GCSE

Applications of Mathematics (Pilot)

General Certificate of Secondary Education

Unit **A381/02:** Higher Tier

Mark Scheme for November 2013

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
λ	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 <u>using a correct method</u> and are not lost for purely numerical errors.
    A marks are for an <u>accurate</u> answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
    B marks are <u>independent</u> of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
    SC marks are for <u>special cases</u> 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 <u>not from wrong working</u> **full marks** should be awarded.

    Do <u>not</u> award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen <u>and</u> 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.   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.

11.   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.

12.   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.

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

14.   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.

15.   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)		340	2	**M1** for 500 – 160	
	(b)		24	2	**M1** for $\dfrac{160}{120} \times 18$ **oe**	
2	(a)	(i)	914 to 915	1		
		(ii)	995	1		
		(iii)	1632	2	**M1** for 44 × 48 or 17 × 170 or 2112 or 2890	
	(b)		Any correct observation	1		See exemplars
	(c)	(i)	950	1		
		(ii)	900	1		
		(iii)	Correct straight line ruled	2	**B1** for two points plotted correctly	Accuracy of *y* coordinate plotting: 20 between 0 and 50 900 at 900 2220 between 2200 and 2250
		(iv)	34 to 35	1	or **FT** *their* straight line	Line need not be ruled
3	(a)		15.4(4) cm or 0.154(4) m or 6.07(…) or 6.1 inches	3	**M2** for 305 – (12 × 9 + 6) × 2.54 or (305 ÷ 2.54) – (12 × 9 + 6) **or** **M1** for (12 × 9 + 6) × 2.54 (= 289.56) or 305 ÷ 2.54 (= 120.078)	

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Question			Answer	Marks	Part Marks and Guidance	
	(b)		60	4	**M1** for conversion to common denominator with at least one correct numerator $\frac{16}{20}, \frac{5}{20}$ oe **A1** for $\frac{11}{20}$ **M1** for $\frac{20}{11} \times 33$	Accept conversion to decimals 0.8 and 0.25 for **M1** with at least one correct
4	(a)	(i)	A and B or C and E	1		
		(ii)	A and C or A and E or A and G or B and C or B and E or B and G or C and G or E and G	1		Condone D and whole square
	(b)	(i)	Complete method $4 \times \frac{1}{2} \times 8 \times 8$ or $2 \times \frac{1}{2} \times 16 \times 8$ or $2 \times 8 \times 8$ or $8^2 + 8^2$ or 16×8	2	**M1** for $\frac{1}{2} \times 8 \times 8$ or $\frac{1}{2} \times 16 \times 8$ or 8×8	
		(ii)	11.3 - 11.32	1		
	(c)		75	2	**M1** for $\frac{12}{16} \times 100$ **oe** **SC1** for 25[%]	
	(d)		1.36 - 1.40	3	**M2** for $2 \times$ *their* **b(ii)** $+ 4 + 4 + 4 + 8 + 4 - 4 \times$ *their* **b(ii) oe** **or** **M1** for $2 \times$ *their* **b(ii)** $+ 4 + 4 + 4 + 8 + 4$	For **M2** or **M1** condone a max of 2 incorrect sides from 7 sides or 6 correct sides with one side missing

Question			Answer	Marks	Part Marks and Guidance	
5	(a)		19	2	**M1** for 141 ÷ 7.8(0) or 18(.0…)	
	(b)		Return 15.9(0) Season 251.2(0)	3	**B2** for return = 15.9(0) **or** **M1** for 5 returns = 66.8 + 12.7 or 20r – s = 66.8 s – 15r = 12.7 added	
6	(a)		370	2	**M1** for 296 × 1.25 **oe**	
	(b)		37	4	**M1** for 3(114 + x) = 416 + x **oe** **M1** for 342 + 3x **M1** for 2x = k or kx = 74 <u>ALT T & I</u> **M1** for trial correctly evaluated **M1** for improved trial correctly evaluated **M1** for improved trial correctly evaluated	
7	(a)		3.12 p.m. or 15.12	5	**M1** for 5456 ÷ 480 **A1** for 11.3(6…) or 11.37 **and** **M1FT** for 11:50 + *their* 11.3(6…) – 8 **A1FT** for 15.2 **B1FT** for either *their* 11 hours 22 minutes or *their* arrival time correctly converted to hours and minutes.	Also accept for **M1 FT** 11:50 + *their* 11.3(6…) + 16 Arrival time of 11.12pm **oe** implies **M1 A1 B1**

Question			Answer	Marks	Part Marks and Guidance	
7	**(b)**	*	Complete and correct solution, $52.72 – 52.82, supported by correct calculations and solutions	**5**	**5** for all 5 calculations seen (two or more may be combined) with solutions **or** **4** for any 4 calculations seen (two or more may be combined) with solutions **or** **3** for any 3 calculations seen (two or more may be combined) with solutions **or** **2** for any attempt at 2 calculations seen (two or more may be combined) **or** **1** for any attempt at 1 calculation seen	Solution requires five calculations, two or more of which may be combined Exchange rate, London: $\frac{156}{99.72}$ = 1.56438 No. of dollars 950 × *their* 1.56438 (Range of answers 1482-1486.18) Exchange rate, LA: $\frac{113.16}{75}$ = 1.5088 No. of dollars 950 × *their* 1.5088 (Range of answers 1425-1434.5) Difference *Their* London $ – *their* LA $ (this may appear before multiplication by 950) Condone their exchange rates rounded or truncated to 2 or more dp.

Question	Answer	Marks	Part Marks and Guidance
8	2799 or 2800	3	**M2** for $\dfrac{2400}{0.95^3}$ or $\dfrac{2659}{0.95}$ or $\dfrac{2658}{0.95}$ **or** **M1** for $\dfrac{2400}{0.95}$ or 2526.(…) **SC1** for $2400 \times 1.05^3 = 2778[....]$ **or** for $2400 \div 1.05^3 = 2073[. …]$ **or** for $2400 \times 0.95^3 = 2057 - 2058$
9	29	5	**M4** for $\dfrac{72}{10} \times 1.6^3$ **or** **M2** for $10 \div 1.6^3$ or 10×0.625^3 **oe** **or** **M1** for 1.6^3 or 4.096 or 4.09 or 4.1 or 0.625^3 or 0.244 or 0.24 **oe** and **A1** for 2.44(…) and **M1** for $72 \div$ *their* 2.44(…) If 0 then **SC1** for $72 \div$ *their* $(10 \div 1.6) = 11$

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