OCR
RECOGNISING ACHIEVEMENT

GCSE

Applications of Mathematics (Pilot)

General Certificate of Secondary Education

Unit **A381/01:** 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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
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 awarded for a correct final 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.

   - **cao** means **correct answer only**.
   - **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' or 'cao'. 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			Correctly drawn triangle (±2mm) Angle stated/labelled (40 ±2)°	1 1	**M1** for **FT** on candidate's drawing.	Condone "intended" straight lines. Use overlay circles for acceptable range of vertices. Accept just "yes angle is 40°" if supported by correctly drawn triangle.
			Consistent comment (true/not true or yes/no or equivalent)	1		Allow either providing it fits with candidates' stated size.
2	(a)	(i)	(£ billion) 5 (billion)	1		Condone repeat of billion in words or as a number in digits. (ie 5 000 000 000)
		(ii)	23(%)	1		
		(iii)	$\frac{40}{100}$ or equivalent seen	1		Accept any equivalent fraction – but must be a fraction (not decimal). If correct fraction erroneously cancelled etc. **isw**
	(b)		201 600 / 219 000 / 219 150 / 219 600	2	**M1** for (300 to 400) × 600 **or** (180 000 to 240 000) seen **or figs** 219 seen	
	(c)	(i)	400	1		
		(ii)	1800 km	2	**M1** for **figs** 18 or 360000 ÷ 200 seen	1800 without km gains just **M1**

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td>(d)</td><td></td><td>Sales' income of (£) 48 and costs of (£)30 and statement to the effect that Amy does make a profit of £18.</td><td>4–3</td><td>For the lower mark there must be a statement to the effect that Amy will make a profit, not necessarily the actual amount, supported by at least a total four correct key calculations and key numbers.
or
No clear statement regarding profit, but with at least a total of six correct key calculations and key numbers.</td></tr>
<tr><td></td><td></td><td></td><td>A total of at least three correct key numbers and calculations and a qualitative attempt to compare their sales' income and costs to form a judgement about profit or loss.
or
A total of at least four correct key numbers and calculations but no attempt to compare sales' income and costs.</td><td>2–1</td><td>For the lower mark there must be a total of at least two correct key calculations and key numbers.
or
An attempt to compare sales' income and costs (but not necessarily correct) to make a consistent statement regarding profit or loss.

<table>
<tr><th>key calculation</th><th>key number (nfww)</th><th>Result</th></tr>
<tr><td>6000 x 0.4</td><td>24 or 2400*</td><td>Clicks cost</td></tr>
<tr><td></td><td>60</td><td>Number of visits</td></tr>
<tr><td>60 x 10</td><td>6 or 600*</td><td>Visits cost</td></tr>
<tr><td></td><td>30/3000</td><td>Total cost to Amy</td></tr>
<tr><td>60 / 5</td><td>12</td><td>Number of sales</td></tr>
<tr><td>12 x 4</td><td>48</td><td>Sales' income</td></tr>
<tr><td></td><td>£18</td><td>Amy's net profit</td></tr>
</table>
*Condone either answer for credit for working</td></tr>
</table>

Question			Answer	Marks	Part Marks and Guidance	
3	(a)	(i)	Express	1	Accept 642695	
		(ii)	(Daily) Mirror, Mail and Sun	2	**B1** for 2 correct but no wrong	
	(b)	(i)	605000g / 605kg / 0.605 tonnes	3	**B2** for **figs** 605 seen **or** **M1** for 1.1 x 11000 (= 12100) **or figs** 121 seen **M1** for "number" x 50 (= 605000) seen **or figs** 55 seen	
		(ii)	80 to 120 (cm)	1		
		(iii)	40 to 60 (cm)	1	**B1** for (ii) ÷ 2 seen	
	(c)	(i)	40(p)	1		
		(ii)	50(p)	1	**FT** from (i)	ie 1.25 x (i)
		(iii)	£2.10(p) or 210p	1	**FT** (ie £2 + (ii) – (i))	

Question			Answer	Marks	Part Marks and Guidance	
4			LMN is an isosceles triangle correct definition of above ABC is an equilateral triangle correct definition of above	1 1 1 1	Second mark dependent on the first for both.	Two equal sides or angles (without contradiction) Three equal sides or angles (without contraction)
5	(a)	(i)	10^5	1		Allow 1 x 10^5
		(ii)	One hundred thousand or 100 000	1		Do not accept 10 x 10 x 10 x 10 x 10 Accept : 10 00 00 or similar
	(b)		£3 + £5 + £10 + £2 = £20	1		Answer needed.
	(c)	(i)	Indicated unambiguously 	1		Need both, one error →zero.
		(ii)	5 (cm)	1		
	(d)		Reflection symmetry A D X M I O V Rotation symmetry N X I	2 2	**B1** for at least four correct and no more than 8 letters selected in total. **B1** for two correct and no more than 4 letters selected in total.	
	(e)		a = 40° b = 70° c = 100°	1 1 1		

Question			Answer	Marks	Part Marks and Guidance	
6	(a)		69.5 – 69.9	1	Ignore subsequent working eg rounding to 70.	
	(b)		Line passing through (12, 53) and through (22, 73)	3	**B2** for 3 correct points plotted (± 1mm) **or** **B1** for 2 correct pairs of coordinates (may be seen in the table) 12 16 22 **53** **61** **73**	
	(c)		0.4 – 1.2 **FT** *their* graph	2	**B1** for one correct length seen 16.4 – 16.6 (man) 17 (woman)	Allow fractional answers eg $16\frac{1}{2}$
7			Candidates' own linear equations	1+1		Do not allow embedded equations or those of the form $a = 6 – 3$ or similar. Condone equations using a letter other than a as the unknown and two distinct equations each using a different letter. Condone naïve algebraic notation such as $3 \times a$ or $1 \times a – 1 = 2$ or similar.
8	(a)	(i)	57.91	2	**B1** Their pre–rounded answer seen and corrected to 2 sf **or** 57.9 ……..	
		(ii)	58	1	**FT** from (i)	

Question			Answer	Marks	Part Marks and Guidance	
	(b)		$\frac{2}{12}$ or $\frac{1}{6}$	1		**isw** for incorrect attempts to simplify
	(c)		7	2	**M1** for either 28 or 4 seen	

Question			Answer	Marks	Guidance
9			Two clear and successful attempts by candidate to substitute their trial solutions into the expressions, then substituting these into the given expression to find the correct solution to the original equation (giving $x = -2.5$ or equivalent).	4	**B1** Clear indication/statement of $a = 4$ **and** $b = 10$ (for the former possibly embedded in an expression – but not for re-stating the original given equation). Allow $4m + 10 = r$ or $4n + 10 = s$ but not, for example: $4m + 10 =$ (a number). **B1** Explicit statement of chosen values of m **and** n **used** in working - embedded in an expression is sufficient. **B1** At least one correct substitution result clearly seen at any point, r and s may be followed through of these into the "main" equation – "correctly calculated" numerator **or** denominator. **A1** Correct answer ($x = -2.5$ or equivalent), which might be embedded in the original equation.

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

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