Version 1.0: 20/06/07

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 3301

Specification A

Paper 2 Intermediate

Mark Scheme

2007 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.

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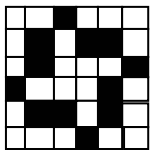
Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

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 awarded.
B dep	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.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

Paper 2I

Q	Answer	Mark	Comments
1(a)	658.(…)	B1	
1(b)	1.7(…)	B1	
1(c)	7.37(…)	B1	$\frac{258}{35}$ $7\frac{13}{35}$
2	1.5 × 98	M1	1.5 × 0.98
	249 – Their 147	M1	2.49 – Their 1.47, 0.17 or 17 gets M2
	Their 102 ÷ 85	M1dep	Only dependent on 2nd M1 Their 1.02 ÷ 0.85, 1.02 ÷ 85, not 2.49 ÷ 85
	1.2	A1	SC2 0.012 or other position of decimal point
3	 Fully Correct	B3	B2 for inner 8 correct (ignore extras) B1 for outer 4 correct (ignore extras) SC1 any other rational symmetry of order 4
4	Method 1: Attempt to compare using equilateral triangles / rhombi Method 2: Using formulae	B1	Method 1: eg, 2 bottom halves equal Need line drawn Method 2: eg, b × h for rhombus or $\frac{1}{2}$ b × h for triangle B2 Complete hexagon on diagram and show each is $\frac{1}{3}$ of the hexagon
	Complete argument	B1	Method 1: Show that both top halves are $\frac{1}{2}$ of a rhombus or are the same Method 2: Using both formulae and triangle has double the height

Q	Answer	Mark	Comments
5	2 2 5 6 7 3 3 6 7 8 6 6 9 10 11 7 7 10 11 12 8 8 11 12 13	B2	One or two errors in table B1 If table not used full listing of totals B2 1 or 2 errors / omissions of totals B1 Allow E, O or W, L or explained symbols
	Counting up Their odds and evens eg, 13 Even, 12 Odd	M1	eg, P(even) = $\frac{13}{25}$ or P(odd) = $\frac{12}{25}$ Must have numbers
	eg, More evens than odds or Yes	A1ft	

Allow embedded solutions, but if contradicted M marks only

6(a)(i)	32	B1	$\frac{32}{1}$ is B0
6(a)(ii)	$4w = 13 - 3$	M1	$w + \frac{3}{4} = \frac{13}{4}$
	2.5, $2\frac{1}{2}$	A1	$\frac{10}{4}$ oe
6(b)	14	B2	B1 for –6 or ± 6 seen
6(c)	$4x - 12$	B1	
6(d)(i)	$3(2a + 3)$	B1	
6(d)(ii)	$(x + 5)x$	B1	$(x + 5)(x + 0)$

7(a)	1415 seen or marked on table	B1	2.15
	1415 – 1040 must be times	M1	eg, 20 + 3 + 15, 64 + 26 + 74 + 51, 215 (mins)
	3 h 35 m	A1	
7(b)	1 h 30 m = 1.5	B1	1 h 30 m = 90
	Distance / Time	M1	96 ÷ 1.5, 96 ÷ 90 × 60, 96 ÷ 1.3, Not 96 ÷ 90 × 100
	64	A1	SC1 73.8

Q	Answer	Mark	Comments
8	Substituting for t = 3 in both terms	M1	Even if algebra not correct
	9 from 3 × 3 or –18	A1	
	0	A1	
9(a)	Straight line, if extended, to pass within (0,13) to (0,15) and (10,22) to (10,24) inclusive	B1	At least between $x = 2$ and $x = 8$ Freehand sketch OK to $\frac{1}{2}$ sq accuracy
9(b)	Increase together	B1	oe Positive correlation or Their equation of line of best fit
10(a)	Reflection	B1	Must be single transformation
	In y axis	B1	oe in y, in $x = 0$, in line y, in vertical axis
10(b)	Correct translation	B1	(–1, –2), (–1, 0), (0, –2)
10(c)	Any enlargement	B1	Any orientation. Not scale factor 1
	Scale factor 3	B1	Any orientation
	Centre (0,1)	B1	(3, 1), (6, 1), (3, 7)
11	$\frac{40}{100} \times 65$	M1	26 Build up method OK
	65 – Their 26	M1dep	$\frac{60}{100} \times 65$ gets M2
	39	A1	
12	(80 or 280 or 190) ÷ 24 × 36	M1	120 ± 2, 420 ± 2, 285 ± 2 for all 3
	120, 420, 285	A2	A1 for 1 or 2 correct. SC1 for 825
13(a)	Graph passing through (0, 10)	B1	1 correct point plotted or worked
	Graph gradient –2	B1	2 further points plotted or worked
	Graph passing from (0, 10) to (5, 0) with no errors to $\frac{1}{2}$ sq	B1	If > 2 lines (including y = 7) then B1maximum
13(b)	Correct horizontal line at least 1 cm long	B1	To $\frac{1}{2}$ sq accuracy. Must be a single line

Q	Answer	Mark	Comments
14(a)(i)	36	B1	
14(a)(ii)	Goes up in 7's, add on 2 lots of 7	B1	oe $7n + 1$, $7x + 1$ B0 for in 7 times table, B0 for add 7
14(b)	$7n + 1$ or $n = 7n + 1$ or $x = 7n + 1$	B2	oe B1 for $7n$ + anything, $n7 + 1$, $7x + 1$ B2 for n x 7 + 1
14(c)	$358 = 7n + 1$	M1	
	51	A1	SC1 for 50 or 51 with wrong working
15(a)	Bearing 037° ± 2	B1	
	290° ± 2	B1	
	Correct intersection of lines	B1	Ignore any x. Within $\frac{1}{2}$ sq of grid intersection
15(b)	6 to 6.2 cm	B1	
	Their 6.1 × 5	M1	
	30 to 31	A1	
16	35 ÷ 500 × (100) and 28 ÷ 330(× 100)	M1	35 ÷ 500 × 330 or 28 ÷ 330 × 500 500:35 and 330:28 and at least 1 attempt to cancel 500 ÷ 35 and 330 ÷ 28
	0.07 (7) and 0.08… (8 or 8.5)	A1	23.(1) or 42.(42), 14.(3) and 11.(79) or 12 Ratio with same multiple of 7 eg, 100:7 and 82.5:7 or 200:14 and 165:14
	Kelly or Fizzy orange	A1	Must have working with 1 of 2 values correct
17	4 × 142 + 5 × 146 + 8 × 150 + 7 × 154 + 5 × 158 + 1 × 162	M1	Σfx where x is midpoint or end point or Values ±0.5 For at least 2 multiplications and additions seen
	Their 4528 ÷ 30	M1dep	
	150.9(3…)	A1	151 with working

Q	Answer	Mark	Comments
18	Sight of 0.12	B1	12% = £15 M1
	15 ÷ 0.12	M1	(1%) = 15 ÷ 12 (= 1.25)
	125(.00)	A1	–1 for incorrect money notation Penalise for further contradictory working eg, 125 + 15 = 140
19(a)	F, I, E, X	B3	–1eeoo
19(b)	$a^2 + ab - ba - b^2$	M1	Must have 4 terms Condone 1 sign error
	$a^2 - b^2$	A1	Must show cancellation, either by 'crossing out' or stating $ab - ab = 0$
20	100 × 0.7 ÷ 5.5	M1	Ratio weight biscuit: 100 = 0.7 : 5.5
	12.72…	A1	
	12.7 or 13	B1ft	Award for any value to at least 4 sf or calculation that is correctly rounded to 2 or 3 sf
21(a)(i)	59 to 61	B1	
21(a)(ii)	Reading at 15(.25) and 45(.75)	M1	44 – 46, 70 – 71
	24 to 27	A1	
21(b)	60 – Their reading at a mark of 55	M1	
	34 to 36	A1	SC1 24 to 26 identified by lines or mark on graph

Q	Answer	Mark	Comments
22	Valid method	M1	Method 1: Two triangles base 15, height 7.5 Method 2: 4 triangles base and height 7.5 Method 3: $x^2 + x^2 = 225$ Method 4: 2 squares side 7.5 and 7.5 Method 5: 1 rectangle sides 7.5 and 15 Method 6: $7.5^2 + 7.5^2 = x^2$ Method 7: Use of trig, eg, 15 sin45º Method 8: Kite or rhombus
	Correct values in method	A1	$x = 10.6(\ldots)$, $15\sqrt{2}/2$, $2x^2 = 225$, $\frac{1}{2} \times 15 \times 15$
	112.5	A1	Must be exact but allow rounding to 112.5 after 112.49, say
23	True or T for $y = x + 3$	B1	
	False or F	B1	
24(a)	$x^2 = 35^2 - 22^2$ (=741)	M1	$x^2 + 22^2 = 35^2$
	$(x =)\ \sqrt{741}$	M1dep	For squaring, subtracting and evidence of square rooting M2 for full method using trig
	27.2(…..)	A1	27 with working
24(b)	Sight of tangent	M1	M2 for full method using sin/cos and pythag
	20 ÷ tan38	M1dep	20tan 52
	25.6, 25.5988…	A1	25.599, 26 with working

Q	Answer	Mark	Comments
25	Breaks down problem into areas of rectangles and areas of (quarter) circles	M1	Any combination of rectangles and circles πr^2 or 12.56 or $4 \times \pi$ is enough evidence for area of circles NB 12.56 from $2 \times \pi \times 2$, if seen is M0 NB 3.14 on its own is not evidence of the area of a quarter circle as it is π
	Uses an 'addition' method (method 1) and finds Area of one (or 5) 'external' quadrants $(5 \times)\ 2 \times 2 - \frac{1}{4}\pi \times 2^2$ or $(5 \times)\ 4 - \pi$ or $(5 \times)\ \frac{1}{4}(16 - \pi \times 2^2)$	M1	Uses a 'subtraction' method (methods 2 and 3) and finds $5 \times$ area of one 'internal' quadrant $5 \times \frac{1}{4}\pi \times 2^2$ or $5 \times \pi$
	$= 0.8584\ldots$, (0.9, 0.86, 0.858) or $(\times 5) = 4.3, 4.29, 4.292\ldots$	A1	15.71, 15.7
	52.3 or 52.29(…), $68 - 5\pi$	A1	Allow 52 if full method seen