GCSE 2004
June Series

AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark Scheme

Mathematics A (3301)
Intermediate Tier Paper 2

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.

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 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 2I

1	28.8 ÷ 2	M1	28.8 − 2 × 10.8
	Their 14.4 − 10.8	M1dep	Their 7.2 ÷ 2
	3.6	A1	

2 (a)	64	B1	
(b)(i)	6.12244…	B1	6.12245
(ii)	6	B1ft	ft their (b)(i); not 6.0, 6.00 etc
(c)(i)	1.78……	B1	1.8
(ii)	1.8 or 2	B1ft	ft to 1 or 2 sf

3	−11	B1	
	−23ft	B1 ft	

4 (a)	$^3/_6$	B2	B1 for numerator, B1 for denominator oe ½ ,50%, 0.5 3 in 6 is B1
(b)	(first) = $^1/_5$ or Y(second) = $^1/_6$	M1	1 in 5, 1in 6 OK, as written explanations but **must** state which spinner; angles 72°or 60°
	Both and statement 1/5 >1/6 oe	A1	Both and statement 72° > 60°

5	a = 60°	B1	
	b = 110°	B1	
	c = 130°	B1	

6	SF = 48/36	M1	oe 1.33…; ÷ 3 × 4 seen in any calculation eg 36 ÷ 3 = 12; 12 × 4 = 48 or 330 ÷ 3 = 110; 110 × 4 = 440; award for any correct answer but look for incorrect method: eg 335, 100, 100, 745; 400, 100, 100, 800
	440, 100, 100, 960	A2	1 for 3 correct.

7 (a)	240	B1	
	800 – 350 – their 240	M1	
	Their 210 ÷ 6	M1dep	
	35	A1	
(b)	24	B1	
	3 ÷ their 24× 100	M1	oe eg 0.125 x 100; 12 can be used without explanation, but any other number used for hours in a day must be stated clearly
	12.5	A1ft`	ft their hours in a day

8 (a)	Correct cuboid	B2	B1 cuboid with 1 incorrect dimension; ignore extra lines, solid or dashed; (look for actual correct measurements in cm.)
(b)	4 × 3 ×2	M1	
	24	A1	

9 (a)	7.5	B1	
	4.20	B1	420p with £ crossed out. SC1 for 4.31 or 4.32
(b)	31.5 ÷ 150 × 100	M1	Oe
	21	A1	

10 (a)	Any k which is a multiple of 4.	B1	eg 1 ½ × 4 + 1 (= 3) or ½ 4 + 1 eg 2 k = 8
(b)	Any sum of 2 + any other prime	B1	nb 1 is not prime 1 + 2 = 3 B0

11 (a)	130	B1	±2°
(b)	C in correct position ± 2mm	B2	B1 if C south west of A ± 1° B1 if C west of B ±1°

12 (a)	2	B1	
(b)	6 km in 10 minutes	M1	6/10 oe
	36 kph	A1	

13	$380 \times 15 \div 100$ or $38 + 19$	M1	or 0.85 oe
	$380 - 380 \times 15 \div 100$	DM1	380×0.85
	£323	A1	

14	$\pi \times 9$	M1	$2 \times \pi \times 4.5$, 28 with no working Not $3 \times$ or 3.1×9 unless $\pi = 3$ or 3.1 seen
	28.3	A1	28.6 to 28.9

15	Graph passing through (0, 1)	B1	1 correct point plotted or worked
	Graph with gradient of 2	B1	3 correct points plotted or worked
	Graph passing from (0, 1) to (5, 11) no errors	B1	Freehand line to ½ sq accuracy, no errors

16	R Y G M 3 2 2 F 2 1 3	M1	2×3 or 3×2 table
	Fully correct	A2	Accept tally marks; 4 or 5 correct entries A1; SC2 for M F R Y G R Y G 3 2 2 2 1 3 or M F R 3 R 2 Y 2 Y 1 G 2 G 3 or R Y G M 3 2 2 R Y G F 2 1 3 4 or 5 correct entries SC1

17	Trial for $x > 4$	B1	All trials correctly evaluated to at least 1d.p., rounded or truncated
	Trial for $4 < x \leq 5$	B1	$5 \to 5.2$, $4.5 \to 4.72$, $4.6 \to 4.81$, $4.7 \to 4.91$
	Trials for $4.7 \leq x \leq 4.85$ that bracket the answer	B1	$4.75 \to 4.96$, $4.76 \to 4.97$, $4.77 \to 4.979\ldots$ $4.78 \to 4.989\ldots$, $4.79 \to 4.998\ldots$, $4.8 \to 5.008..$ or 5 $4.85 \to 5.056\ldots$
	Trial for $4.75 \leq x < 4.8$ and answer 4.8	B1	nb Minimum for full marks eg. test 4.75, test 4.8, state 4.8 as answer

18 (a)	p + sum of given probs = 1	M1	Oe eg $1 - \,^8/_9 = p$
	$p = \,^1/_9$	A1	Oe eg 2/18, 0.11
(b)(i)	Correct probs $^1/_6 \times \,^5/_6 + \,^5/_6 \times \,^1/_6 = \,^5/_{36} + \,^5/_{36}$	B2	-1eeoo allow as decimals to 2 dp
(ii)	Sum of 4, not 4 and not 4, 4	M1	Need $p_1 \times p_2 + p_3 \times p_4$
	Correct probs $^5/_{36} + \,^5/_{36}$	A1	
	$= \,^{10}/_{36}$ oe	A1ft	ft their probs if M1 awarded 0.27, 0.28

19(a)	$2x \geq -2$ or $1 - 3$	M1	Allow > but not = unless recovered in answer
	$x \geq -1$ must be on answer line	A1	Eg $2x > -2$, $x > -1$ is MA1A0 $2x = -2$, $x = -1$, $x \geq -1$ is M1A1 $2x = -2$, $x = -1$, $x > -1$ is M0A0
(b)	$x < 2$, $2 > x$	B1	Condone alternative letters
(c)	$-1, 0, 1$	B1ft	Follow through their inequalities for (a) and (b) unless part(b) is an "invented inequality" such as $x - 3 < 2$

20	$C = \pi \times 7$	M1	$C = 2 \pi 3.5$ must substitute numbers $C = \pi d$ or $2 \pi r$ is M0 until used
	$= 21.98 - 22$	A1	$3.14 \times 7 = 21.98$, $^{22}/_7 \times 7 = 22$
	Length = $22.98 - 23$	A1ft	f.t. their 21.99 + 1 if M1 awarded. common error: wrong r = 7 $C = 2 \pi 7 = 43.98\ldots$ (accept 44) M1,A0 Length = 45 (accept 44.980…) A1ft
	Height = 10 cm	B1	Allow answers transposed

21	$3x = 8y - 3 - 2y = (6y - 3)$	M1	Method mark is for isolating x term, Allow one error for M1
	$(x =) (6y - 3) \div 3$	A1ft	ft their equation if M1 awarded allow $(6y - 3) \div 3$ for A1 but not $6y - 3 \div 3$ eg $(8y - 3) \div 3 - 2y$ is M1A1
	$x = 2y - 1$	A1	

22 (a)(i)	$4x - 8 + 3x + 6$	M1	Allow one error for M1
	$7x - 2$	A1	Penalise further working in all parts
(ii)	$n^2 + 3n + 3n + 9$	M1	Must have a term in n for M1. Allow one error for M1.
	$n^2 + 6n + 9$	A1	
(b)(i)	$a(2a + 1), (a + 0)(2a + 1)$	B1	
(ii)	$4xy^2(2x^2 - y)$	B2	B1 for $4xy^2(2x^2 + y)$, $4x(2x^2y^2 - y^3)$ $2xy^2(4x^2 - 2y)$, $4xy(2x^2y - y^2)$ $4y^2(2x^3 - xy)$, $xy^2(8x^2 - 4y)$ B0 for $2xy(4x^2y - 2y^2)$

23		B3	Line bisecting AD B1 at least 4cm long Line bisecting ADC B1 at least 4cm long Region shaded or marked B1
24 (a)	4.07×10^{13}	B2	B1 for incorrect rounding $\times 10^{13}$ eg 4, 4.06, 4.065. 4.07^{13} B0 for 4.07×10^{-13}
(b)	Their (a) $\div$ (298000 or 86400)	M1	Dividing by 86400 or 298000 at any point gets M1 Use of original value gives 136420234.9 if dividing by 298000 or 470523495.4 if dividing by 86400
	Their (a) $\div$ 298000 $\div$ 86400	DM1	Dividing by 'other' value gets DM1
	= 1580.75 to 3sf	A1ft	Use of original value gives 1578.937904

25	Trapezium 0.5(5 + 10 × 4 = 30	B1	
	Area rectangle = 50	B1	
	Area shape = 20 ft	B1ft	ft their values iff one correct. **Alternative** Splitting into rectangles and 2 other parts and correct rectangle 5 (or 10) B1 Trapezia 9 and 6 (or triangles 6 and 4) B1 20 B1 ft their values iff one error.

26	Answer only is 0 total		
	$2(x + 1) + (x - 3)$ (=8)	M1	Second set of brackets not needed Or $4(x + 1) + 2(x - 3)$ $2x + 1 + x - 3$ is M0 unless invisible bracket recovered $x/2 + \frac{1}{2} + x/4 - \frac{3}{4}$ is M1
	$3x - 1$ (=8)	A1	$6x - 2$ (= 16) $3x/4 - 1/4$ (= 2) A1
	Their $3x - 1 = 8$	DM1	Their $6x - 2 = 16$ nb $2(x + 1) + x - 3 = 8$ Or $4(x + 1) + 2(x - 3) = 16$ gets M2 $3x/4 = 9/4$
	$x = 3$ ft	A1 ft	

27	Angle C = 180 – x Angle C = 180 – ($z + y$) $x = z + y$	B1 B1	C + x = 180 create parallel line to C + $y + z$ = 180 BC at A z alternate angle $x = y + z$ x alternate angle $x = y + z$