

Methods in Mathematics (Pilot)

General Certificate of Secondary Education

Unit **B391/01**: Foundation Tier

Mark Scheme for January 2013

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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
✓	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

- 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.

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

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.
 - **nfw** 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 for example 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 **x** next to the wrong answer.
8. 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).
 9. 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.
 10. 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.
 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)	(i)	Radius	1		
		(ii)	Sector	1		
	(b)		Tangent drawn	1		Mark on intention
2	(a)	(i)	9.72	1		
		(ii)	(£)2.20	1		
	(b)		19	2	M1 for $950 \div 50$ oe	
3	(a)		Correct reflection	2	B1 for any reflection in a vertical line	Could be drawn by hand
	(b)		Correct enlargement	2	B1 for enlargement with any scale factor ($\neq 1$) or 2 sides enlarged correctly	
4	(a)		$\begin{array}{cc} (\times) & \times \\ - & + \end{array}$	2	B1 for \times correct or $-$ correct	
	(b)		$\begin{array}{cc} (\div) & (+) \\ \times & - \end{array}$	2	B1 for 1 correct symbol SC1 if symbols incorrect but four 6s in the correct positions	
5	(a)	(i)	D plotted	1		
		(ii)	(2,6)	1	FT the coordinates of <i>their</i> D	
	(b)		(-2,5)	1		

Question		Answer	Marks	Part Marks and Guidance	
6	(a)		Answer must be less than 25.2	1	Accept estimate eg $20 \times 0.5 = 10$, $25 \times 0.6 = 15$, $25.2 \div 2 = 12.6$ 15.12 scores 0
	(b)	(i)	12.8	1	
		(ii)	15	1	
7	(a)		Arrow closer to 0 than 0.5	1	If no arrows, mark to centre of letter
	(b)		Arrow at 1	1	
	(c)		Arrow at 0.5	1	Condone two arrows labelled and third arrow with no letter
8	(a)(i)		11	1	
	(a)(ii)		20	2	M1 for $24 \div 6$ soi by 4 or for 120 or <i>their</i> $(24 \div 6) \times 5$
	(b)	(i)	$\frac{7}{8}$	2	B1 for $\frac{2}{8}$ or both correctly converted over another common denominator seen eg $\frac{4}{16}$, $\frac{10}{16}$ Correct equiv implies B1
9	(a)		Rectangle	1	
	(b)		Parallelogram	1	
	(c)		Rhombus	1	Accept Kite

Question			Answer	Marks	Part Marks and Guidance	
10	(a)	(i)	13	1		Condone fully embedded answers
		(ii)	5	1		Condone fully embedded answers
	(b)		$3n$	1		
	(c)	(i)	23	2	M1 for $2 \times 4 + 3 \times 5$ or B1 for 8 or 15 nfww	
		(ii)	4	2	M1 for $3 \times 4 - 2 \times 5 + 4 \times \frac{1}{2}$ or B1 for two of 12, 10 and 2 nfww	
11	(a)		2, 4, 6, 12	2	B1 for any 2 and no extras or any 3 of these with one extra number less than 12 or all 4 with 1 or 2 extra numbers less than 12	
	(b)		One from 25, 100, 225 etc	1		
	(c)		9	2	M1 for $(21-3) \div 2$ with one arithmetic error	
12	(a)		15, 5	2	One mark for each. Second mark can be FT	
	(b)	(i)	$\frac{10}{50}$ oe	1		Penalise "in" or "out of" first time only Ignore incorrect cancelling
		(ii)	$\frac{5}{50}$ oe	1	FT $\frac{\text{their } 5}{50}$ oe	Ignore incorrect cancelling

Question		Answer	Marks	Part Marks and Guidance	
	(ii)	$\frac{20}{50}$ oe	1		Ignore incorrect cancelling
13*		Clear explanation & correct answer $ABC = \frac{1}{2} \times 8 \times 6 = 24$ $BCFE = 8 \times 11 = 88$ $BADE = 6 \times 11 = 66$ $ACFD = 10 \times 11 = 110$ $24 + 24 + 88 + 66 + 110$ 312	5	4 correct answer and slightly unclear explanation or clear explanation and arithmetic errors or 3 for clear explanation and significant error or 2 for not well presented and significant error, or well presented and no more than 2 significant errors or well presented and no more than one significant error and other arithmetic errors or 1 for any correct calculation	
14	(a)	0.22 0.25 0.15 0.2	2	B1 for 2 correct decimals or 3 correct fractions or percentages seen	
	(b)	Danni, most (or many) throws	1	Accept because she threw it 500 times	Accept 0.2, D etc
15		No and $4^3 = 8^2 = 64$	3	M1 for showing at least 2 more squares (>3) M1 for showing at least 2 cubes (>1) If 0 scored allow SC1 for 64 seen or answer of 0 demonstrated	Accept others eg $9^3 = 27^2 = 729$ or equiv statements with roots Condone extra wrong work

APPENDIX 1

Use this space for a generic mark scheme grid that applies across the question paper

Exemplars for: **Q6a**

1	Answer is too big	0
2	Because he has two decimal points	0
3	By estimating using rounding	0
4	Multiplying by something that is below 1 is the same as dividing it	0
5	25.2 divided by 2 is 12.6 25×0.5 is 12.6	1
6	Because 0.6×0.2 is not 0.22	0
7	Because rounded up the numbers are 26×1 which is 26	1
8	He is timesing by a negative (decimal) therefore instantly looking at it the answer is too big considering what he is timesing it by.	0
9	Because 25.2×2 is only 50.4 so it cannot be more than that at least.	1
10	$25.2 \times 1 = 25.2$ Estimate $25.2 \times 0.5 = 12.6$	1
11	Because the numbers he tried to times are too small to make a big number like that	0
12	When you multiply by a decimal it makes the answer smaller	1 BOD
13	Because he's timesed by 6 not 0.6	1 BOD
14	Because 6×25 doesn't equal that	0
15	It should be lower than the starting number	1
16	Because if you round to a whole number (25×1) you can see that the answer won't be above 150	1 BOD
17	Because it wouldn't be a high number	0
18	$25 \times 6 = 150$	1

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