OCR
RECOGNISING ACHIEVEMENT

GCSE

Methods in Mathematics (Pilot)

General Certificate of Secondary Education

Unit **B392/01:** Foundation Tier

Mark Scheme for June 2012

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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
^	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).
   - **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	(a)		H	2	**M1** for any 2 perimeters correct	Shape Area Per A 9 12 B 8 12 C 6 12 D 6 12 E 7 12 F 5 10 G 7 12 H 6 14 Allow 14 for H on answer line
	(b)		F	2	**M1** for any 2 areas correct	Allow 5 for F on answer line
	(c)		C and D	1		
2	(a)		148	1		
	(b)		4	1		
	(c)		43	2	**M1** for $\times 2$ **and** +3 or 40	
	(d)		5	1		
3	(a)		48	1		
	(b)		Possible dimensions eg 2 5 8	2	**M1** for use of $l \times w \times h$	eg $2 \times 5 \times 12$ $1 \times 1 \times 80$ $1 \times 2 \times 40$ $1 \times 4 \times 20$ $1 \times 5 \times 16$ $1 \times 8 \times 10$ $2 \times 2 \times 20$ $2 \times 4 \times 10$ $2 \times 5 \times 8$ $4 \times 4 \times 5$
	(c)		64 or 4 by 4 by 4	2	**M1** for dimensions of any cube	Allow 4 if length of side implied

Question			Answer	Marks	Part Marks and Guidance	
4	(a)		(8 , 5)	2	**M1** for D marked correctly or FT *their* D	D may be implied from one point
	(b)		(5, 3)	2	**B1** for *x*-coordinate 5 or *y*-coordinate 3	If coordinates clearly reversed in **(a)** then **2** marks available in **(b)** for (3, 5).
	(c)		12	2	**M1** for lengths 6 and 4 or 24 **or** **M1** for ½ × *their* length × *their* height (as marked)	
5	(a)		85	1		
	(b)		63	2	**M1** for 21 or 252 or ¾ × 84 or 0.75 × 84	Accept ×3 then ÷4
	(c)		600	2	**M1** for ¼ or 150 × 4	
6	(a)		32 [8] 40 [20] 5 25 40 10 [50]	1 1 1	**SC2** for 2 [8] 10 [20] 80 100 10 40 [50] **or** **SC1** for 2 rows 'correct'	
	(b)		3 [to] 2	2	**M1** for 18 [to] 12 **oe** **or** **B1** for 2 to 3	
7	(a)		3 [6 9] 12 15	2	**M1** for 1 or 2 correct entries	
	(b)		57 with reason eg 3*n* – 3 or eg add on 3 rails 14 times	1 2	**M1** for add 3 or 3*n* or 3 × 20 or list to at least 51 or 3 times table	See exemplars

Question			Answer	Marks	Part Marks and Guidance	
8	(a)	(i)	60 75 300	2	**M1** for 1or 2 correct	
		(ii)	Multiply the middle number by 3	1		Condone 'multiply by 3' or 'add on numbers one below and one above'. Allow multiply by the number of consecutive numbers.
	(b)		Multiply the middle number by 5 with at least one example	3	**M2** for multiplying the middle number by 5 without an example or rule fully demonstrated by an example **or** **M1** for 5 consecutive numbers listed	Condone eg 'it' for middle number Allow multiply by the number of consecutive numbers.
	(c)	(i)	$a + 1$, $a + 2$, $a + 3$, $a + 4$, $a + 5$, $a + 6$	1		
		(ii)	Addition of 7 consecutive terms leading to $7a + n$ or $ka + 21$ or $7a + 21 = 7(a + 3)$	2	**M1** for $a + 3$ is the middle number **A1** for multiply $(a + 3)$ by 7 because there are 7 numbers **or** **SC1** for $7(a + 3)$ [=] $7a + 21$ or $7a + 21$ [=] $7(a + 3)$	
9	(a)		Rule eg Numbers on the two dice add up to 8.	1		Sum of dice 8 scores 1 Sum equals 8 scores 0
	(b)	(i)	Line of crosses through (1, 1) to (5, 5)	1	Accept line from (1, 1) to (5, 5) or 5 points	
		(ii)	Line of crosses through (1, 7) to (5, 3)	2	**M1** for line joining two points or two correct points (other than (4, 4))	

Question			Answer	Marks	Part Marks and Guidance	
	(c)	(i)	4 4	1		
		(ii)	Intersection of the lines of crosses	1		Allow eg where the lines cross

Question			Answer	Marks	Guidance
10*			Deal 1 chosen supported by correct breakdown of calculation and annotation and units. eg Deal 1 chicken 3 [×] 8.50 = £25.50. Deal 2 chicken 34.00 – 6.80 = £27.20 or Deal 1 lamb 3 [×] 8.80 = £26.40. Deal 2 lamb 35.20 – 7.04 = £28.16	4	**3** for correct costs (condone eg 25.5) for deal 1 and deal 2 but insufficient supporting evidence or annotation **or** Deal 1 correct but arithmetical error evident in calculation for deal 2 or vice-versa. **or** **2** for cost of deal 1 or deal 2 correct with correct breakdown of calculation or 25.5[0] and 6.8[0] (or 26.4[0] and 7.04) **or** **1** for 25.5[0] (or 26.4[0]) correct or 10%/20% of £34 (or £35.20) attempted NB for 4, 3, 2 or 1 marks, if deals considered for both lamb and chicken, mark better solution. Allow chicken balti and lamb balti as one meal. If meals mixed within deal treat as a misread. <u>Alternative</u>: **4** for clear reasoning that with deal 1 cost is 75% of cost of 4 meals and so deal 1 is the better deal as 25% is greater than 20%.

Question			Answer	Marks	Part Marks and Guidance	
11	(a)	(i)	1860	1		
		(ii)	$25n + 360$	2	**M1** for $25n$ or $360 + kn$ $k > 1$	Condone £ in formula
	(b)	(i)	$[n] = \frac{H - 400}{18}$	2	**M1** for $H - 400 = 18n$ **or** **B1** for $[n] = \frac{H + 400}{18}$ or $H - 400/18$	
		(ii)	45	2	**M1** for $\frac{1210 - 400}{18}$ FT *their* **(i)** **SC1** for 34 (from Warsash)	Alternative: $1210 = 18n + 400$ **M1** $810 = 18n$ **A1** 45
12	(a)		$s = 115$ $t = 100$	1 1	**SC1** for $s = 110$ and $t = 115$	
	(b)		3 correct angles (only) marked	2	**M1** for 1 correct angle (only) marked	Condone other angle sizes marked

Question			Answer	Marks	Part Marks and Guidance	
13	(a)		264 or 260	4	**M2** for $\sqrt{(540^2 + 390^2)}$ **soi** by 666.[...] **OR** **M1** for $540^2 + 390^2$ or incorrect use of Pythagoras eg $\sqrt{(540^2 – 390^2)}$ **and** **M1** for (390 + 540) – *their* 666 from Pythagoras Allow **B3** for 263.9 or 263.8919...	Alternative: **M2** for $\tan^{-1}$ (390/540) or $\tan^{-1}$ (540/390) followed by use of sin or cos to find AB **OR** **M1** for use of either $\tan^{-1}$ and sin or $\tan^{-1}$ and cos. **and** **M1** for (390 + 540) – *their* 666 from trig For scale drawing allow full marks for final answer of 264 or 260 or **M1** for acceptable scale drawing **and** **M1** for (390 + 540) – *their* 666 from scale drawing
	(b)		345 to 346	2	**M1** for $\pi \times 55 \times 2$ or for **figs** 345 **or** **B1** for 341	

Question			Answer	Marks	Part Marks and Guidance	
14			[£] 9.3[0] and 35[%]	6	**B3** for £9.30 **OR** **M1** for 0.225 × 12 or 2.7[0] or eg percentages totalling 22½% with at least one correctly evaluated **and** **M1** for 12 – *their* 0.225 × 12 **OR** **M1** for 1 – 0.225 or 0.775 **and** **M1** for (*their* 1 – 0.225) × 12 **OR** **M2** for 0.775 × 12 **AND** **B3** for 35% **or** **B2** for 65% **or** **M2** for 1 – 5.72/8.80 or (8.80 – 5.72)/8.80 **or** **M1** for 5.72/8.80 or 3.08 or 308	eg 20% 2% ½% First **M1** may be implied by second **M1** Allow eg (880 – 572)/8.80

Question			Answer	Marks	Guidance
15*			All four angles, calculated correctly with reasons eg 45 from 90/2 (or from ½ square corner) and **then** 135 from co-interior angles in a trapezium or angles in a trapezium/quadrilateral add to 360 or (360 – 90)/2 **OR** 135 from (360 – 90)/2 (or 270/2) and **then** 45 from co-interior angles in a trapezium or angles in a trapezium/quadrilateral add to 360 or 90/2 (unless contradicted). One angle correct (with or without reasons or working) **or** angles *a, a*, 180 – *a*, 180 – *a* with explanation involving symmetry and angles of trapezium 360.	3 - 2 1	For lower mark – both angles correctly calculated (45º and 135º)

Question			Answer	Marks	Part Marks and Guidance	
16	(a)		$7y > 3y + 10$ ringed	1		
	(b)	(i)	$y > 2.5$	2FT	**M1** $4y > 10$ **or** **B1** $y = 2.5$ **oe** FT *their* **(a)** for **M1A1**	
		(ii)	tin or weight more than 2.5[kg]	1FT	**FT** *their* **(i)**	
17	(a)		0.2	2	**M1** for 1/5 or 1 ÷ 5	
	(b)	(i)	25.09[9...]	1	Allow 25.1[0]	

Question			Answer	Marks	Part Marks and Guidance	
		(ii)	$6 \times 5 + \sqrt{42}$ or $5 \times 6 + \sqrt{42}$	2	**M1** for 6, 5, 4 and 2 entered in boxes in a way which gives an answer larger than *their* **(i)** **or** **SC1** 36.48...	

APPENDIX 1

Exemplar responses for questions 7b

Response	Mark awarded
There are 60 rails because you add 3 rails each time a post is added	1
There are 60 rails because the nth term is $3n$ so $3 \times 20 = 60$.	1
There are 42 rails because number of rails goes up by 3 each time and 20 is 14 more than 6 so $3 \times 14 = 42$ rails	1
There are 57 rails because rails is the 3 times table	2
There are 57 rails because for each post there are 3 rails	2 BOD adding implied
There are 57 rails because you have to do 3×20 which is 60 then take away 3 which is 57. You have to take away 3 because with 1 post you can't make rails, you need two posts.	3

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