		

Question	Answer	Marks	Answer
18*	Gives correct solution ($x = 3.5$ or $x = 3\frac{1}{2}$ or $x = \frac{7}{2}$) with a complete correct method	**3**	
	Gives an embedded answer or a correct answer with an incomplete, incorrect or no method or shows 2 of the 3 stages correctly in their method	**2-1**	For the lower mark show a correct stage in their method
	No partially correct method seen	**0**	**Notes** Possible three correct stages are: collecting terms in x (eg $7x$ – x or $6x$ as only x term(s) seen on LHS in an equation) collecting constants (eg 13 + 8 or 21 or -21 seen with 'correct' sign as the only constant in an equation) [x =] b/a from ax = b

Question			Answer	Marks	Part Marks and Guidance	
19	**(a)**		$x > 3$	**2**	Mark final answer **M1** for $6x > 23 - 5$ or better Or **B1** for answer 3 or > 3 or x … 3 with = or any incorrect inequality symbol or for $6 \times 3 + 5 > 23$ as final answer	Condone use of = or incorrect inequality symbol for M1
	(b)		$[r =] \frac{p+7}{3}$	**2**	Mark final answer **M1** for $3r = p + 7$ or $\frac{p}{3} = r - \frac{7}{3}$ Or **SC1** for answer $p + 7 \div 3$ or $\frac{p-7}{3}$ or $\frac{p}{3} + 7$	

Question			Answer	Marks	Part Marks and Guidance	
20	(a)		2 | 1 5 8 3 | 2 4 4 6 8 4 | 0 1 2 3 5 5 8 5 | 2 3 7 6 | 0 2	3	**M2** for ordered diagram with one error, omission or extra or for unordered diagram with all 20 values in correct rows and no extras Or **M1** for [un]ordered diagram with no more than two errors, omissions or extras	Give bod for unclear numbers if crossed out as part of median calculation If two diagrams, mark better
	(b)		41.5 or $41\frac{1}{2}$	2	**M1** for 41 and/or 42 as answer or identified in table or working or for 1.5 as answer or figs 415 as answer	e.g. accept 1 and/or 2 ringed in 40 row in table for **M1** or ordered list of at least first/last 11 values But M0 for 1 5 8 2 4 … without further clarification
	(c)		$\frac{2}{5}$	2	Mark final answer **B1** for $\frac{8}{20}$ **oe** seen Or **M1** for *their* fraction simplified fully	$\frac{2}{5}$ = 0.4 scores B1 only Must see both unsimplified and simplified fraction
21	(a)		$^{-}2$	1		
	(b)		At least 6 points plotted correctly Correct smooth curve drawn for $-5 < x < 1$	1 1	1 mm tolerance, **FT** their table 1 mm tolerance from correct points	Points implied by correct curve No ft mark for curve, it must be through the 7 correct points Intention of a continuous smooth curve
	(c)		$^{-}3.3$ to $^{-}3.5$ and $^{-}0.5$ to $^{-}0.7$	2	**FT** their graph **B1** for one correct value	Tolerance of ±0.1 for reading Max **B1** if *their* graph has more than 2 solutions

Question			Answer	Marks	Part Marks and Guidance	
22			Correct Pythagoras statement with hypotenuse 6 or sides 3 $s^2 + s^2 = 6^2$ or $s^2 = 3^2 + 3^2$ Simplified statement for square side $s^2 = 18$ Concluding statement $s = \sqrt{18} = 4.24[2\ldots]$	**M1** **M1** **A1**	Alternative method: **M1** for use of 45° with trigonometry **M1** for $\sin 45 = \frac{s}{6}$ **soi** **A1** for $s = 6 \sin 45 = 4.24[2\ldots]$ After 0 awarded **SC2** for $4.24^2 + 4.24^2 = 5.99[..]^2$ which rounds to 6 **soi** Or **SC1** for use of Pythagoras **soi**	accept any letter in place of *s* or equivalent using cosine

APPENDIX 1

Exemplar responses for question 8c

Response	Mark awarded
In the first year there wasn't as many but it grew higher and higher	1
Increased from 2012 to 2013 and then increased from 2013 to 2014	1
Because the population gets higher	1
More tourists came	1
It starts going up	1
The number of tourists grew quickly then slowed down entering 2013	1
The number of tourists increased by 3060 to 4200 in 2011 to 2012 but in 2013 the number of tourists in the first quarter only increased by 200	1
The numbers went up	1
Rised in 2012 and rised again in 2013	1
Each year for the first quarter 2000 more tourists attend every year	1
Every year the tourists would increase by 1 each year	1
Increased by 600 in 2011 - 2012 but stayed the same for 2012 - 2013	1
There is always a smaller number of tourists in Q1 which rises throughout the year. The number of tourists increased each year	1
Its increasing every time, go up then down and up	0
It's positive	0
It's a positive correlation	0
It got less then more throughout the years	0
in Q1 of 2011 it was 3600 in Q1 of 2013 it was 4400 so it decreased	0
It goes up one year and down another	0

Exemplar responses for question 10(b)(ii)

Response	Mark awarded
because it is not a multiple of 2	1
because the last number is odd	1
because it end in 3	1
because two numbers cannot fit into 863 because its odd, it needs three numbers	1
because no other number can go into it	1
because you cannot times anything to get that answer	1
because it cannot be split into prime factors	1
you cannot half that number so you cannot × two things together to get the answer	1
because 863 cannot be timesed by anything but 1 and itself	1
because it has an odd number in it and doing this can only make an even number at the end	1
because it is not in any times table	1
This because it cannot be halved into whole numbers	1
3 is an odd number	1
because it is an uneven number, nothing can evenly divide into it	1
because they are odd numbers so you would have to times to odd numbers together	1
two numbers multiplied together will always equal an even number	1
because it has a 3 at the end and 3 is a prime number	1
Because nothing goes into it	1
because it cannot be multiplied	0
because it will is more than two consecutive numbers	0
because of the 3	0
because it is not divisible by 3	0
because it does not add up or multiply anything in timetables like prime	0
because it has 2 consecutive numbers 863 is not equal	0
because the consecutive numbers would be decimals	0
because it has an odd number in it	0

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