OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics A

General Certificate of Secondary Education

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

Mark Scheme for November 2012

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

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
A	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 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)		(£)7	1		
	(b)		(£)1.5(0)	2	**M1** for 5 – 3.5(0)	
	(c)		(£)20	2	**B1** 0.30 or 0.45 or 0.60 or 1.50 or 3 seen as a difference (not a percentage)	May be seen in table Assume these are £ and accept equivalents as pence. Condone missing units and first and last zeroes eg .3
	(d)		(£)67.55	3	**M1** for any combination of given full prices from table = 96.5 soi **M1 dep** for changing *their* given full prices to sale prices Condone 1 error If **0** scored, then **SC2** for 96.5 × 0.7 oe Or **SC1** for 96.5 × 0.3 oe or better	eg 10 × 9 (+) 5 (+) 1.5 or 10 × 10 – 2 – 1.5 eg 7 × 9 (+) 3.5 (+) 1.05 or 7 × 10 – 1.4 – 1.05 oe = 96.5 – 96.5 × 0.3 = [£]28.95
2	(a)		1800 (psi)	2	**B1** for 2500 or 700 or 4300 or figs18 seen or attempt to count back from arrow tip to red zone	May be contained in attempted sum or difference. May be seen in counting marks on diagram.
	(b)		120 (minutes)	2	**B1** for 2 hours Or **M1** for 60 × 2 oe	
3	(a)		Diameter drawn	1	Line intended straight close to centre of circle	Mark intention to reach circle. Where there is a choice between a radius and a diameter, mark the radius unless diameter clearly indicated.

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part Marks and Guidance</th><th></th></tr>
<tr><td></td><td>(b)</td><td></td><td>90</td><td>1</td><td>Condone “right angle”</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Square drawn

Use of right angle at centre</td><td>2

1</td><td>B2 for square with all sides 6.5 to 6.9 cm and wholly within circle
Or B1 for approximate square drawn (by eye)

Angle ±2° between two diagonals or radii</td><td>Use ruler
Condone corner(s) outside circle by 2mm for 2 marks

Use protractor</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Chord</td><td>1</td><td>If their diagram shows circle inscribed in square then allow “tangent”</td><td></td></tr>
<tr><td>4</td><td>(a)</td><td></td><td>Identifies when healthy or when unhealthy

and

Any other correct statement which may be the corollary of the first</td><td>1

1</td><td>1 for
She starts off healthy oe or
She is healthy at the start (for the first 3 weeks)
She finishes unhealthy oe

0 for
She is not always healthy (period not defined)

1 for
She finishes unhealthy (following statement 1 above)
She only weighs 420g at the end
She weighs 250g at the end of (in) week 2
She gains about 50g a week

2 for
She starts off healthy but ends up [40g] underweight
She starts off healthy but only gains about 50g a week
She starts off healthy but after 3 weeks she is unhealthy</td><td>Mark the best part of the statement

Weight gain
<table><tr><td>wk 2</td><td>wk 3</td><td>wk 4</td><td>wk 5</td></tr><tr><td>50</td><td>60</td><td>50</td><td>60</td></tr></table>
Weight
<table><tr><td>wk 1</td><td>wk 2</td><td>wk 3</td><td>wk 4</td><td>wk 5</td></tr><tr><td>200</td><td>250</td><td>310</td><td>360</td><td>420</td></tr></table>
Above or below line (approx)
<table><tr><td>wk 1</td><td>wk 2</td><td>wk 3</td><td>wk 4</td><td>wk 5</td></tr><tr><td>+35</td><td>+11</td><td>0</td><td>-25</td><td>-40</td></tr></table></td></tr>
</table>

Question			Answer	Marks	Part Marks and Guidance	
	(b)	**(i)**	4 points plotted Join all *their* points	1 1FT	Half square accuracy Ignore plots at (0, …) and (5, …) Mark intention (ignore below 1 week)	Use overlay
		(ii)	Any value from 110 to 290 inclusive	1	If a range, award one correct limit	
5	**(a)**		0.0401 0.401 4.01 40.1	1	**0** for correct but reversed order	Condone obvious transcription errors that do not render answer ambiguous and extra zeroes on right hand end
	(b)		6	1		
	(c)		$\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$	2	Condone $\frac{4}{8}$ $\frac{5}{8}$ $\frac{6}{8}$ and equivalents, eg $\frac{8}{16}$ etc or decimal versions (0.5, 0.625, 0.75) or percentages **M1** for any fraction correctly converted to have a denominator that is a multiple of 8 or for one of 0.5, 0.625 or 0.75 or 50%, 75% or 62.5% or 3 diagrams with attempted $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{5}{8}$ shaded Or **B1** for correct but reversed order	eg **M1** for $\frac{3}{4} = \frac{12}{16}$ or $\frac{1}{2} = \frac{40}{80}$
6	**(a)**		136 (Angles on) straight line = 180	1 1	 Condone half a turn but not half a circle	

Question			Answer	Marks	Part Marks and Guidance	
	(b)		(p =) 75 (t =) 30	1 2FT	 180 – 75 – *their p* correctly evaluated or 180 – 2 × *their p* correctly evaluated **M1** for 180 – 2 × *their p* or 180 – 75 – *their p* Or **SC1** for correct but reversed	Accept on diagram
7	**(a)**		1(.0)	1	Condone additional wrong zeroes such as 01.00	
	(b)	**(i)**	3 and (0).2	1	Must be in this order	
		(ii)	Points plotted at (6, 0.1) (2, 0.3) (1, 0.6)	 1 1 1	–1 for each extra point Mark intention each time If **0**, then **M2** for (0).1 × 6 and (0).3 × 2 and (0).6 × 1 seen Or **M1** for one of (0).1 × 6 or (0).3 × 2 or (0).6 × 1 seen	Use overlay

Question			Answer	Marks	Answer
8*			• Ruth closer • Both (totals or parts) in same form • Correct differences (accept approximations) • Exact $71\frac{2}{3}$ or $71.\dot{6}$ (g) • Clear working	5	**Possible full working** Ruth $(71.7 \times 6) = 430.2$ oe High by 0.2 Jayne $(71¼ \times 6) = 427.5$ oe Low by 2.5 oe Ruth closer Exact $430 \div 6 = 71\frac{2}{3}$ $430 \div 6 = 71.666$ Jayne 71.25 Down by about 0.4 Ruth up by about 0.1 Ruth closer Exact $71\frac{2}{3}$
			• Ruth closer • Both (totals or parts) in same form • Attempt differences • Exact $71\frac{2}{3}$ or $71.\dot{6}$ (g)	4–3	• Ruth closer • Attempt both (totals or parts) in same form • Attempt $430 \div 6$
			One correct from: • 71.25 • 71.66.... • $71\frac{7}{10}$ • 430.2 oe • 427.5 oe	2–1	One from: • Attempt to change 71¼ to decimal • Attempt to change 71.7 to fraction • $430 \div 6$ • $71¼ \times 6$ • 71.7×6
			No relevant working	0	

Question			Answer	Marks	Part Marks and Guidance	
9	**(a)**		2 points plotted ± ½ vertical unit	2	**B1** for 1 point plotted ± ½ vertical unit If > 2 points plotted –1 for each extra. Ignore points from (c) ie on line is ok	Overlay available
	(b)		Ruled line drawn	1	From age 10 to 20	Within tramlines
	(c)	**(i)**	4.7-5.1 5.8-6.3	1 1		
		(ii)	Marco Data more strongly correlated for younger ages	M1 A1	Accept *their* value for Marco	Condone other relevant arguments. Mark best part even if contradictory. **A0** for 'More accurate', 'More points', 'fits the pattern'
10			Line (curve) joining (9, 160) to (9-10, 180) Horizontal line from *their* (9-10, 180) to (12, *their* 180) Line joining *their* (12, 180) down to (…., *their* 180 ÷ 2) and line back up to (1, *their* 180) Horizontal line from *their* (1, 180) to (3-3.30, *their* 180) then down to (3-3.30, 0)	1 1 1 1 1	Or **SC2** for 4 correct corners identified Or **SC1** for 2 correct corners identified	Mark to candidate's benefit Overlay available Mark corners by eye Condone freehand No credit for sections > 180 LHS scheme does not apply to lines that 'go back in time' Includes U shaped (even straight lines) from *their* (12, 180) to any point (12, *their* 90) to (1, *their* 180)

Question			Answer	Marks	Part Marks and Guidance	
11	(a)		6	1		May be embedded
	(b)		$x > 4$	2	**M1** for $3x > 12$ If **0**, then **SC1** for answer ($x =$) 4 or 5	Correct first step May be embedded
12	(a)		36	1		
	(b)		125 is greater than *their* 6^2	2	Accept 6^2 if value for 6^2 seen in 12(a) **B1** for $\left(\frac{5^7}{5^4} =\right)$, 5^3 or $5 \times 5 \times 5$ or 125	Candidate may restart for 6^2 Implied by 25×5

APPENDIX 1

Exemplar responses for question **4a**

Response	Mark	Reason	Response	Mark	Reason
Her weight is too low as it's underneath the lowest healthy weight	**0**	False, her weight is sometimes above the lowest healthy weight	**Her weight was healthy at first** but then it began to drop	**1**	Mark the best part, "Her weight…..First" Second part false, her weight never drops
For the first 3 weeks Rosy is a healthy weight	**1**	Correct	For the last 2 weeks her weight is below the lowest healthy weight line	**1**	Correct because mentions "below"
In the first 2 weeks Rosy's weight was healthy	**1**	Condone implication that the third is not	In the last 3 weeks Rosy's weight decreased and her weight is unhealthy	**0**	Wrong period defined AND weight decreasing is wrong
Rosy has a unhealthy weight as she grows up because it is out of the range	**0**	False, her weight is sometimes above the lowest healthy weight	Rosy does not put on very much weight. It increases slowly as she grows.	**1**	Actual value not used but statement is correct
In the first 2 weeks Rosy is very healthy	**1**	This is true, even though not a complete statement of the period	As it progresses she seems to get more unhealthy	**0**	"It" is not defined. Statement not true for the first 3 weeks
The first 2 weeks she's at an ideal weight but by the 3rd week ....she starts to drop getting to a weight of 455 on week 4	**1**	Mark the correct first part. Second part is wrong but does not negate first statement.	She is not a healthy weight and needs to put some weight on to be at a healthy weight	**0**	It is not defined as to when she needs to put on weight
Rosy's weight started off well and was a healthy weight	**1**	Correct	Rosy then went below a healthy weight at the age of 3 weeks. After 3 weeks she is not healthy	**1**	Second statement is a corollary of the first but says **under weight**
Rosy was a healthy weight but now she's not	**1**	Correct	Rosy was at an unhealthy weight from week 3	**0**	Second statement is a corollary of the first and not **under** weight
Rosy starts off healthy and then it deteriorates so by the end she isn't very healthy weight	**1**	Correct	She is putting on weight just not as quickly as she should be	**1**	Correct statement covering a different feature (rate of gain)

Response	Mark	Reason	Response	Mark	Reason
When she is born she is a healthy weight	**1**	Condone "when born" for Week 1	At week 4 drops out of the lowest healthy weight section	**1**	Implies **under weight** by "drops out". Condone "at" for "during".
When Rosie was born she was 200g which was a healthy weight	**1**	BOD for "when born" instead of week 1	At 5 weeks she was 430g which was underweight meaning she wasn't a healthy weight	**1**	Wrong value in comment 2 but states **unhealthy**.
From week 1 to week 2 she would be considered healthy	**1**	Concerns when she was unhealthy	During week 2 she is just healthy but from week 4 to 5 she becomes unhealthy	**1**	Corollary to first statement but accept
She does not have a healthy weight because her weight after week 3 is lower than it should be	**1**	Correct	**She starts off in a healthy state** in the first half of it but in the second half she is not healthy	**1**	Condone "half" this could score 2 marks
Rosie is not at a healthy weight from about 3 weeks	**1**	Concerns when she was unhealthy	Rosie was at a healthy weight until about 3 weeks	**1**	TRUE
She has a healthy weight of 200g in her first week	**2**	2 marks in one statement	She is now after her fifth week an unhealthy weight of 420g	**2**	Would score 2 marks
On the third week she was borderline healthy and by the third week she was underweight	**1**	Correct statement about health but second part incorrect	On week one she weighed 200 grams	**1**	Correct reading from the graph used in statement
Rosie's weight was decreasing over the five weeks	**0**	Not true	At the end of the five weeks she weighed 420g	**1**	Correct reading from the graph used in statement
As she got older her weight gets lower	**0**	Not true	Rosy's weight is lower than the lowest healthy recommended	**0**	Does not state when this is true
When she was one week old she was very healthy but at 5 weeks she wasn't	**2**	Two correct statements about when healthy	She became unhealthier each week. **She should have been putting on more weight than she was**.	**1**	Mark second part of statement regarding low weight gain (First part would just qualify)
Between weeks 1 and about 2 and a half she was reasonably healthy	**1**	Correct as defines when healthy	Between weeks 3 and 5 Rosy had put on more weight and was reasonably unhealthy	**1**	Entire statement is correct, if imprecise.

Exemplar responses for question **9cii**

Statement	Mark	Reason
More younger people jumped near the line of best fit	**1**	Implies "better correlation" or clustering around the line
There is more of a clear correlation at Marco's age	**1**	Implies "better correlation" or clustering around the line
The points are closer together	**0**	Doesn't describe closer to the line but implies "to each other"
The younger people who took part jumped closer to the line of best fit	**1**	Describes closer clustering
They are all around an average and the line of best fit is better there	**0**	They are not around an average and the **correlation** is not better
It is closer to the line which is positive correlation	**0**	The reading is from the line and no mention of greater clustering of points
His age section eg 10, 11 and 12 are all close to 4.9	**0**	False statement
Ages 10 and 11 show a pattern of the distance they jumped and Marco's distance was more reliable as it was similar to the pattern	**0**	Doesn't define "better correlation"
All the other jumpers in that region are about the same	**0**	Doesn't define "better correlation"
It’s supposed to be closer to the actual jump because the others near his age will have roughly the same	**0**	Doesn't define "better correlation"
That's where his age range should have jumped	**0**	Doesn't define "better correlation"
It’s right between people who are older or younger than him	**0**	Doesn't define "better correlation"
It best fits on the line and is equal to the others	**0**	Doesn't define "better correlation"

Statement	Mark	Reason
Marco is much closer to the line of best fit and Carl isn't near anyone in his age group	**0**	Doesn't define "better correlation"
The estimate is similar to those near it but the older ones are more spread out	**0**	Doesn't define "better correlation"

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