

GCSE 2004

November Series



Mark Scheme

Mathematics A (3301)

Paper 1I

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.

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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.

Probabililty

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

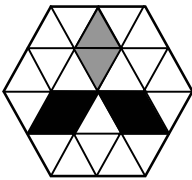
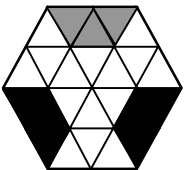
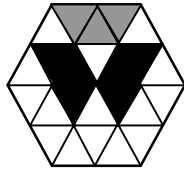
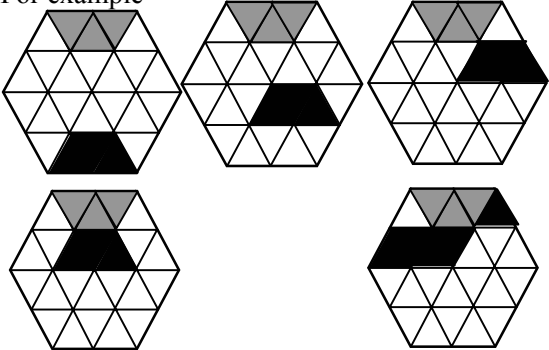
Part marks for a question should be shown in the margin at the side of the work. The totals should be shown in the oval either at the end of each question or after each double page. These marks should be transferred to the appropriate box on the front of the paper. The grand total for the paper should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

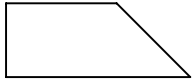
1	15×20 or 16×25	M1	or 14×20
	(their 300) + (their 400) or 700	M1	or (their 280) + (their 400) or 680
	$(20 -)\{(their\ 700) - 687\}$	M1	or $(20 -)\ 13$ or $687 - (their\ 680)$
	7	A1	

2(a)	$4 \times 5 (+) 3 \times -7$	M1	$20 (+) - 21$
	-1	A1	SC1 for 41
(b)	$(5 - 7) \div 4$	M1	oe
	3	A1	or SC1 for $^{-1}/_2$ or $^{-2}/_4$ seen

3(a)		B1	
(b)	 or 	B2	B1 for any shading with rotational symmetry order 2 For example 

4(a)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>3</td> <td>2</td> </tr> <tr> <td>1</td> <td>4</td> </tr> </table>	3	2	1	4	B2	-1 eooo Allow tally marks Allow $^3/_10, ^2/_10, ^1/_10$ and $^4/_10$ oe
3	2						
1	4						
(b)	7 seen as numerator	B1ft	B1 incorrect notation eg 7 out of 10, 7 to 10, 7 : 10				
	10 seen as denominator	B1					

5(a)	A Parallelogram	B1	
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	B Rhombus	B1	Allow parallelogram for B if not given for A
(b)		B1	oe
	Trapezium	B1ft	No ft for square or rectangle No ft for parallelogram or rhombus if given in (a)

6(a)	$40 \div 8$ or $40 \div 5$	M1	$\frac{1}{8} + \frac{1}{5}$
	$5 + 8$ or 13	M1	$\frac{5}{40}$ (+) $\frac{8}{40}$
	$\frac{13}{40}$	A1	or 0.325
(b)	$\frac{16}{40}$ (-) $\frac{15}{40}$	M1	oe e.g. 0.4 (-) 0.375
	$\frac{1}{40}$	A1	oe or 0.025

7	$360 \div 8$	M1	or $180 - 1080 \div 8$ oe
	45	A1	

8(a)	2	B1	
(b)	1130 and 1230	B1	
	Steepest (or steeper) line	B1	oe, e.g. covers greater distance in same time
(c)	19	B1	
	$20 \times (\text{their } 19) + 30 \times (\text{their } 19)$	M1	oe
	9.50	A1ft	

9	$3 + 4 + 2$ or 9	M1	Attempt to add areas of all surfaces, e.g. 6 areas $(3 + 4 + 2 + 3 + 4 + 2)$ oe, $2 \times \{3 \text{ areas } (3 + 4 + 2)\}$ oe, $4 \times 6 - 3 \times 2$ or $2 \times 5 + 2 \times 4$ oe
	18	A1	
	cm^2	B1	

10	4 : 1 or 1 : 4 seen	M1	$\frac{60}{40}$ or $\frac{40}{60}$
	$60 \div 5$	M1	$\frac{6}{4} \times 8$ M2 for 8 : 2 <u>and</u> $60 \div 10$ or 16 : 4 <u>and</u> $60 \div 20$

	12	A1	SC2 for 48 : 12 or 48
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11	$y = x - 2$ Correct line drawn or table with 3 values correct	B1	Or $-3 = x - 2$
	$y = -3$ Correct line drawn or coordinate at $y = -3$ identified or table includes $(-1, -3)$	B1	Or $x = -1$
	$(-1, -3)$	B1ft	ft their lines not in 1st quadrant

Mark method (using either lines or tables or equation) that gives the best score. Do not mix methods.

12	$\angle BAD = 30$ or $\angle BCD = 25$	B1	
	$180 - (25 + 30)$	M1	
	125	A1	

13(a)	$2(x + 3)$	B1	
(b)	$12y + 3$	B1	
(c)	$4x^3 + 20x$	B2	B1 one correct term

fw deduct 1 mark e.g. in (c) $4x^3 + 20x = 24x^4$ scores B2 - 1 or $4x^3 + 20 = 24x^3$ scores B1 - 1

14(a)	$\frac{6}{20}$	B1	oe
	0.3	B1ft	
(b)	200×0.34	M1	
	68	A1	Allow 68/200

15	Trapezium with vertices at $(1, 1), (1, 2), (2, 3), (2, 1) \pm 2$ mm	B2	B1 correct trapezium in any position or 3 points correct or 2 points correct with construction 'rays'
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16	$(30, 29 \text{ or } 28) \div (4 \times 0.5)$	M1	Any two approximations correct
	$(30, 29 \text{ or } 28) \div 2$	M1dep	oe, allow any or no rounding for 28.78 if $\div 2$ used
	14, 14.5 or 15 and/or Gemma	A1	Must score M2 to be awarded A1

Give full marks for **two** correct approximations (from those given) **and** eventual division by 2 e.g. division by 2 from approximating their (4×0.5) e.g. $4.5 \times 0.5 \rightarrow 2$

17	Arcs on PQ and RQ and equal intersecting arcs	M1	Allow if arcs drawn from P and R
	Bisector accurate to $\pm 2^\circ$	A1	59.5 to 63.5

18(a)	$(66 \div 150) \times 100$	M1	oe
	44	A1	
(b)	150×0.2 or 30	M1	oe or 150×1.2 or 180
	(their 180) $\times 0.2$ or 36	M1	oe or (their 180) $\times 1.2$ M2 150×1.2^2
	216	A1	Or SC2 66 Or SC1 60 or 210

19(a)	Volume	B1	
(b)	Length	B1	

20(a)	4	B1	
(b)	$(32 - 4 - 4 - 5 - 5) (\div 2)$ or 14 or $16 - 4 - 5$	M1	oe
	7	A1	

21(a)	2×14 or 4×7	M1	Or 2 and 7 or 2, 2 and 7 only <u>or</u> on answer line
	$2 \times 2 \times 7$	A1	Or $2^2 \times 7$
(b)	28, 56, 84, ... <u>and</u> 42, 84, ...	M1	Or $2 \times 2 \times 3 \times 7$ or $2^2 \times 3 \times 7$
	84	A1	SC1 for any multiple of 84

22	Any correctly evaluated counter example with non-prime conclusion. Examples -4 and $5 \Rightarrow 25$ and not prime -5 and $6 \Rightarrow 35$ and not prime -8 and $9 \Rightarrow 77$ and not prime accept any indication of "not prime"	B2	B1 any correctly evaluated <u>trial</u> with <u>no</u> conclusion Examples -3 and $4 \Rightarrow 17$ -4 and $5 \Rightarrow 25$ -5 and $6 \Rightarrow 35$ -6 and $7 \Rightarrow 47$ -7 and $8 \Rightarrow 61$ -8 and $9 \Rightarrow 77$ or incorrectly evaluated trial that gives a counter example with non-prime conclusion
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23(a)i	Straight line joining points between (5, 1)&(5, 5) and (28, 21)&(28, 25)	B1	
(ii)	Ben	B1	oe
	No evidence for correlation at higher scores	B1	oe
(b)(i)	Any two <u>different</u> valid comparisons from: Lowest <u>or</u> highest scores Lower quartiles Medians (allow average) IQR <u>or</u> range (allow spread)	B2	B1 for one valid comparison
Comparisons must be <u>precise</u> e.g. do not allow "On average (or overall) the boys scored ..." Must be "The boys average (or median) score was ..." Allow comparisons of actual values ± 1 small square			
(ii)	$\frac{1}{4} \times 56 + \frac{1}{4} \times 52$	M1	oe allow $\frac{1}{4} \times 57 + \frac{1}{4} \times 53$
	27	A1	Allow 28 with method
24	12×10^7	M1	Or 120000000 or 120 million oe
	1.2×10^8	A1	
25(a)	c^4	B1	
(b)	d^5	B1	
(c)	$1/e^7$ or e^{-7}	B1	
(d)	$6g^5h^5$	B2	-1 eooo (see below)
In (d) e.g. $6g^5 \times 2h^5$ scores B2 - 1; $6g^5 \times 2h^4$ scores B2 - 2; $6 + g^5 + h^5$ scores B2 - 1; $5 + g^5 + h^5$ scores B2 - 2			
26(a)	$x^2 - y^2$	B2	B1 $x^2 + xy - xy - y^2$ (4 terms seen any 3 correct)
(b)(i)	$(x - 9)(x - 4)$	B2	B1 $(x \pm 9)(x \pm 4)$
(ii)	4 and 9	B1 ft	
27(a)	65	B1	
(b)	25	B1	
28	$13^2 - 12^2$ or $QS^2 + 12^2 = 13^2$	M1	Or $41 - 4^2$
	$(QS =) 5$	A1	$(QS^2 =) 25$
	$4^2 + (\text{their } 5^2)$	M1	$(\text{their } 5)^2 + 12^2$

	$\sqrt{16 + 25} (= \sqrt{41})$	A1	$\sqrt{25 + 144} (= 13)$
If 5 obtained from incorrect method do not give 1st M1A1; can give 2nd M1A1 for 5 used subsequently.			