GCSE

Methods in Mathematics (Pilot)

Unit **B392/01:** Foundation Tier

General Certificate of Secondary Education

Mark Scheme for June 2016

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 <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.   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)		parallelogram	1	Ignore spelling	
	(b)		10[cm^2]	2	**M1** for 2 x 5	
	(c)		P (1, 2) Q (8, 4)	1 1		
	(d)		(4.5, 3)	2	**M1** for midpoint marked or one coordinate correct	
2	(a)		35	1		
	(b)		63	1		
	(c)		16	1		
3	(a)	(i)	6, 1, -4	2	**B1** for 6 or **M1** for -5	
		(ii)	162, 486, 1458	2	**B1** for 162 or **M1** for × 3 seen	
	(b)*		Explanation eg nth term is 11n - 8 so 12th term is 124 eg 124 seen and 2x58 = 116 Or 124 with 58, 69, 80, 91, 102, 113 seen	2	**1** 124 or 'add 11' **M1** for explanation that 2 x a seen term in the sequence is ≠ to another seen term in the required position in the sequence	
4	(a)		£228	2	**M1** for 114 or 684 **M1** for ÷3 x2 or x2 ÷3 seen	
	(b)		£16	2	**M1** for ¼ soi	
	(c)		£112	2	**M1** for 280 x 0.4 oe	eg 28 x 4
5	(a)		18	1		
	(b)		10	1		
	(c)		125	1		
	(d)		-6	2	**M1** for -2 or 3(5 + -7) or 15 + -21	

Question			Answer	Marks	Part Marks and Guidance	
6	(a)		6 pack A 2 pack B	2	**M1** for multiple of 3 added to a multiple of 5 or **M1** for showing mulitples of 3 or 5	
	(b)		Rob's method by 5p or £0.05 Allow FT from a) for 4 marks if no further errors and as long as A + B not used	4	**M3** for Rob £13.45 and Sai £13.50 or **M2** for Rob 13.45 or Sai 13.50 or **M1** for Rob 1.45 + 5x2.40 or Sai 8.70 + 4.80	
7	(a)		[a=] 40 [b=] 100	1 1	**M1** if a + b = 140	
	(b)		[r=] 145 [s=] 155	2 2	**M1** for 360 – (70 + 120 + 25) oe **M1** for 180 - 25	**SC2** for r = 155 s = 145
8			236740 70756 62.4 62.4 Rebecca correct	4	**B3** for 3 or 4 correct numerical answers or **B2** for 2 correct numerical answers or **B1** for 1 correct numerical answer	
9			Two from 4 by 4 by 3 2 by 2 by 12 1 by 1 by 48	3	**B2** for 1 set of dimensions Or **M1** for 48	

Question			Answer	Marks	Part Marks and Guidance	
10	(a)		-3, 2, 7, 12, 17	2	**M1** for 3 correct	
	(b)		Ruled line from (0, -3) to (4,17)	2	**M1** for 4 points plotted (ft their (a)	
	(c)		2.4 or 2.3-2.5 from their graph with evidence of use of graph	2	**M1** for 5x = 12 or for evidence of reading from their graph	
11	(a)		110	1		
	(b)		54.6	2	**M1** for [×] 3	
12	(a)		Loop around a>b+c	1		
	(b)		Loop around x<y+z	1		
13			Increase 875 by 34% line to 1.34 × 875 Increase 875 by 6% line to 1.06 × 875 Decrease 875 by 28% line to 0.72 × 875	1 1 1		
14 C3	(a)		$\frac{3}{10}$ 0.3[0] 0.35, 35% $\frac{16}{25}$, 64%	4	**3** for five correct **2** for three correct **1** for two correct	Condone missing % signs
C	(b)		$\frac{1}{14}$	1	Allow 14^{-1}	Accept 0.071428571… Allow decimal (rot) in the answer box if acceptable answer seen elsewhere.
C	(c)		Fraction or decimal between ⅓ and ½	2	**M1** for 0.33.. and 0.5 **or** $\frac{1}{2} + \frac{1}{3}$ **or** correctly converting to fractions with common denominator	Condone correct % for M1

	Question		Answer	Marks	Part Marks and Guidance
15* C			Angles 90º 270º 135º 135º 45º 45º identified correctly with clear, correct reasons relating to appropriate angles eg <u>**A = 90º**</u> (four of these at a point make 360º) <u>**B = 135º**</u> (angles at a point) <u>**F = 135º**</u> (equal to B by symmetry) <u>**D = 270º**</u> (angles at a point) <u>**C = E = 45º**</u> (symmetry and angles of hexagon add up to 720º)	5	**4** for four correct angles with correct reasons that clearly apply to at least two angles **or** values for all six angles correctly identified with no reasons. **3** for four angles correctly identified with no reasons **or** three angles with a correct reason that clearly applies to at least one of them. **2** for at least three angles correctly identified. **1** for one of the four angles correctly identified. Condone use of single letters to identify angles but marks for reasons cannot be awarded for calculations alone.

	Question		Answer	Marks	Part Marks and Guidance	
16 C	(a)		£32, £28	2	**M1** for 60 ÷ (8 + 7)	Either order
C	(b)	(i)	$\frac{3}{5}$ oe	1		Must be fraction
C		(ii)	9:1	3	**M2** for 9 red **or** ratio 9:6 seen **OR** **M1** for 6 black	Not 6:9 for M2
17 C	(a)		[x=] 7.5 oe	3	**M1** for $7x + 14$ **M1** for getting numbers **and** *x* on different sides **M1** for correct FT from kx = n	Correct numbers **and** correct x from their equation k ≠ 1 Max. of M2 for incorrect answer
C	(b)		$[t =]\dfrac{v - u}{a}$ oe	2	**M1** for $v - u = at$ oe	

Question			Answer	Marks	Part Marks and Guidance	
18 C	(a)		57.1 to 57.14…. or 57 nfww	5	**B1** for radius = 4 cm soi	May be on diagram
					M1 for Semicircle = $$\frac{\pi(their\,4)^2}{2}$$	
					A1 semicircle = 25.1 to 25.14.. **or** 25 **or** 8π	25 without working scores 0 marks
					M1 for $\frac{8 \times 8}{2}$ oe	
	(b)		4.3[2.....]	2	**M1** for 350 ÷ 81	

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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