OCR
RECOGNISING ACHIEVEMENT

GCSE

Mathematics B

General Certificate of Secondary Education

Unit **J567/01:** Paper 1 (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.

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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.

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 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)		C	1		
	(b)		B	1		
	(c)		A	1		
	(d)		D	1		
2	(a)		3.40(p) or 340 p(ence)	2	Mark final answer **M1** for 6.8(0) ÷ 2 or 3.4 **seen**	
	(b)		1.20(p) or 120 p(ence)	2	Mark final answer **M1** for 2.60 × 2 – 4 or 5.20 or 1.2 or 120 **seen**	Allow 2 marks for 1.2 **if** 3.4 given as answer in (a)
	(c)		20 or £0.20(p)	2	Mark final answer **SC1** for answer 60 or £0.60(p) OR **M1** for 80 ÷ 4 **oe** or answer of 0.2	
	(d)		0.60(p) or 60 p(ence)	2	Mark final answer **SC1** for answer 1.20 or 120 p(ence) OR **M1** for 1.8(0) ÷ 3 or 180 ÷ 3 **oe** or for answer of 0.6 or 60	Accept 0.33(…) as $\frac{1}{3}$

Question			Answer	Marks	Part Marks and Guidance	
3	(a)		Correct reflection with sides meeting at all 3 vertices	2	**M1** for 1 line correct or 3 correct vertices only or correct reflection not drawn accurately	See overlay Vertices must be within two dots in any direction Condone non-ruled lines for 2 marks Allow 2 marks if triangle otherwise accurately drawn but very small gap at one vertex
	(b)		Correct shape with rotation symmetry order 4	2	**M1** for correct horizontal line length 4 units; ignore any other lines	See overlay Condone non-ruled lines for 2 marks
4	(a)		9:47 or 9.47 **oe**	1		Ignore am or pm
	(b)		40	2	**M1** for 12:15 **seen** in working	
	(c)		16:47 **oe** or 16:46 **oe**	2	Mark final answer **M1** for 17:05 **seen** in working or answer of 16:45	Accept 4:47 or 4:46 **oe** for 2 marks Ignore am or pm Accept 4:45 **oe** for **M1**
5	(a)	(i)	37 (± 2)	1		
		(ii)	106 (± 2)	1	**SC1** for 40 in (a)(i) **and** 100 to 110 inclusive in (a)(ii)	
	(b)	(i)	acute	1		
		(ii)	obtuse	1		

Question			Answer	Marks	Part Marks and Guidance	
6	(a)		Correct outline (with 10 squares)	1		
	(b)		10, 13	1		
	(c)	(i)	16	1		
		(ii)	28	1		
7	(a)	(i)	6	1		
		(ii)	12	1		
	(b)		$7\frac{1}{2}$ or 7.5	2	**B1** for answer between 7 and 8 inclusive	
	(c)		40	3	Mark final answer **M1** for (26 – (2 × 8)) ÷ 2 **oe** or 5 **seen** (could be on the diagram) **M1** for *their* 5 × 8	*their* 5 must follow from a clear attempt to find the width
8	(a)	(i)	3	1		
		(ii)	450	1		
	(b)		105	2	If 105 seen, ignore subsequent working **M1** for 4 × 20 + 25 or 80 **seen**	Accept 1 hour 45 min or 1:45 clearly indicated (not 1.45)
	(c)		500	1		

Question			Answer	Marks	Part Marks and Guidance	
9	**(a)**	**(i)**	180	1		
		(ii)	(Quadrilateral is 360 because it is made up of) **two triangles** each **180**	1		See Exemplars
	(b)		60	2	**M1** for 360 – (80 + 105 + 115) **soi**	If answer line blank, 60 in correct position on diagram gains 2 marks
10	**(a)**	**(i)**	33	1		
		(ii)	8	1		
		(iii)	7	1		
	(b)	**(i)**	36	2	**M1** for a square number less than 50 as final answer or a multiple of 6 less than 50 as final answer	
		(ii)	13	2	**M1** for a prime number as final answer or for a list of prime numbers **only seen**	Do not accept 1 eg 2, 3, 5, 7 would score **M1** but 2, 3, 7, 9 would score **M0**
11	**(a)**		10:30 or 10.30 or half (past) ten **oe**	1		
	(b)		20	1		
	(c)		16	1		

Question			Answer	Marks	Part Marks and Guidance	
12	(a)	(i)	4	1		
		(ii)	$^{-}3$	1		
	(b)	(i)	$\frac{7}{32}$ $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$	2	**B1** for 3 fractions in correct order OR **M1** for an attempt to put at least three over a common denominator.	Allow equivalent fractions eg $\frac{7}{32}$ $\frac{8}{32}$ $\frac{10}{32}$ $\frac{12}{32}$
		(ii)	$1\frac{3}{4}$ or 1.75 or $\frac{7}{4}$ **oe**	2	**M1** for $3\frac{1}{4}-1\frac{1}{2}$ **soi**	
13			Pie Chart correctly drawn with angles of 70° (Excellent), 180° (Good), 80° (Satisfactory), 30° (Poor) (±2°) and correctly labelled	4	**B3** for 4 or 3 angles correct OR **B2** for 2 angles correct OR **B1** for 1 angle correct or all of 70, 180, 80, 30 **seen** AND **B1** for correctly labelling *their* pie chart with 4 sectors OR **SC1** following **B2** for the two correct sectors labelled correctly	Ignore labelling for first 3 marks May be seen in table Labelling must be consistent with the original data, G > S> E> P; condone abbreviations
14	(a)	(i)	17	1		
		(ii)	50	1		
		(iii)	37	1		
	(b)		7, 8, 10, 10 (any order)	3	**M1** for 5 ages (together with 6) that have a median of 8 AND **M1** for eldest age of 10	

Question			Answer	Marks	Part Marks and Guidance	
15	**(a)**		73	2	Mark final answer **M1** for 13 + 20 × 3 or 60 **seen**	
	(b)		$(h =)\frac{C-d}{20}$ **oe**	2	Mark final answer **M1** for $C-d$ **oe seen** or $-20h=-c+d$ **oe seen** OR **SC1** for $(h =)\frac{C}{20}-d$ or $(h =)C-\frac{d}{20}$ or $\left(h =\right)\frac{d-C}{20}$ **oe** as final answer	Could be embedded eg $C-d-20$
16	**(a)**	**(i)**	55 Corresponding [angles]	M1 A1	Accept any complete correct equivalent with full reasoning	Angle may be marked on diagram Condone F-angles
		(ii)	125 Alternate [angles with p + 70]	M1 A1	**FT** *their* (a)(i) + 70 or exterior angle of triangle After **M0**, **SC1** for correct reasons after attempt at *their* (a)(i) + 70 seen	Angle may be marked on diagram Condone Z-angles Accept correct equivalent reasons if at least 2 correct reasons seen If only one correct reason seen allow **A1** if both 55° seen in triangle on diagram See exemplars Diagram may clarify explanation
	(b)		9	2	**M1** for 360 ÷ 40	Condone nonagon for **M1**

Question			Answer	Marks	Part Marks and Guidance	
17	(a)		2 ⁻1 ⁻1 2	2	**M1** for two correct	
	(b)		Correct smooth curve through all 7 correct points	2	**B1** for at least 6 points plotted correctly **FT** *their* table	Use overlay Tolerance for plotting ±1mm vertically from correct position for points Intention of correct smooth curve
	(c)		1.3 to 1.5 and ⁻1.3 to ⁻1.5	2	**B1** for each correct value or **FT** *their* graph	Tolerance ±0.1 for reading
18	(a)		D	1		
	(b)		A	1		

Question			Answer	Marks	Part Marks and Guidance	
19	(a)		40	2	**M1** for 0.4 seen or $\frac{120}{300}$ [× 100] **oe** or 10% = 30 or 1% = 3 used	
	(b)		165.60	4		165.6 scores 3 only Allow 4 for ans 16560p Methods may all be in pence Attempt at build-up methods for 80% or 20% must come from a reasonable attempt at 10%
					M2 for attempt at 80% of 34.5[0] seen AND **M1** for *their* '27.6' × 6 OR **M1** for attempt at 20% of 34.5[0] seen AND **M1** for *their* '6.9' × 6	eg **M2** for 34.50 – 6.90 seen or 0.8 × 34.50 **oe** [= 27.6] eg 0.2 × 34.50 **oe** [= 6.9] or attempt at 2 × 3.45
					Alternative method **M1** for attempt at 34.5[0] × 6 [= 207] **soi** AND **M2** for attempt at 80% of *their* '207' seen OR **M1** for attempt at 34.5[0] × 6 [= 207] **soi** AND **M1** for attempt at 20% of *their* '207' [= 41.4] seen	eg 0.8 × *their* '207' or attempt at 8 × *their* correct 10% or *their* '207' - 0.2 × *their* '207' eg 0.2 × *their* '207' **oe** or attempt at 2 × *their* correct 10%

Question			Answer	Marks	Guidance
20*			Statement that Mike is incorrect, with fully correct justification, using three estimated calculations Calculations need to be **clearly** set out and annotated **Units** need to be shown, and spelling, punctuation and grammar must be correct	5	eg Number of gallons = 200 ÷ 50 = 4 Number of litres = 4 × 5 = 20 Cost = 20 × 1.40 = £28 So Mike is not correct, car is cheaper Or Cost per gallon = 1.4 × 5 = 7 Number of gallons = 200 ÷ 50 = 4 Cost = 7 × 4 = 28 Or Number of miles per litre = 50 ÷ 5 = 10 Number of litres = 200 ÷ 10 = 20 Cost = 20 × 1.40 = 28
			Correct conclusion, clearly showing evidence of a correct method, using rounding, which leads to a correct answer (£28 **oe**) Or Correct justification with full clearly presented method with one or two arithmetic slips	4-3	For lower mark Reaches a conclusion with evidence of correct process, but method incomplete or with errors Or Method showing two of the above estimated calculations
			Method showing one of the above estimated calculations eg seeing 4 gallons Or **Attempt** to **find** two of the following: • No. of gallons– 195 ÷ 51.4 (=3.79) • No. of litres– *their* '3.79' × 4.55 (=17.2…) • Cost per gallon– 1.389 × 4.55 (=6.31…) • No. of miles per litre– 51.4 ÷ 4.55 (=11.29…) • No. of litres– 195 ÷ *their* '11.29'…(=17.26…) • Cost– *their* '17.2' × 1.389 • Cost– *their* '6.31' × *their* '3.79'	2-1	For lower mark **At least** two correctly rounded values seen (may be seen in table) Or **Attempt** to find one of the following: • Number of gallons • Cost per gallon • Number of miles per litre
			Incorrect answer with no relevant content	0	

APPENDIX 1

Exemplar responses for 9(a)(ii)

Response	Mark awarded
Sum of the angles is **180** so **two triangles** put together will have a sum of 360	1
Because all angles in a triangle add up to **180** so if you combine **both triangles** together you get 360	1
Because the quadrilateral is made up of **two triangles** whose angles are **180**	1
Because **both triangles** are **180**	1
All the angles in a four sided shape add up to 360	0
You times 180 by 2	0
Because all the angles add up to 360 as all the angles together are a circle	0
Two triangles together equal 360	0
Because the triangles are 180	0

Exemplar responses for Q16(a)(ii)

Acceptable equivalent reasons are:

[Angles in a] triangle = 180
[Angles on a straight] line = 180
Vertically opposite [angles]
[Vertically] opposite angles equal
[Angles at a] point = 360
[Co]-interior/allied [angles] = 180 or C/U [angles] = 180

Response	Mark awarded
125, alternate angles then 180 – 55 = 125	M1A1
125, angles in a triangle sum 180, opposite angles are equal, angles on a straight line sum 180	M1A1
125, angles in a triangle add to 180 and angles on a straight line add to 180	M1A1
125, the angle reflects off the opposite to make 55 next to it, then it needs to add up to 180 on a straight line [with both 55 marked in triangle]	M1A1 ignore first reason second reason and diagram scores **A1**
125, angles in a triangle. Angles on a straight line	M1A0 [both 180s need to be seen]
125, angles on a straight line add up to 180	M1A0 unless both 55s marked in triangle
125, triangle = 180 so 2 of the 360 angles are 55 the other 2 (q) are equal so must be 125 to make 360	M1A0 unless both 55s marked in triangle
125, 70 + 55 = angle q because there both on the same line and to get q you must add them	M1A0
70, it is also an opposite angle	M0A0
135, 55 + 70 = 135, 135 is the adjacent angle on a z angle	M0A0 **SC1** as reason acceptable and addition seen
140, it is an alternate angle and an angle around a point	M0A0 **SC0** as addition not seen

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

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