

Methods in Mathematics (Pilot)

General Certificate of Secondary Education

Unit **B391/01**: Foundation Tier

Mark Scheme for June 2011

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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.

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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 awarded for a correct final 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 $180 \times (\textit{their} '37' + 16)$, 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.
 - **cao** means **correct answer only**.
 - **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)	(i)	-8	1	
		(ii)	6	1	Accept -6
		(iii)	5	1	
	(b)		-17	1	
2	(a)		81	1	Accept £0.81
	(b)		28	1	
	(c)	(i)	608	1	
		(ii)	484	2	M1 for correct method with one calculation error or SC1 for one digit incorrect.
3	(a)		(-2, 2)	1	
	(b)		point marked at (3, -1)	1	Not necessarily labelled.
	(c)		point at (k, 2) where $-2 < k < 3$	1	Shape need not be completed. Point can be implied by lines on diagram if clear.
	(d)		AD and DC or AB	1	Accept clear non-standard description of correct sides.
4	(a)		$85 - 14 = 71$	2 1FT	M1 for $85 - 41$ or $58 - 14$ or $84 - 15$ FT from numbers using digits 1,4,5,8. or SC2 for $14 - 85 = 71$ eg $(88 - 11) = 77$

Question		Answer	Marks	Part marks and guidance	
	(b) (i)	$\frac{1}{5}$ or $\frac{1}{8}$	1		
	(ii)	$\frac{4}{5}$ or $\frac{5}{8}$	1	Condone $\frac{3}{4}$ or $\frac{3}{5}$	
	(iii)	Any top heavy fraction	1	Using two digits from 1, 3, 4, 5, 8	Including where denominator = 1
	(iv)	$\frac{4}{8}$	1		
	(v)	$\frac{1}{5}$	1		
5		2 correctly placed numbers in each of 4 regions	3	M2 for 3 regions correct or 1 correct in each (no errors) or M1 for more correct placed numbers than errors	eg has only placed one number and it is correct.
6	(a) (i)	Same number of red and blue (<7)	1	Penalise more counters of either colour used than available only once throughout part (a).	
	(ii)	Number of reds greater than number of blues; blues \neq 0	1		
	(iii)	Some blues, no reds	1		
	(b) (i)	$\frac{1}{7}$	1	Penalise wrong notation only once throughout part (b)	Ignore probability words throughout part (b)

Question		Answer	Marks	Part marks and guidance	
	(ii)	$\frac{6}{7}$	1FT		
7*		Rectangle, kite and parallelogram drawn and correctly labelled.	6	<p>or</p> <p>5 if one or two errors labelling and/or extras labelled</p> <p>or</p> <p>4 for two of the three correctly labelled shapes</p> <p>or</p> <p>3 for two of the three shapes, not fully labelled</p> <p>or</p> <p>2 for one of the three shapes correctly labelled</p> <p>or</p> <p>1 for any placement of two triangles along common edges (except copy of example given)</p> <p>SC4 list of exactly three correct quadrilaterals, no diagrams, or three correct diagrams, no correct labels.</p> <p>or</p> <p>SC2 list of exactly two correct quadrilaterals, no diagrams</p>	<p>Accept without bisecting lines if clear diagrams</p> <p>No extra quadrilaterals labelled.</p> <p>Ignore extra attempts</p> <p>Ignore extra attempts</p> <p>1 includes making a 5, 5, 8 triangle</p>

Question		Answer	Marks	Part marks and guidance	
8	(a)	4.5	1	Accept any value from 4.4 to 4.6	
	(b)	$2 \times 2.5 + 1$ equals 6 not 'their 4.5'	2	or any equally valid reason M1 for correct checking method with calculation error, or for correct method which only considers one of the lines	eg this equation should have positive gradient, but line has negative gradient. eg similar for intercept
	(c)	(i)	13	1	
		(ii)	Ruled straight line through (0, 1) and (4, 13)	2	M1 for straight line through one of integer points on correct line. If this point is not (0,1) or (4,13) then it must be evidenced. Line must not be horizontal or vertical
	(d)	Coordinates where their line intersects line given	1FT dep	Dependent on line with positive gradient. Within $\frac{1}{2}$ small square.	(1.8, 6.4) Not horizontal or vertical line.
9	(a)	25	1		
	(b)	1000	1		
	(c)	32	1		
10	(a)	0.55	2	M1 for $1 - (0.4 + 0.05)$ oe	
	(b)	76	2	M1 for 190×0.4 oe, soi by figs 76	Accept $\frac{2}{5}$ of 190

Question		Answer	Marks	Part marks and guidance	
11	(a)	Translation $\begin{pmatrix} -5 \\ -4 \end{pmatrix}$	1 1	Accept 5 left, 4 down, SC1 for 2 translations which end up in correct position	Condone fractions, coordinates Accept 'across -5' but not 'across 5' Condone '5 back', Condone eg 'left - 5' Any other indication of 2 transformations scores zero
	(b)	Vertices at (3, 1), (3, 2), (6, 3), (6, 1)	3	B2 for 3 vertices correct or B1 for $y = x$ drawn or SC2 for reflection in $y = -x$ or SC1 for any reflection of A	MR -1 for reflections of B instead of A
12	(a)	$2 \times 2 \times 5 \times 7$	2	M1 2 correct steps in factor tree or factor ladder or complete factor tree or ladder with 1 error or 3 number factorisation of 140 seen or 2, 2, 5, 7	Condone $1 \times 2 \times 2 \times 5 \times 7$ eg $10 \times 2 \times 7$
	(b)	20	2	Accept $2 \times 2 \times 5$ M1 for any common factor >1	
	(c)	1260	2	SC1 for any multiple of 1260 or M1 for $2 \times 2 \times 3 \times 3 \times 5 \times 7$ oe or sequence of multiples of both seen up to > 1000 or <i>their</i> LCM found	eg 7×180 , 9×140 etc Condone 1 error

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