

GCSE 2004

June Series



Mark Scheme

Mathematics A (3301)

Intermediate Tier Paper 1

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from:

Publications Department, Aldon House, 39, Heald Grove, Rusholme, Manchester, M14 4NA
Tel: 0161 953 1170

or

download from the AQA website: www.aqa.org.uk

Copyright © 2004 AQA and its licensors

COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales 3644723 and a registered charity number 1073334. Registered address AQA, Devas Street, Manchester. M15 6EX.

Dr Michael Cresswell Director General

AQA GCSE Mathematics Specifications A & B

Notes for Examiners



In general if a response is fully correct then it is sufficient to tick the final answer and put the mark for that part in the margin. Parts not attempted or totally incorrect must have 0 for that part in the margin. Negative marks must not be used.




Errors **must** be underlined or ringed.

Responses that are partly correct will generally be awarded marks for method or partial working. In that case the following should appear in the margin to indicate what the mark(s) has been awarded for. These are detailed in the mark scheme.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M dep or DM	A method mark dependent on a previous method mark being awarded.
B dep or DB	A mark that can only be awarded if a previous independent mark has been awarded.
Ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.

Within the script the following notations can be used to explain the decision further. These should appear next to the place in the script where the error or omission is made.

ft or 	Follow through marks. Wrong working should not be penalised more than once so that positive achievement later in the question can be recognised.
	An answer that does not follow through from previous working.
MR or MC	Misread or miscopy. Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Fw	Further work. Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.
Choice	When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.
Wnr	Work not replaced. Erased or crossed out work that is still legible can be marked.
Wr	Work replaced. Erased or crossed out work that has been replaced is not awarded marks.
	Work incomplete or method missing.
Allow	In general decisions should support the candidate. If an examiner feels that work is worthy of a mark then it can be allowed.
BOD	Benefit of the doubt should only be given in cases where evidence is not secure. For example overwriting numbers. It should not be used to avoid making a decision. Examiners are expected to make decisions based on the scheme.
seen or 	Every page containing working should be annotated to show it has been considered.
From page 23 	Marks transferred from another part of the paper. Candidates often make a mistake in their original work and do the question on the back page or another page with some space. The part marks should be credited there within the script and the marks transferred to the margin by the printed question.
Wrong method	Candidates sometimes obtain the correct answer via a completely wrong method. If an examiner is sure that this is the case then the Method mark should not be awarded and subsequently the accuracy mark cannot be awarded. This notation should also be used when candidates ‘fiddle’ algebra to demonstrate a given result.
Pa	Premature approximation. Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise in the standardising meeting.

Unusual responses

Very occasionally situations may occur which are not covered by the above notations. In these rare cases examiners should write brief comments in the script to explain their decision, such as ignore, irrelevant etc.

Blank answer spaces and blank pages

Blank answer spaces should be crossed through to show that they have been seen. Blank pages at the end of a paper should also be crossed through to indicate that they have been seen. Any working on these pages must be marked.

Diagrams

Diagrams that have working on them should be treated like normal responses and marked with same notations as above. If the diagram is written on but the correct response is within the answer space the work within the answer space should be marked and the diagram ticked to indicate that the examiner has seen it. Working on diagrams that contradicts work within the answer space is **not** to be considered as choice but as working.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a candidate has used an incorrect method to obtain an answer, as a general principle the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised as directed at the standardising meeting.

Questions which ask candidates to show working

Instructions on marking will be given at the standardising meeting but usually marks are not awarded to candidates who show no working.

Questions which do not ask candidates to show working

As a general principle, a correct response is awarded full marks.

Probability

Answers should be written as fractions, decimals or percentages. If a candidate uses an incorrect notation such as “1 out of 4” for $\frac{1}{4}$ consistently through the paper, then penalise the first occurrence but allow any following answers. Ratio is not acceptable as incorrect notation.

Recording Marks

Part marks for a question should be shown in the margin at the side of the work. The totals should be shown in the oval either at the end of each question or after each double page. These marks should be transferred to the appropriate box on the front of the paper. The grand total for the paper should also be shown in the appropriate box on the front of the paper. This total should agree with the total of the part marks within the paper.

Checkers at the board will first check that the part marks agree with the ringed totals, either at the end of each question or after each double page. They will then check that these marks have been transferred correctly and finally that the total on the front cover is correct. Papers that contain clerical errors may be returned to examiners.

Paper 1I

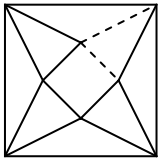
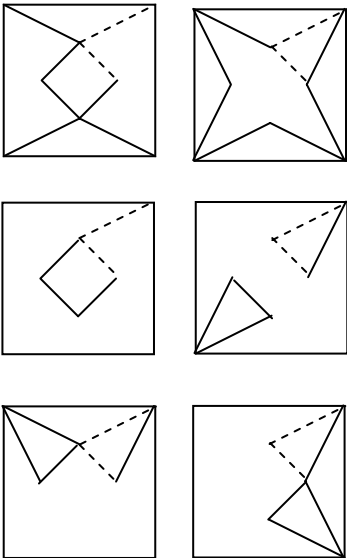
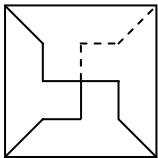
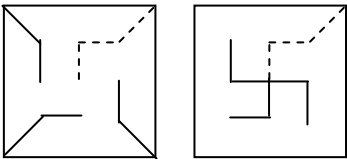
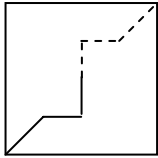
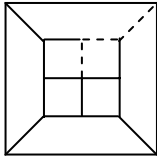
1	$48 \div 16$ or 3	M1	oe
	$36 \div (\text{their } 3)$ or 12 in table or $20 \times (\text{their } 3)$ or 60 in table	M1	
	12 and 60	A1	

2	$200 \div 4$	M1	or $200 \div 240$
	50	A1	or $\frac{5}{6}$ oe
	miles per hour or mph	B1	or miles per minute units must be consistent

3	$40 \div 100 \times 60$ or 4×6	M1	oe
	$55 \div 5 \times 2$	M1	oe
	24 or 22	A1	
	24 and 22 and conclusion	A1	

4 (a)	$3x + 7y$	B2	B1 for 1 term correct
(b)	$5 \times 4 (+) 2 \times -7$ or sight of 20 and -14	M1	
	6	A1	
(c)	$25 (-) 9$	M1	
	16	A1	

5 (a)	$ \begin{array}{cccc} & & 7 & 9 \\ 5 & 7 & 9 & 11 \\ 7 & 9 & 11 & 13 \\ 9 & 11 & 13 & 15 \end{array} $	B2	B1 for any 2 correct rows or any 2 correct columns or any 6 correct entries
(b)	(<u>their 6</u>) (as numerator) 16 (as denominator)	B1ft B1	oe incorrect notation – B1

<p>6 (a)</p>	<p>Correct pattern</p> 	<p>B2</p>	<p>B1 for any one (or better) of:</p> 
<p>6 (b)</p>	<p>Any shape that:</p> <p>Includes all given lines.</p> <p>Has rotational symmetry order 4.</p> <p>Has no line symmetry.</p> <p>E.g.</p> 	<p>B2</p>	<p>B1 for: any shape that includes 2 of the given lines with rotational symmetry order 4 and no line symmetry, (ignore unused line). E.g.</p>  <p><u>or</u> any shape that includes all given lines with rotational symmetry order 2 and no line symmetry. E.g.</p>  <p><u>or</u> any shape that includes all given lines with rotational symmetry order 4 and line symmetry. E.g.</p> 

7 (a)	$4x = 12$	M1	
	3	A1	
(b)	$y + 5 = 28 \div 2$ or $2y + 10 = 28$	M1	
	$y = 14 - 5$ or $y = \frac{28 - 10}{2}$	M1dep	
	9	A1	
(c)	$7z + 3z$ or $9 - 2$	M1	
	$10z = 7$	A1	
	$\frac{7}{10}$	A1	oe

8	Multiple of 6 used as common denominator in both fractions	M1	oe
	$\frac{1}{2} \rightarrow \frac{3}{6}$ and $\frac{1}{3} \rightarrow \frac{2}{6}$	A1	oe
	$\frac{5}{6}$	A1	oe SC B1 $\frac{5}{6}$ with no working

9 (a)	$250 \div 5$ or 50	M1	
	(Bob) 50 , (Mary) 200	A1	SC1 (Bob) 200, (Mary) 50
(b)	$(\text{their } 200) \div 250 \times 100$	M1	or $4 \div 5 \times 100$
	80	A1	SC B1 20

10	Fully correct [(2, 2), (2, 4), (8, 2)]	B3	B2 Enlargement scale factor 2 B1 Any enlargement or 2 points correct
----	--	----	---

11 (a)	112	B1	
	Corresponding angle	B1	Allow F angle
Note 68 or 130 and corresponding angle scores B0 B0			
(b)	$180 - 130$	M1	oe eg $360 - 68 - 112 - 130$
	50	A1	

12	8.8475	B2	B1 digits 88475 or 8.8(...)
----	--------	----	-----------------------------

13 (a)	88	B1	
(b)	Positive correlation (both words)	B1	Allow “the higher the mark on paper 1, the higher the mark on paper 2” oe
(c)	Straight line passing between (20, 14) & (20, 25) and between (90, 82) & (90, 93)	B1	
(d)	Correct mark (± 1) from their line	B1ft	

14	Attempt to find LCM of 2, 5 and 8 or any common multiple of 2, 5 and 8, eg 80, 120, ...	M1	or 1, 3, 5, 7, 9, ... and 1, 6, 11, 16, 21, ... and 1, 9, 17, 25, 33, 41, ...
	40	A1	or 41

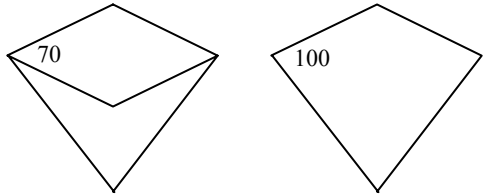
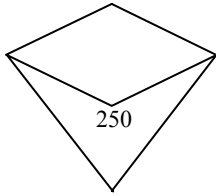
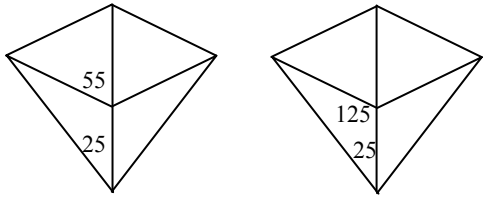
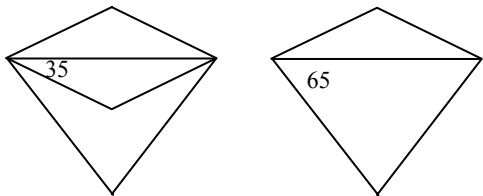
15 (a)	w^8	B1	
(b)	x^{-2}	B1	accept $1/x^2$
(c)	y^6	B1	

16 (a)	5	B1	
	-3	B1	
(b)	Points plotted	B1ft	$\pm \frac{1}{2}$ square
	Smooth curve	B1ft	through their 6 points $\pm \frac{1}{2}$ square
(c)(i)	Intersection with x axis	B1	
(ii)	-0.2	B1ft	$\pm \frac{1}{2}$ square

17 (a)	correct midpoints \times correct frequency	M1	$1 \times 12, 3 \times 18, 5 \times 10, \dots$ allow one error
	Σ their (midpoints \times frequency)	M1	their(1×12) + their(3×18) + their(5×10) + ...
	(their 190) \div 50	M1	
	3.8 or $3\frac{4}{5}$	A1	SC These values with full method: 4.8 (using ucb as midpoints) or 2.8 (using lcb as midpoints) or 4.3 (using 1.5, 3.5, 5.5, ... as midpoints) or 3.3 (using 0.5, 2.5, 4.5, ... as midpoints)
(b)(i)	3.4 to 3.5	B1	
(ii)	UQ – LQ	M1	or attempt to find both UQ and LQ with either correct and their (UQ – LQ) or distances at CF 12.5 and 37.5 marked on graph and their (UQ – LQ) seen
	3.3 to 3.6	A1	

18 (a)	$15^2 - 10^2$	M1	
	$225 - 100$ or 125	A1	
	$\sqrt{125}$ or $5\sqrt{5}$	A1	
(b)	$25 \div 10$ or 2.5	M1	or $10 \div 25$ or 0.4
	15×2.5	M1	or $15 \div 0.4$ or $(25 \times 15)/10$ oe
	37.5	A1	
	sight of tan	M1	Can be implied from table (1.192 or 0.839)
	Tan 50 = $DE/10$ or tan 40 = $10/DE$	M1dep	oe or M2 $DE/\sin 50 = 10/\sin 40$ oe
	11.92 or 11.9 or 12	A1	

19	$(300, 315, 316 \text{ or } 320) \times 4 \div 0.2$	M1	2 approximations correct If 316 used must see 4 and 0.2
	$(1200, 1260, 1264 \text{ or } 1280) \div 0.2$	M1	or $(300, 315, 316 \text{ or } 320) \times 20$
	6000, 6300, 6320 or 6400	A1	

20	$(x - 5)(x - 5)$ or $(x - 5)^2$	B2	B1 for any incorrect signs
Note	Mark the method that gives the best score Do not award M1 if either B1 clearly comes from incorrect assumptions (e.g $\angle BAE = 90$) SC3 complete method with 1 arithmetic error		
21	$(\angle BAD) \rightarrow 70$	B1	
	$(\angle BAE) \rightarrow 100$	B1	
	$(\text{their } 100) - (\text{their } 70)$	M1	
	30	A1	
21	$(\angle ADC) \rightarrow 250$	B1	
	$360 - 250 - 50$ or 60	B1	
	$(\text{their } 60) \div 2$	M1	
	30	A1	
21	$(\angle ADB) \rightarrow 55$ or $(\angle ADE) \rightarrow 125$	B1	
	$(\angle AED) \rightarrow 25$	B1	
	$(\text{their } 55) - (\text{their } 25)$ or $180 - (\text{their } 125) - (\text{their } 25)$	M1	
	30	A1	
21	$(\angle CAD) \rightarrow 35$	B1	
	$(\angle CAE) \rightarrow 65$	B1	
	$(\text{their } 65) - (\text{their } 35)$	M1	
	30	A1	
22	$120\% \rightarrow 600$	B1	1.2
	$600 \div 120 \times 100$	M1	$600 \div 1.2$
	500	A1	

23	$4x + 3y = 14$ $4x + 2y = 10$	$4x + 3y = 14$ $6x + 3y = 15$	M1	allow error in <u>one</u> term
	$y = 4$	$2x = 1$	M1	correct elimination from their equations
	$x = \frac{1}{2}$ and $y = 4$		A1	oe SC correct answers with no working or using T&I

24 (a)	1.75×10^6	B1	or 1750000
(b)	8.2×10^{-3}	B1	or 0.0082
(c)	0.049	B1	
(d)	2.6×10^6	B1	

25	Kite 2 and reason e.g. $110 + 70 = 180$ sum of (opposite) angles = 180	B2	B1 Kite 2
-----------	--	----	-----------