AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Mathematics 3301
Specification A

Intermediate Tier Paper 1

Mark Scheme

2005 examination – June 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.

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   A method mark dependent on a previous method mark being
or **DM**   awarded.

B dep   A mark that can only be awarded if a previous independent mark
or **DB**   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   Follow through marks. Wrong working should not be penalised
or ✔   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 1I

1	90 ÷ 30 or (£)3	M1	
	25 × their (£)3	M1	
	75	A1	

2(a)	*5 × 3 (+) 2 × –4 or* *15 (+) –8*	M1	MR 23 scores M1A0
	7	A1	
(b)	*16 = 10 + 2*c	M1	$(c) = \dfrac{a - 5b}{2}$
	2c = 6	M1	$(c) = \dfrac{16 - 10}{2}$ 10 + 2 × 3 (= 16) scores M2
	3	A1	

3(a)	4.12	B1	
(b)	7.28	B1	
	(their 7.28) + 13.7	M1	Must see evidence of correct addition E.g Decimal points lined up Tenths added to tenths, … Allow one computational error
	20.98	A1ft	ft answer with 2 decimal places only
(c)	30 or 24	M1	324 scores M1A0
	54	A1	

4(a)	Rhombus correct	B1	
	D (0, −1)	B1ft	ft only if *x* and/or *y* coordinate negative
(b)	*H* (4, −3)	B2	B1 for *H* marked correctly or parallelogram drawn B1 ft coordinates for incorrect *H* only if *x* and/or *y* coordinate negative SC1 *H* attempted at (10, -1)

5(a)	Fully correct pie chart, correctly labelled with all sector angles correct (108°, 120°, 72° and 60°) (sectors ± 2°)	B4	B3	4 correct sectors drawn; no/wrong labels, or 2 correct sectors drawn and 4 labels in correct order of size
			B2	2 correct sectors drawn; no/wrong labels, or 1 correct sector drawn and 4 labels in correct order of size, or 4 correct angles calculated
			B1	1 correct sector drawn; no/wrong labels, or 1 correct angle calculated or 4 sectors labelled in correct order of size
(b)	$18 \div 60 \times 100$	M1	oe	eg $\left(\frac{3}{10} \text{ or } \frac{108}{360}\right) \times 100$
	30	A1		
(c)	Stem (1, 2, 3, 4, 5)	B1		
	Leaf (8) (3, 9) (6, 6, 9) (1, 3, 4) (4)	B2	B1	3 or 4 rows correct
			B1	not ordered

6(a)	$6 (\pm 0.1) \times 50$	M1	
	295 to 305 inclusive	A1	
(b)	215 (± 2)	B1	
(c)	Bearing drawn from *A* 130 (± 2)	B1	
	AC length 7 cm (± 0.1) cm	B1	Allow *C* not labelled

7	($\angle ACB =$) $180 - 2 \times 40$	M1	oe or 100 seen
	$2 \times (\text{their } 100) + 40 + x = 360$	DM1	oe
	120	A1	

8	4×12	M1	or 48
	(their 48) ÷ 3 or 16	M1	oe
	£80 ÷ (their 16)	M1	oe
	5	A1	SC2 for 5 with no working

9	4×5 or 4×6 or $\frac{1}{2} \times 1 \times 4$ or $\frac{1}{2} \times 4 \times 6$ or $\frac{1}{2} \times 4 \times 5$ or $\frac{1}{2}(5 + 6) \times 4$	M1	
	$4 \times 5 + \frac{1}{2} \times 4 \times 1$ or $4 \times 6 - \frac{1}{2} \times 4 \times 1$ or $\frac{1}{2} \times 4 \times 6 + \frac{1}{2} \times 4 \times 5$ or 2×11 or 5.5×4	DM1	or their 20 + their 2 or their 24 − their 2 or ½ × their(20 + 24) or their 12 + their 10
	22	A1	SC1 for 22 with no working
	m²	B1	units mark

10(a)	Even	B1	
(b)	Odd	B1	

11(a)	2×9 <u>or</u> 3×6 seen	M1	or $\quad 18 \div 2 = 9$ or $18 \div 3 = 6$ or $\quad$ 2 and 9 or 3 and 6 on factor tree or $\quad$ 2, 3, 3 or $1 \times 2 \times 3 \times 3$
	$2 \times 3 \times 3$	A1	oe
(b)	36	B1	

12	$(35 - 3) \div 4$	M1	or $\quad 32 \div 4$
	8	A1	
	$4n + 3$	B2	oe B1 for $4n$ or $4 \times n$ or $n \times 4$ <u>not</u> $n4$ B1 for $+ 3$ in linear expression fw $4n + 3 \to 7n$ or 7 deduct B1
	$(x - 3)/4$	B2	oe B1 for $x - 3$ in brackets oe or for their $(x - 3) \div 4$ SC1 $\quad$ condone $x - 3 \div 4$

13	3 <u>and</u> common denominator	M1	or $\quad {}^7/_3 + {}^7/_4$ $\hspace{3cm}$ 2.33(3 …)
	$3(+) \, {}^4/_{12} + {}^9/_{12}$ allow one error in numerator	M1	or $\quad {}^{28}/_{12} + {}^{21}/_{12}$ $\hspace{3cm}$ 1.75 allow one error in numerator
	$4{}^1/_{12}$	A1	oe $\quad$ e.g. ${}^{49}/_{12}$ $\hspace{2.5cm}$ 4.083(3 …) SC2 $\quad 1{}^1/_{12}$ oe $\hspace{2cm}$ 4.08 scores M2 A0

14(a)	0	B1	
	−6	B1	
(b)	At least 5 points plotted correctly	B1ft	$\pm \, {}^1/_2$ square
	Correct curve from $x = -2$ to 4	B1	Smooth curve through 7 points $\pm \, {}^1/_2$ square

15	Straight lines each side of straight sections of L	M1	
	Semi circles at each end of L <u>or</u> quadrant at outside corner of L	M1	
	Complete locus 2cm $\pm$ 2 mm from L	A1	

16(a)	$x(x + 4)$	B1	
(b)	$4y < 6$	M1	$y = 1.5$ oe scores M1A0
	$y < 1.5$	A1	oe
(c)	$p - 3 = 2r$ or $p/2 = {}^3/_2 + r$	M1	or $\quad (p + 3)/2$ or $(3 - p)/2$
	$(p - 3)/2$ or $p/2 - {}^3/_2$	A1	oe

17(a)	Red <u>and</u> 2	B1	
(b)	50 is not a multiple of 4, or 50 is not a multiple of 20	B1	$^1/_4$ or $^9/_{20}$ of 50 is not an integer oe
(c)	$^1/_5 + ^1/_{10}$	B1	
	$^2/_{10} (+ ^1/_{10})$	DB1	
(d)(i)	Correct probabilities	B1	
(ii)	$^3/_{10} \times ^3/_{10}$	M1	or 0.3×0.3
	$^9/_{100}$	A1	or 0.09 or 9%

18	20 (seconds) seen	B1	Approximating to 1 sf at any stage
	$200 \div 20(.42)$ (m/s) or 3×200 (m/min) or 5×200 (m) in 100 (s)	M1	For speed = distance/time <u>or</u> distance in 100 sec
	(their 10) $\times 3600$ or (their 600) $\times 60$ or (their1000) $\times 36$	M1	For a conversion of distance to km or time to hours
	36	A1	

Common responses	0.2 seen scores B0M0M1 (for conversion of distance to km)
	10 from 200/20 scores B1M1M0 (for approximation and speed calculation)
Other examples	$0.2 \div ^{20}/_{3600}$ or $200 \div ^1/_{180}$ or 0.2/20 scores B1M2
	$3600 \div (20.42 \times 5)$ or 0.2/20.42 scores B0M2 (complete method/no estimation)

19(a)	$\pi (\times) 5^2$	M1	Condone 3.1… $\times 5^2$
	$\pi (\times) 5^2 \times 10$ or (their area) $\times 10$	M1	Condone 3.1… $\times 10 \times 5^2$ their area must contain π
	250π or $250 \times \pi$ or $\pi \times 250$	A1	775 to 790 scores M2A0 Do not accept $\pi250$ Ignore fw 250π can be recovered in (b)
(b)	40×50	M1	$10 \times 10 \times 10$ 40×50
	their 2000×10	M1	their 1000 – their 250π $20 \times$ their$(\pi (\times) 5^2)$
	$20 \times$ their 250π	M1	$20 \times$ their $(1000 – 250\pi)$ their 2000 – their 500π
	$20000 – 5000\pi$	A1	$20(1000 – 250\pi)$ $10(2000 – 500\pi)$
			4290 to 4500 scores M3A0 Ignore fw except 15000π

20(a)	$2x - 20 = x + 12$ allow one error	M1	or $\frac{1}{2}x - \frac{1}{4}x = 3 + 5$ allow one error or $\frac{1}{4}x$ or 8 in $\frac{1}{4}x = 8$
	$x - 20 = 12$ or $2x = x + 32$	A1	or $\frac{1}{4}x = 8$
	$(x =)$ 32	A1	
(b)	$(x + a)(x + b)$	M1	$ab = \pm 14$
	$(x + 7)(x - 2)$	A1	
	$-7, 2$	B1ft	from two linear factors

21(a)	10^{6}	B1	oe
(b)	8×10^{9}	B1	
(c)	2.4×10^{22}	B2	B1 2.4 <u>or</u> 22 as power <u>or</u> 24 000000000000000000000 oe e.g. 24×10^{21}

22(a)	$360 - (90 + 90 + 40)$	M1	oe
	140	A1	
(b)	70	B1ft	