OCR
Oxford Cambridge and RSA

GCSE

Methods in Mathematics (Pilot)

Unit **B392/01:** Methods in Mathematics 2 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for November 2015

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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.

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 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. In questions with a final answer line:

   (i) If one answer is provided on the answer line, mark the method that leads to that answer.

   (ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

   (iii) If more than one answer is provided on the answer line and there is more than one method provided, award zero marks for the question unless the candidate has clearly indicated which method is to be marked.

9. In questions with no final answer line:

   (i) If a single response is provided, mark as usual.

   (ii) If more than one response is provided, award zero marks for the question unless the candidate has clearly indicated which response is to be marked.

10. 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.

11. 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.

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

13. 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.

14. 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)		14[cm]	1		
	(b)	(i)	Rectangle with perimeter 14cm and length and width recorded	2FT	**B1** for rectangle	
		(ii)	FT their (b)(i)	1FT		1 by 6 area 6 2 by 5 area 10
2	(a)		72 subtract 7 512 multiply by 4	1,1 1,1		Allow goes down by 7 Condone $n - 7$ and $n \times 4$
	(b)		13 21 34	2	**M1** for 13	
3	(a)	(i)	4913	1		
		(ii)	15	1		
	(b)		136.88	2	**M1** for 23.6 or 5.8 or figs 13688 or 136.9	
4	(a)		B and G	1		
	(b)		C and E	1		
5			C (2,1) D (0,5)	4	**B3** for C and D correctly plotted **OR** **B2** for A and C or B and D correctly plotted or C (2, 1) or D (0, 5) **OR** **B1** for A or B correctly plotted	Allow B3 for C (0, 5) and D (2,1)

Question			Answer	Marks	Part Marks and Guidance	
6*			£13.20 with 2×1.30 and 2 ×1.80 and 4 × 1.75 Or with 2 boxes of 4 cakes and 2 boxes of 6 cakes £6.20 and 4 boxes of 5 drinks £7	5	**4** for £13.20 or 13.20 or 13.2 with inadequate justification **OR** **3** for £13.50 with 5 × 1.30 and 4 × 1.75 or for 2 ×1.30 and 2 ×1.80 and 4 × 1.75 **OR** **2** for either 5 × 1.30 = 6.50 or for 4 × 1.75 = 7.[00] or for 2×1.30 and 2 ×1.80 = 6.20 **OR** **1** for 4 drink boxes or for 2 '6 cakes' and 2 '4 cakes or for 5 '4 cakes'	
7	(a)		3/8 eg 15 ÷ 5 = 3 and 40 ÷ 5 = 8 or eg 15/40 = 0.375 and 3/8 = 0.375	1 1		Allow cancels by 5
	(b)		2/3 eg 2 ÷ 3 = 0.666	1 1	.	
	(c)		1/5 or ¾ 1/5 = 2/10 or ¾ = 6/8	1 1	 Or eg 1/5 = 0.2 and 1/10 =0.1 or ¾ = 75% and 3/8 = 37.5%	

Question			Answer	Marks	Part Marks and Guidance	
8	(a)		[£] 39	2	**M1** for 24	
	(b)		$\frac{C - 15}{8}$ oe $\frac{15 - C}{-8}$	2	**M1** for $C - 15 = 8n$ oe	-8n = 15 – C Allow **M1** for C – 15 ÷ 8
	(c)		5	2	**M1** for $55 = 8n + 15$ or better Or for $C = 45$ substituted in their (b)	$n = \frac{55 - 15}{8}$
9	(a)		no no no yes yes	2	**M1** for N N Y Y Y or Y Y N N N	Accept N N N Y Y for 2 marks
	(b)	(i)	80	1		
		(ii)	2	2	**M1** for $x + 4 = 6$ or $5x + 20 = 30$	
10	(a)	(i)	14.50	2	**M1** for [10%] 29 or [1%] 2.90 or 14.5 or 0.05 × 290	
		(ii)	7.65	2	**M1** for 0.18 × 42.5[0] Or for eg 10% = 4.25, 1% = 0.425, 8% = 3.4[0]	
	(b)		80	2	**M1** for 240 ÷ 300 (not contradicted) or for 0.8	

Question			Answer	Marks	Part Marks and Guidance	
11	**(a)**		48	**2**	**M1** for 8 × 2 × 3	
	(b)		132	**4**	Must be working in 3d **M1** for two cuboids height 8m and middle cuboid **AND** **M2** for middle cuboid 36 **OR** **M1** for middle cuboid dimensions 2,6,3	Alternative method **M1** for cuboid 8,10,3 - hole **AND** **M2** for hole 108 **OR** **M1** for Hole dimensions 6,6,3 Alternative method **M1** top cuboid and two cuboids height 6cm **AND** **M1** top cuboid 10,6,3 (may be implied by 60) **and** **M1** side cuboid 6 x 2 x 3 (may be implied by 36) Alternative method **M1** area cross-section x 3 **AND** **(eg) M2** area 8 x 10 – 6 x 6 or **M1** area 6 x 6
12	**(a)**	**(i)**	96	**2**	**M1** for 24 × 4	
		(ii)	1/8 oe	**1**		
C	**(b)**		11 $\frac{55}{112}$ isw	**1** **1**		Condone values outside the boxes if unambiguous and not contradicted
13			7.87(...) or 7.9	**3**	**M2** for $\sqrt{(3.4^2 + 7.1^2)}$ or 7.8 **or** **M1** for $3.4^2 + 7.1^2$	

Question			Answer	Marks	Part Marks and Guidance	
14			Area square 144 ¾ of 144 =108 Area circle 113.(...) Conclusion eg Yes because 113 is close to 108 or No because 113 is more than 108	6	**M1** for area square 144 **AND** **M2** for ¾ of 144 = 108 **OR** **M1** for ¼ of 144 = 36 **AND** **M2** for 113.(...) **OR** **M1** for $\pi \times 6 \times 6$ **AND** **A1** conclusion	Alternative method (part) **M2** for 113/144 = 0.78.. or **M1** for 113/144 NB Use of $\pi = 3$ condoned

Question			Answer	Marks	Part Marks and Guidance
15* C			19 houses with clear reasoning eg 5n + 1 = 100 …….. n = 19.8 < 20 ….. so 19 houses or sequence up to 96/101 with appropriate statement or 100 – 6 = 94 ….. 94 ÷ 5 = 18.8 ….. first house is 6 sticks with 94 left for others made of 5 sticks so it's 18 + 1 = 19 houses	4	**3** for $5n + 1 = 100$ or reasoning leading to 20 houses would take 101 sticks or 19 houses with incomplete/ no reasoning or 94 ÷ 5 = 18.8 **OR** **2** for correct formula for *n*th term or sequence up to 96 or 101 **OR** **1** for sequence started e.g. 6, 11, 16, 21. .. or 6, 11, 16 and +5 seen

Question			Answer	Marks	Part Marks and Guidance	
16 C	(a)		6 :3 :10	2	**M1** for 12 :6 :20	
C	(b)		84	2	**M1** for 7x(3 + 4 + 5) or 21:28:35 or 21 ÷ 3	

17* C			74º clearly presented with a correct reason for each angle used. eg correct solution <GEF = 43º (angles on a st. line) and <GFE = 74º (angle sum of triangle) and <BCF = 74° (corresponding angles) or <GFE [= 137°- 63°] = 74° (exterior angle = sum of opposite interior angles) and <BCF [= <GFE] = 74° (corresponding angles)	4	**3** for <BCF = 74° with at least one reason clearly stated or complete solution with one numerical error **OR** **2** for one correct angle on route to answer with reason or <BCF = 74° with no reasons or working **OR** **1** for a correct angle which helps to get to the answer Ignore any additional irrelevant statements	

Question			Answer	Marks	Part Marks and Guidance	
18 C	(a)		Correct explanation eg correct explanation: *x* is how much the pennies are worth, 2*y* is how much the 2p coins are worth. They are worth 35p altogether.	1		Use of specific examples for *x* and *y* scores 0
C	(b)		$x + y = 25$	1		NOT eg 2x + 4y = 70
C	(c)		15, 10	3	**M2** for $x + y = 25$ drawn **OR** **M1** for at least two points on $x + y = 25$ found	FT *their* **(b)** for method marks Alternative method **M1** for elimination of one variable and **M1** for FT to *x* or *y*

Question			Answer	Marks	Part Marks and Guidance	
19 C			144, 36	**5**	**M1** angles of pentagon add up to 540° or exterior angle = 72° **A1** 108 **AND** **M1** for 360 - 2 × *their* 108 or for 360 - 3 × *their* 108 or for $\frac{360 - 2 \times \textit{their } 144}{2}$ or for 180 – *their* 144 **B1** 144° **B1** 36°	Could be marked on diagram (eg 108 correctly placed scores M1, A1)

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