AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Mathematics 3301
Specification A

Paper 1 Intermediate Tier

Mark Scheme

2006 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.

The following abbreviations are used on the mark scheme:

M   Method marks awarded for a correct method.

A   Accuracy marks awarded when following on from a correct method.
               It is not necessary always to see the method. This can be implied.

B   Marks awarded independent of method.

M dep   A method mark which is dependent on a previous method mark being
awarded.

ft   Follow through marks. Marks awarded for correct working following a mistake in an
               earlier step.

SC   Special Case. Marks awarded for a common misinterpretation which has some
               mathematical worth.

oe   Or equivalent.

eeoo   Each error or omission.

Paper 1I

1	Two correct numbers in same form	M1	eg 0.22 and 0.19 or 22% and 19% or fractions with common denominator
	Three correct numbers in same form	M1	eg 0.15, 0.22 and 0.19 or 15%, 22% and 19% or fractions with common denominator
	$\frac{3}{20}$ 19% 0.22	A1	oe M2A1 $\frac{3}{20}$ = 15% oe and correct solution SC1 All correct with no working

2	5×10^3	B1	
	10000	B1	
	7×10^4	B1	

3(a)	0.59	B1	
3(b)	6.32	B1	

4	$\frac{1}{2} \times 4 \times 1$ <u>or</u> 2	M1	or length of side = 4.1 cm ($\pm$ 1 mm)
	$4 \times$ (their 2) + 9 <u>or</u> $25 - 4 \times$ (their 2)	M1	or (their length)^2
	17	A1	M2A1 17 (counting squares) SC2 17 with no working SC1 15 to 19 inclusive
	cm^2	B1	

5(a)	$(27 + 3) \div 5$	M1	or 30 $\div$ 5 or 5 $\times$ 6 – 3
	6	A1	
5(b)	$5(x + 2)$	B2	oe B1 $x + 2$ or 5 $\times$ (their x + 2) or $5x + 2$

6	500 ÷ 10 or 50	M1	or 500 × 3	500 ÷ 5 or 100
	(their 50) × 3 or 150	M1	or 1500 ÷ 10	(their 100) × 3
	(their 150) ÷ 5	M1		(their 300) ÷ 10
	30	A1		

7(a)	0	B1	oe
7(b)	0.7	B1	oe
7(c)	0.2	B1	oe

| 8 | Correct pair of comparable values (ignore units) | B2 | eg 1.5 and 1.6 (per 100g)
9 and 9.6 (per 600g)
(3) and 3.2 (per 200g)
4.5 and (4.8) (per 300g)
0.666 … and 0.625(g/p)
1.5 and 1.8 (difference) oe

B1 for finding one correct comparable value or correct method to find one value
1.80 alone scores B0 |
| | Regular | B1ft | For correct comparison
ft allow their decision only if B1 given |

9(a)	360 – (60 + 140 + 115)	M1	
	45	A1	
	135	B1ft	ft 180 – (their 45)
9(b)	Explanation based on $360 – 3 × 90 = 90$ oe, or Attempt at drawing quadrilateral with 3 right angles & conclusion that 4th angle would also be 90 or five (or more) sides would be needed for 3 right angles	B2	B1 Incomplete explanation showing some insight into problem. eg Angle sum of quadrilateral is 360 Attempt at drawing quadrilateral with 3 right angles with no or inadequate conclusion

10(a)		Walk	Other	B2	B1 Any two correct
	Boy		2		
	Girl	3	3		

10(b)	No and explanation.
	
	eg $\frac{3}{6}$ is same as $\frac{2}{4}$
	
	    Same proportion boys/girls
	    Equally likely
	(Can't decide) sample too small
		B2	oe
			
			B1 No and incomplete explanation, or
			     Implication that the number of boys and
			     girls should be equal, or Correct
			     explanation with no decision.

11(a)	E	B1	
11(b)	C	B1	
11(c)	180 – 115	M1	or 360 – (90 + 90 + 115)
	65	A1	

12(a)	*6*x *+ 5*	B2	B1 $6x$ or + 5 eg $6x – 5$ scores B1
12(b)	*15*	B1	
12(c)(i)	*1 × 3 + 4 <u>or</u> 1 × (3 + 4)*	M1	or 3 + 4 <u>or</u> 1 × 7
	1 × 3 + 4 <u>and</u> 1 × (3 + 4)	M1	or 3 + 4 <u>and</u> 1 × 7
	7 (must see <u>both</u> methods and answers)	A1	SC1 7 with no working

12(c)(ii)	*a(b + c) = ab + ac,* or
	Comparison of add *b* to *c* then multiply by *a* with multiply *a* by *b* then add *c*
		B2	oe
			
			or complete counter example (showing both
			     expressions have different values when
			     $a \neq 1$ <u>or</u> c $\neq$ 0)
			
			B1 incomplete comparisons or counter
			     examples

13(a)(i)	$x + 2$	B1	
13(a)(ii)	$x – 2$	B1	
13(b)(i)	$n^2 + n$ or $n(n + 1)$ or $n \times (n + 1)$ or $(n + 1) \times n$	B2	B1 n^2 … or brackets omitted
13(b)(ii)	42	B2	B1 10 and 11 seen

14(a)	Rotation	B1	Allow turn
	90° clockwise	B1	oe $\frac{1}{4}$ turn clockwise scores B2 $\frac{1}{4}$ turn scores B1
	(centre) (1, 1)	B1	
14(b)	Correct enlargement - vertices at (2, 1), (2, 3), (4, 5), (4,1)	B3	B2 Enlargement incorrect sf <u>or</u> centre, or 3 points correct within 1 small square B1 Enlargement incorrect sf <u>and</u> centre, or 2 points correct within 1 small square "Ray" lines attempted from (0, 7)

15	3 <u>and</u> common denominator	M1	or $\frac{21}{5} - \frac{5}{3}$ 1.66(6 …)
	$(3 +) \frac{3}{15} - \frac{10}{15}$ Allow one error in numerator	M1	or $\frac{63}{15} - \frac{25}{15}$ 4.2 Allow a total of 1 error in <u>either</u> 1ˢᵗ or 2ⁿᵈ M mark
	$2\frac{8}{15}$	A1	oe eg $\frac{38}{15}$ 2.533(3 …) SC2 (3) $-\frac{7}{15}$ oe 2.53 scores M2

16	10 (÷) 0.2	M1	Both approximations correct
	50	A1	
	7	A1	Allow 7.1 or 7.0 7 with no working scores 0

17(a)	0.833 (3…) <u>or</u> 0.875 and 0.9 0.166(6 …) <u>or</u> 0.125 and 0.1	M1	Allow percentages or Fractions with denominators with prime factors of 2 and/or 5 only terminate oe
	$\frac{5}{6}$	A1	Must see working
17(b)	Attempt at 3 ÷ 11	M1	Answer attempted to 2 dp (Accept error in 2ⁿᵈ dp)
	0.2727(27 …)	A1	Minimum of 4d.p. or recurring notation SC1 sight of digits 27

18(a)	5 + 4	M1	or 9
	$\dfrac{9}{30}$	A1	oe
18(b)	(2.5, 1), (7.5, 2), (12.5, 7), (17.5, 9), (22.5, 7), (27.5, 4) joined within 1 small square, straight lines attempted	B2	B1 One error <u>or</u> not joined <u>or</u> joined with curve SC1 for consistent plots at lcb or ucb

18(c)	Correct comparison of average <u>and</u> spread, or
	 Correct comparison of average or spread <u>and</u> one other valid observation
		B2	eg Students average time larger oe
			     Allow eg in general, on average, overall
			
			     Spread of student times larger oe
			     Allow eg larger range, more varied …
			 Other valid observations
			 eg More students watch from 15 to 25 h
			     Same number (7) watch from 10 to 15 h
			
			 B1 one correct comparison of average/spread
			     or one valid observation

19(a)	$[180 - (90 + 50)] \div 2$ <u>or</u> $180 - (90 + 40)$	M1	Allow 20 if clearly $\angle BAC$ Allow 50 if clearly $\angle BAD$ $[180 - (90 + 50)] \div 2$ or 20
	$[180 - (90 + 50)] \div 2$ <u>and</u> $180 - (90 + 40)$	M1	$180 - (40 + 90 + \text{their } 20)$
	30	A1	
19(b)(i)	100	B1	
19(b)(ii)	110	B1	

20(a)	$7x - 14y - 6x + 3y$	M1	Allow one error
	$x - 11y$	A1	
20(b)(i)	w^8	B1	
20(b)(ii)	w^6	B1	
20(b)(iii)	w^{12}	B1	
20(c)(i)	$(y - 2)(y - 3)$	B2	B1 $(y \pm 1)(y \pm 6)$ or $(y \pm 2)(y \pm 3)$
20(c)(ii)	2 <u>and</u> 3	B1ft	

21(a)	7×10^5	B2	B1 $35\,000\,000 \div 50$ (: 1), or their $700\,000$ (: 1), or their $700\,000$ in correct standard form
21(b)	$3.5 \times 10^3 \div 10^6$	M1	or $3\,500 \div 1\,000\,000$ or 0.0035
	3.5×10^{-3}	A1	

22	$\pi \times 20$ ($\div 2$)	M1	$3.1(4 \ldots) \times 20$ ($\div 2$)
	(their 10π) + 20	M1	(their $31.(4 \ldots)$) + 20
	$10\pi + 20$	A1	$10 \times (3.1(4 \ldots) + 2)$ (award <u>only</u> if (their $31.(4 \ldots)$) + 20 seen)
	Factorising $10\pi + 20$ or Expanding $10(\pi + 2)$	B1	Showing that (their $31.(4 \ldots)$) + 20 and $10 \times (3.1(4 \ldots) + 2)$ are the same

23	$1 \rightarrow D$	B1	$1 \rightarrow y \geq 2x - 4$
	$2 \rightarrow C$	B1	$2 \rightarrow y \geq -2x + 4$
	$3 \rightarrow E$	B1	$3 \rightarrow y \leq 2x - 4$
	$4 \rightarrow A$	B1	$4 \rightarrow y \leq -\frac{1}{2}x + 2$