

GCSE

Methods in Mathematics (Pilot)

Unit **B392/01**: Foundation Tier

General Certificate of Secondary Education

Mark Scheme for June 2014

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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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Annotations

Annotation	Meaning
BP	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
✓	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

Subject-Specific Marking Instructions

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.

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.

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 $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by eg FT 3 \times *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.

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.

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**.

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'.

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).

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.

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.

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.

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

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.

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)		£235.56	2	M1 for 235.5[5.....] or 235.6[0]	
	(b)		3 858 000	2	M1 for 3 858 400 or 3858	
2			25 19 13 36 108 324 26 58 122	1 1 2	B1 for 26	
3	(a)	(i)	A 10 B 12 C 14 D 12 E 14	2	B1 for 3 correct perimeters	
		(ii)	Even	1		
	(b)		Shape S with smallest perimeter identified 12 [cm] Shape L with largest perimeter identified 20[cm]	1 1 1	or FT the perimeter for their S or FT the perimeter for their L	<p>If 2 shapes only drawn but no labels then S and L can be assumed (eg 12 and 20 scores 2 + 2; 12 and 18 scores 2 + 1 if correct FT)</p> <p>If more than 2 shapes but no labels, accept 12 and 20 on correct shapes to identify S and L.</p> <p>If S and L correctly identified then marks for perimeter shown on shape (answer line blank) can be gained.</p> <p>If 0 scored, SC1 for any 2 correct perimeters on shape or answer line. [shapes may have more than 9 squares]</p>

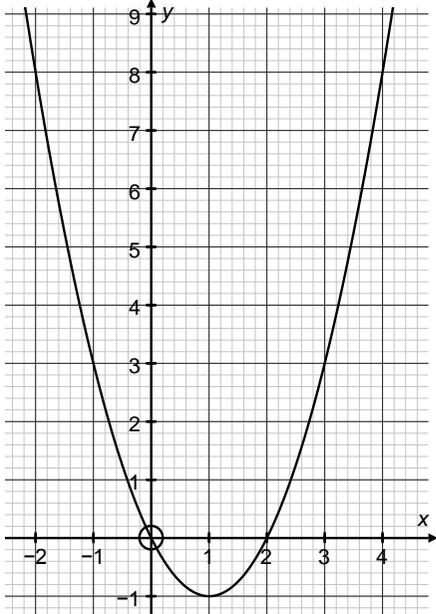
Question		Answer	Marks	Part Marks and Guidance	
4	(a)	43	1		
	(b)	5	1		
	(c)	16	2	B1 for 64 soi or M1 for evidence of $\div 4$ and $+3$	
5		0.25 25[%] $\frac{2}{5}$ 40[%] $\frac{2}{3}$ 0.666[...] or 0.67 or $0.\dot{6}$	4	B3 for 4 or 5 correct or B2 for 3 correct or B1 for 1 or 2 correct	
6	(a)	3 correct angles marked (only)	2	M1 for 1 or 2 correct angles marked	For 2 marks ignore 50 in correct place.
	(b)	[a =] 60° [b =] 110° [c =] 70°	1 1 1		
7	(a)	£0.36 or 36p	2	M1 for $144 \div 4$ or figs 36	Condone £0.36p for 2 marks but 0.36 or 0.36p scores M1
7	(b)	Pack of 6 juices supported by correct justification, clearly comparing 6 and 10 packs 1 carton in 6 pack costs 32p (or £0.32) 1 carton in 10 pack costs 35p (or 34.8p or £0.35 or £0.348) [1 carton in 4 pack costs 36p] Or $1.92 \div 6 = 32p$ etc $3.48 \div 10 = 34.8p$ etc Money notation must be correct, do not accept £0.32p.	3	2 Comparison of 6 and 10 packs substantially correct but error in calculation and/or money notation incorrect and/or conclusion missing/ incorrect 1 32 (6 pack) or 34.8 or 35 (10 pack)	

Question		Answer	Marks	Part Marks and Guidance	
		<p>Condone error/omission in money notation in working if correct if correct in concluding statement.</p> <p>ALT method eg Pack of 6 cartons with eg 60 cartons costed for 4, 6 and 10 packs. 6 pack 60 cost £19.20 10 pack 60 cost £20.88 4 pack 60 cost £21.60 '60 cost' can be implied by 10×1.92 6×3.48 15×1.44</p>		<p>2 Consideration of cost of 60 cartons from 4, 6 and 10 packs substantially correct but error in calculation and/or money notation incorrect and/or conclusion missing/ incorrect</p> <p>1 Attempt to find cost of 15 4 packs, 10 6 packs and 6 10 packs and 19.20 or 20.88 or 21.60 correct</p>	
8	(a)	$\frac{1}{8}$	1	Accept equivalent fractions	
	(b)	$\frac{1}{3}$	1	Accept equivalent fractions	
	(c)	$\frac{7}{10}$	2	Accept equivalent fractions M1 for $\frac{8}{10}$ (for 4/5) or answer 0.7	
9	(a)	Explanation eg $20 \times 10 \times 5 [= 1000]$	1		May be in stages
	(b)	10 [cm]	1		
	(c) (i)	cube	1		
	(c) (ii)	10 by 10 by 10	1		
	(d)	1 by 1 by 1000 or 2 by 2 by 250 or 5 by 5 by 40	1		

Question		Answer	Marks	Part Marks and Guidance		
10	(a)	$450 \div 30 [=15]$ and $300 \div 30 [=10]$ and $15 \times 10 = 150$ ALT method $(450 \times 300) \div (30 \times 30) = 150$	2	M1 for $450 \div 30$ and $300 \div 30$ or 15 and 10 ALT M1 450×300 and 30×30 or figs 135 and 9	Allow M1 for $450 \times 300 \div 30 = 4500$ then $\div 30 = 150$ Allow 2 for $450 \times 300 = 135000$ $30 \times 30 = 900$ $900 \times 150 = 135000$	
	(b)	Brown 3 [packs] Cream 12 [packs]	4	M2 for 30 brown 120 cream or M1 for $150 \div 5$ And M1 for <i>their</i> $30 \div 10$ or <i>their</i> $120 \div 10$ evaluated and rounded up If using 1 : 3 then SC2 for 4 and 12 or SC1 for 37.5 and 112.5	Brown 3 scores 2 (from 30 then 3)	
11	(a)	(i)	$a \geq 17$	1		
		(ii)	$a < 17$	1	Allow SC1 for (i) ≥ 17 and (ii) < 17	
	(b)		$x < 7$	2	M1 for $2x < 14$ or SC1 $x < 6$ or $x = 7$ or $x > 7$ or 7 embedded	Do not isw
12	(a)		$3y$	1		
	(b)		$\frac{y-3}{5}$ oe	2	M1 for $\frac{y+3}{5}$ or $y - \frac{3}{5}$ or $5x = y - 3$ or $y/5 - 3$	$y - 3 \div 5$ scores 1
13	(a)	(i)	0.12	2	M1 for 0.08 or M1 1% is 1.5p	Condone 12p and £0.12p
		(ii)	1.62	1	Or FT <i>their</i> (a)(i)	

Question		Answer	Marks	Part Marks and Guidance	
13	(b) *	Cherry supported by correct breakdown of calculation eg strawberry $140/400 = 35\%$ cherry $100/250 = 40\%$	4	3 cherry and eg 0.35 and 0.4 or 35% and 40% but no decision or 2 either strawberry $140/400 = 35\%$ Or cherry $100/250 = 40\%$ or 1 cherry with partial justification eg cherry is almost half fruit but strawberry is only about a third.	
14		A $x + y = 3$ B $x = 3$ C $y = x + 3$ D $x - y = 3$	1 1 1 1	Accept rearranged forms for A C D	
15	(a)	24	2	M1 for 360 as sum of exterior angles or $360 \div 15$ or $180 - (13 \times 180 \div 15)$	
	(b)	156	1	Or FT $180 - \text{their (a)}$	
16		44.89 to 45.0241	4	M3 for $AB = \sqrt{45}$ or AB^2 or area = $36 + 9$ Or M2 for $AB = \sqrt{6^2 + 3^2}$ or AB^2 or area = $6^2 + 3^2$ Or M1 for right angled triangle drawn with AB as hypotenuse and sides 6 and 3 Alternative method Surround square with larger square with horizontal and vertical sides. M3 for $9 \times 9 - 4 \times \frac{1}{2} \times 3 \times 6$ Or M2 for 9×9 and $\frac{1}{2} \times 3 \times 6$ Or M1 for 9×9 or $\frac{1}{2} \times 3 \times 6$ Do not condone 9 obtained incorrectly from $6 + 3$	

Question		Answer	Marks	Part Marks and Guidance	
17	(a)	17	2	M1 for 1, 5, 9, 13, or for fifth pattern drawn or for error in counting but +4 used	
	(b)	$4n - 3$ oe	2	M1 for $4n$ correctly obtained	Condone use of n^4 , nx^4 , etc or consistent different letter Allow correct expressions that have not been simplified
	(c)	Clear and complete explanation of why there cannot be a pattern with an even number of squares	2	<p>Looking for 3 aspects For 2 marks explanation could be <u>starting with 1 or odd</u> and <u>adding 4 or even</u> on each time <u>will always give an odd number</u> or <u>$4n$ is even</u> and <u>subtracting 3</u> makes it <u>odd</u></p> <p>1 mark for 2 aspects A partially correct explanation eg “adding on 4 keeps it odd” or “$4n$ is even” or 3 or more examples in the sequence shown to be odd</p> <p>2 marks and 1 mark can be gained from a different expression seen in part (b).</p>	
18	(a)	3, 0, -1, 0	2	B1 for 2 values correct	

Question	Answer	Marks	Part Marks and Guidance	
(b)		2	<p>B1 for at least four of <i>their</i> points correctly plotted and B1 for correct smooth <u>curve</u></p>	<p>Within half a small square</p> <p>Within half a small square horizontally of 5 points</p> <p>Curve must have one minimum turning point. Condone minor imperfections but not a “pointed” turning point.</p> <p>Ignore anything outside range of $-2 < x < +3$</p>
(c)	-0.4, 2.4 (± 0.1)	2	<p>B1, B1 (or FT <i>their</i> graph) If 0 scored, M1 for evidence of at least one reading from $y=1$</p>	<p>Could be straight line Condone correct answers without a curve (-0.4 and 2.4 only)</p>
19	13.7 to 13.8	5	<p>M2 for square 64 or M1 for side square 8 cm or 8 [cm] on diagram And M2 for 50.2 to 50.3 M1 for $\pi \times 4 \times 4$ or M1 64 – circle area</p>	<p>Circle area must involve use of π</p>

APPENDIX 1

Exemplar responses for questions 7b

Response	Mark awarded
6 pack is better because if you bought 2 packs of 6 it would come to 3.84 so you are getting 2 extra for about 36p extra.	0 as not considering 4 pack
6 cartons $1.92 \div 6 = 0.32p$ 10 cartons $\text{£}3.48 \div 10 = 35p$ 4 cartons 36p A pack of 6 cartons is best for money	2 as money notation incorrect

Exemplar responses for questions 17c

Response	Mark awarded
There will never be an even amount of squares in the middle and each time you add four extra squares that one extra square will make the even number an odd number.	2
Because of the centre square previous sequence + 4 . The sequence started with an odd number.	1 omits final aspect
The pattern starts with an odd number. When an odd number is added onto an odd number it will always be odd.	0 incorrect
Because the pattern started as an uneven number and the same amount is being added each time.	0
Odd plus even equals odd	1 too general

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