OCR
RECOGNISING ACHIEVEMENT

GCSE

Methods in Mathematics (Pilot)

General Certificate of Secondary Education

Unit **B391/01:** Foundation Tier

Mark Scheme for January 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.

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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.

M (method) marks are not lost for purely numerical errors.
A (accuracy) marks depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
B marks are independent of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.

1 Two additional situations may appear in the mark scheme allowing the award of **A** marks or independent (**B**) marks:
   i. Correct answer with no working
   ii. Work follows correctly from a previous answer whether correct or not ("FT" on mark scheme and on the annotations tool).

2 The following abbreviations are commonly found in GCSE Mathematics mark schemes.
   i. Where you see **oe** in the mark scheme it means **or equivalent.**
   ii. Where you see **cao** in the mark scheme it means **correct answer only.**
   iii. Where you see **soi** in the mark scheme it means **seen or implied.**

iv. Where you see **www** in the mark scheme it means **without wrong working.**
v. Where you see **rot** in the mark scheme it means **rounded or truncated.**
vi. Where you see **seen** in the mark scheme it 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.
vii. Where you see **figs 237**, for example, this means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point e.g. 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.

3 Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.

4 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).

5 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.

6 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.

7 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' or 'cao'. If the answer is missing, but the correct answer is seen in the body allow full marks. If the correct answer is seen in 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.

8 Ranges of answers given in the mark scheme are always inclusive.

9 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.

10 Where a follow through mark is indicated on the mark scheme for a particular part question, you must ensure that you refer back to the answer of the previous part question if this is not shown within the image zone. You may find it easier to mark follow through questions candidate by candidate rather than question by question by question.

11 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)		415	1		
	(b)		144	1		
	(c)		17.8	2	**M1** for correct method **or** **M1** for figs 178	eg '8' in tenths position for an answer less than 26.4, or use of number line
2	(a)		$\frac{3}{5}$	1		
	(b)		$\frac{12}{20}$, $\frac{7}{10}$, $\frac{40}{50}$ **oe**	2	**M1** if 2 fractions with same correct denominator seen, or 2 decimal equivalents	eg **M1** for $\frac{12}{20} = \frac{6}{10}$
3	(a)		Correct reflection	2	**M1** for quadrilateral to left of mirror with 3 correct points	Reasonable hand drawn acceptable
	(b)		2 × Correct shading	1 + 1		No mark for all shaded or none shaded

Question			Answer	Marks	Part Marks and Guidance	
4	(a)		103º	2	**M1** for 360 – (116 + 141) **soi**	
	(b)		62 with complete reasoning	4	CBE is 28 – (vertically) opposite angles CEB is 180 – (90 + 28) - angles in a triangle (add to 180) **or** **3** for correct answer and one reason missing **or** for correct reasoning with one calculation error **or** **2** for 62 without reasons or for any combination of two from the two required reasons and the two correct calculations (following through) **or** **1** for one of the four required reasons or correct calculations (following through)	28 could be found from angles on a straight line twice Full method could be ABE is 152 from angles on a straight line CEB is 152 – 90 exterior angle is sum of the two opposite interior angles "calculation" could be 28 seen on diagram This could be 152 seen in diagram
5	(a)	(i)	312	1		Allow 312.0
		(ii)	0.312	1		
	(b)		eg 10, 1000	2	**M1** if divisor larger than multiplier	

Question			Answer	Marks	Part Marks and Guidance	
6	(a)		1 2 3 4 6 12	3	**B2** for 4 or 5 factors (no extras) **or** **B1** for 2 or 3 factors (no extras) **or** **B1** for 5 or 6 correct plus one extra (<12)	Condone repeated factors Accept for 3 marks 1 × 12, 2 × 6, 3 × 4 Accept for 1 mark 2 × 2 × 3
	(b)		B with valid reason	2	**B1** for incomplete reason	eg shows understanding of idea of a multiple of 12
7	(a)		Point marked at (2, ⁻4)	1		Condone letter Q at (2, 4) position
	(b)		(2, *k*) for any $k \neq 3$ or ⁻4	1FT		
8	(a)		Radius seen	1		Just one radius, not two radii that define a sector
	(b)		Chord seen	1		For the chord accept diameter
	(c)		Arc seen	1		
	(d)		Sector seen	1		Shading needed
	(e)		Diameter	1		
9	(a)		Order of operations unchanged	1		
	(b)		4 correct sums with different answers	4	**1** each **If 0-2 scored then** **SC3** for all correct sums but without answers or with any incorrect answers **OR** **if 0 scored** **SC1** for at least 2 correct answers without any sums given	Mark answers on answer lines. If any blanks on answer lines, can look back in working. If more than four sums in total, each incorrect sum will cancel a correct sum except those on the answer lines. (ignoring any 2s or repeats)

Question			Answer	Marks	Part Marks and Guidance	
10	(a)		Any check of accuracy	1	eg 55 × 35.2 (= 1936)	eg 1936 ÷ 35.2
	(b)	(i)	3900	1		
		(ii)	4000	1		
	(c)		8000	1	or 7800	
11	(a)		30	1		
	(b)	(i)	$\frac{1}{15}$ **oe**	1FT	$\frac{2}{\text{their (a)}}$	Probabilities expressed in form "1 in 15" or "1 out of 15" penalise only first occurrence (from parts (i),(ii) and (iii)
		(ii)	$\frac{1}{6}$ **oe**	1FT	$\frac{5}{\text{their (a)}}$	
		(iii)	$\frac{8}{15}$ **oe**	1FT	$\frac{16}{\text{their (a)}}$	
12	(a)		0.4 0.3 0.12 0.18	2	**M1** for 2 correct fractions or percentages or divisions **soi** by 2 correct	
	(b)		Yes, large number of trials **oe**	1	Accept No if they say 'not large enough sample'	eg enough trials, large sample,
	(c)		1280 **isw**	2	**M1** for *their* 0.4 × 3200 **oe** (*their* 0.4 must be less than 1) Condone $\frac{1280}{3200}$	$3200 \times \frac{80}{200}$

Question			Answer	Marks	Part Marks and Guidance	
13	(a)		$14x + 11$ Final answer	3	**B2** for $ax + 11$ or $14x + b$ **nfww** or $14x + 11$ seen **or** **B1** for $8x - 4 + 6x + 15$ condone 1 error or $6x + 15$ seen	Accept eg $8x + 6x + 11$ for **B2**
	(b)		$\frac{1}{7}$ or 0.14(28517) **rot**	3	**M1** for correctly isolating x terms **M1** for correctly isolating number terms **M1FT** their $kx = n$ to $x = \frac{n}{k}$, $k \neq 1$ or 0	Must be on opposite sides of equation eg $5x + 2x + 3 = 4$ scores **M1** , $5x = 1 - 2x$ scores **M1** $7x - 1 = 0$ scores **M1** only
14			5 10 12	3	**M2** for $4x + 7 = 27$ or better **or** **M1** for $2x$ and $x + 7$ seen **If 0 scored SC1** for 4, 8, 15 or 5, 10, 12 in the wrong order	

APPENDIX 1

Exemplar responses for question **6(b)**

Response	Mark awarded
B, 12s multiples never end	2
B, 12 can be multiplied by many numbers, but it only has 3 factors (Q6a was 3, 2, 6)	2
B, there are limitless multiples, but only 5 or so factors	2
B, 12 only has 5 factors and it can multiply into lots	2 BOD
B, the 12 times tables doesn't end	2
B, it has over 100 multiples but only a few factors	2
B, 12 has an infinite amount of multiples	2
B, every number has more multiples than factors	2
B, 12's numbers reach to a very high number, its factors only reach to 12	1
B, only 5 go into 12, while it has more multiples	1
B, 12 only has factors up to itself, whereas it has more multiples	1
B, 12 has 10 multiples whereas it has 6 factors	1
B, there are only 4 factors and there are lots more multiples	1
B, because there are only three factors ((a) had 2, 4, 6)	0
B, it only has six factors, but there are more multiples in the six times table than this	0
B, there are four ways to multiply to get 12, but there are only three factors (after 2, 2, 3 in (6)(a))	0

Exemplar responses for question **9(a)**

Response	Mark awarded
Because you don't have to plus 4 and 3 before you minus 5	1
Because you add first	1
Because the sum in brackets is already at the front, so you would do that first anyway	1
Because the sum is set out so that the adding comes before the subtracting anyway.	1
Because add and subtract are in the same place in BODMAS and the answer will be the same in either	1
It is a simple add or subtract question, it does not need brackets	1
The sums with brackets are what you work out first so with them there it would give the same answer	1
The sum already follows the rule of BODMAS, the sum comes before the subtraction.	1
Because 3+4 make 7, you can do the sum without them. 7 – 5 = 2	1
you would get the same answer with or without them	1

It isn't algebra and the sum is simple without brackets	0
There is no number before the brackets	0
… does not need to use brackets because he can simplify the sum	0
… because there is not a number on the opposite side of the bracket.	0
… because he is not multiplying the numbers	0
This does not involve BODMAS	0
You can work out the sum without them	0
Because he isn't multiplying or dividing	0
In BODMAS addition comes before subtract	0
Because it is a plus not a times	0
In BODMAS you add before subtracting anyway	0
adding is before subtracting	0
using straightforward mathematics 3+4-5=2	0
straightforward sum, no need for breaking it down	0

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