Version 1.0

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 3301
Specification A

Paper 1 Intermediate Tier

Mark Scheme

2005 examination – November series

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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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 ¼ 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	400 × 10 (÷ 100)	M1	or 36(00) ÷400 or 9
	(their 40) – 36	M1	or [10 – (their 9)] × 400 (÷ 100)
	4	A1	

2 (a)	$2p + 8q$	B2	B1 $2p$ or $8q$ seen
2(b)(i)	5 × –3 + 2	M1	or –15 seen
	–13	A1	
2(b)(ii)	$5x = 30$	M1	oe or 5 × 6 (+ 2)
	6	A1	

3(a)	(30 – 20) ÷ 2 or 5	M1	oe or (30 – 20) or 10
	2 × (their 5) + 15	M1	oe or (their 10) + 15
	25	A1	
3(b)	30 × (their 25) or 750, or 15 × 20 or 300	M1	2 × 30 × (their 5) or 300 or 2 × 25 × (their 5) or 250 or 2 × 15 × (their 5) or 150 or 2 × 20 × (their 5) or 200
	30 × (their 25) – 15 × 20 or 750 – 300	M1	2 × 30 × (their 5) + 2 × 15 × (their 5) or 2 × 25 × (their 5) + 2 × 20 × (their 5) or 2 × 45 × (their 5)
	450	A1 ft	
	cm²	B1	

4(a)	20	B1	
4(b)	3 – 5	M1	or –2
	(their –2) ÷ 2	M1	
	–1	A1	SC2 –1 × 2 + 5 (= 3)

5(a)	360 ÷ 72 or 5	M1	oe or 400 ÷ 360 or $^{10}/_{9}$ oe
	400 ÷ (their 5)	M1	oe or (their $^{10}/_{9}$)× 72 oe
	80	A1	
5(b)	168 ÷ 400 × 100	M1	oe or $^{42}/_{100}$ or 0.42
	42	A1	

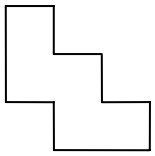
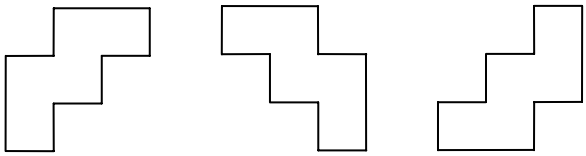
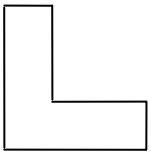
6(a)	6.5 × 50	M1	allow 6.4 × 50 to 6.6 × 50
	325	A1	allow 320 to 330
6(b)	(0)55	A1	allow (0) 53 to (0) 57
6(c)	300 – 180	M1	oe or line from *A* on bearing approximately 300°
	120	A1	118 to 122 (if line drawn from *A*)

7(a)	6 and 1	B1	
7(b)	5 correct plots	B1 ft	ft their points
	$y = x^2 - 3$ plotted between $x = -3$ and $x = 3$	B1	Smooth curve through 7 correct plots ± $^{1}/_{2}$ square
7(c)	1.7 to 1.8	B1 ft	± $^{1}/_{2}$ square
	–1.8 to –1.7	B1 ft	± $^{1}/_{2}$ square

8	(300 ×) 0.5	M1	or 300 × 0.58 – 300 × 0.08 or 174 – 24
	150	A1	

9	1 and 5	B2	B1 1 only or 5 only, or 1 and 5 and one other factor 1, 2, 5 and 10 and 1, 3, 5 and 15 with 1 error or omission, or 1, 2, 5 and 10 or 1, 3, 5 and 15 and attempt to test the other value, or 1, 2, 3, 5, 10 and 15

10	10 × 50 or 500	M1	or 50 × 7 or 350
	(their 500) × 7 or 3500	M1	or (their 350) × 10
	(their 3500) ÷ 1000	M1	or correct conversion (their g) → kg
	3.5	A1	oe

11(a)	Correct faces shaded	B1	
11(b)		B1	
11(c)		B1	

12	$x + 6$	B1	
	$4 \times$ their$(x + 6)$	B1	
	$x + x + 6 + 4x + 24$	B1	
	$6x + 30$	B1	SC2 Complete correct numerical verification

13	32.5	B1	

14(a)	$a = 40$	B1	allow angles on diagram
	180 – [(their 40) + 20]	M1	
	120	A1	SC1 reversed answers
14(b)	$\angle BAC = z$, or $\angle CDE = x$ and $\angle DCE = y$	B1	or $\angle BCE = x + z$ allow angles on diagram
	Sum of angles of triangle = 180	B1 dep	Sum of angles on a straight line = 180

15	60 or 59 ÷ 0.3 or 80 ÷ 0.5	M1	
	190 to 200 or 160	A1	oe Look out for alternatives. e.g.
	190 to 200 and 160 and correct conclusion	A1	300/1.5 > 240/1.5; 60/0.3 ≡ 80/0.4 > 80/0.5 60/0.3 ≡ 100/0.5 > 80/0.5

16	5 and common denominator	M1	or $^{11}/_{3} + {}^{14}/_{5}$ or (3.66 or 3.67) or 2.8 seen
	$(5 +) {}^{10}/_{15} + {}^{12}/_{15}$ or $(5 +)^{22}/_{15}$ allow error in one numerator	M1	or $^{55}/_{15} + {}^{42}/_{15}$ or (3.66 or 3.67) + 2.8 allow error in one numerator
	$6\ {}^{7}/_{15}$	A1	or $^{97}/_{15}$ or 6.466 or 6.47 SC2 $1^{7}/_{15}$ or $5^{7}/_{15}$

17	1 by 5 by 2 identified	B1	or height = 2 or base = 1 by 5
	$2 \times (1 \times 5 + 1 \times 2 + 2 \times 5)$	M1	oe area of 6 faces attempted
	34	A1	

18	$50000 – 0.3 \times 50000$ or 35000	M1	oe or 0.7×50000 or 15 000
	(their 35000) – 0.3 × (their 35000)	M1	oe or 0.7 × (their 35000) M2 50000×0.7^2
	24500	A1	SC1 20000 or (50000 –) 30000

19	enlargement	B1	
	(centre) (1, 3)	B1	
	Scale factor $^{1}/_{2}$	B1	

20(a)(i)	9.17×10^{6}	B1	
20(a)(ii)	4.8×10^{-5}	B1	
20(b)	$(1.8 \div 2) \times (10^{12-8})$ or 0.9×10^{4}	M1	oe or 1 800 000 000 000 ÷ 200 000 000
	$9(.0) \times 10^{3}$	A1	or 9 000

21	Robert's results	B1	or <u>all</u> results
	Largest number of trials	B1	
	$(^{22}/_{200}$ <u>or</u> $^{76}/_{200}$ <u>or</u> $^{102}/_{200}) \times 10$	M1	or $(^{25}/_{250}$ or $^{98}/_{250}$ or $^{127}/_{250}) \times 10$ allow rounded values or black = 1 <u>or</u> white = 4 <u>or</u> green = 5 or $^{1}/_{10}$ <u>and</u> $^{4}/_{10}$ <u>and</u> $^{5}/_{10}$
	black = 1, white = 4, green = 5	A1	

22(a)(i)	y^9	B1	
22(a)(ii)	y^5	B1	
22(a)(iii)	y^{14}	B1	
22(b)	$x^2 + 5x - 24$	B2	B1 $x^2 - 3x + 8x - 24$ (4 terms seen 3 correct)
22(c)	$(h - 5)(h + 5)$	B1	oe
22(d)	$w + v = \sqrt{t}$	M1	or $(w - v)^2$ or $(v - w)^2$
	$(w + v)^2$	A1	

23(a)(i)	169	B1	
23(a)(ii)	171 – 158	M1	allow scale misread (± 1 unit) for LQ <u>or</u> UQ
	13	A1	
23(b)	$^{2}/_{15} \times 450$	M1	oe
	60	A1	

24	(Graph 1) D	B1	
	(Graph 2) A	B1	
	(Graph 3) E	B1	
	(Graph 4) C	B1	

25(a)	(sin x =) 3.2/4 or 4.8/6	B1	oe eg, $4 \times 0.8 = 3.2$
25(b)	4.8/3.2 or 1.5	M1	oe $0.8 = 4.8/PQ$
	1.5×4	DM1	oe 4.8/0.8
	6	A1	