Version 1.0: 1106

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 3302
Specification B

Module 5 Intermediate Paper 2

Mark Scheme

2006 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.

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.

Module 5 Intermediate Tier Paper 2

Q	Answers	Mark	Comments
1(a)	Correct enlargement	B2	B1 for enlargement any scale factor (not 1) Accept any orientation Tolerance 2 mm
1(b)	Ticks in boxes 2 and 3 only	B2	1 correct, 1 wrong B1 1 correct, 2 wrong B0 2 correct, 1 wrong B1 2 correct, 2 wrong B0
2(a)	5 × 4 (–) 2 × –9	M1	20 (–) –18
	38	A1	SC1 for 2
2(b)	3 × 4 × –9	M1	
	–108	A1	
3(a)	0.8	B1	oe eg, $\frac{4}{5}$
3(b)	(+) 2.6	B1	oe eg, $\frac{13}{5}$ or $2\frac{3}{5}$
4	1 foot = 30 cm	B1	1" = 2.5(4) cm or other valid equivalence
	$5\frac{1}{2} \times 30 = 165$	B1	66 × 2.5(4) = 165 (or 167.64) 172 ÷ 2.5(4) = 68.8 (or 67.7…)
	(172 > 165) yes	B1dep	or other valid comparison coming from award of both previous B1s
5	34.6 – 2 × 5.7 (= 23.2)	M1	34.6 ÷ 2
	(their 23.2) ÷ 2	M1dep	(their 17.3) – 5.7
	11.6	A1	11.6

Q	Answers	Mark	Comments
6(a)	$5(x - 2)$	B1	
6(b)	$y(y + 3)$	B1	
7(a)	C	B1	
7(b)	B	B1	
7(c)	1 flat section between slopes	B1	Proportions not important
	Line right up to Hunby	B1	Must go to within 2 mm of Hunby Ignore any extras after reaching H NO MARKS in (c) if line moves backwards in time or distance These B marks are independent
8(a)	Angle 70º or 60º	B1	±2º
	PS = 6 cm	B1	±2 mm
	Parallel line through their S	B1	
	Completed trapezium	B1dep	All angles ±2º All sides ±2 mm Dependent all previous B3
8(b)	3.7	B1ft	ft their SR ±2 mm

Accept embedded answers throughout Q9 unless contradicted on answer line when last mark is lost

9(a)	75	B1	
9(b)	$y - 4 = 2 \times 5$	M1	or $\frac{1}{2}y - 2 = 5$
	$y = 10 + 4$	M1	$\frac{1}{2}y = 5 + 2$
	14	A1	14
9(c)	$7z - 5z$ or $-4 - 2$	M1	oe
	$2z = -6$	M1dep	Allow also $2z = 6$ or $2z = -2$
	-3	A1	

Q	Answers	Mark	Comments
10(a)	Correct plots	M1	± 1 mm
	Curve through plots ± 1 mm	A1	Within 2 mm of correct all the way
10(b)	2.2 and 0.8 in correct boxes	B1, B1	or ft from their plots
10(c)	Correct curve	B1 ft	Within 2 mm of correct all the way ft from their (b)
11(a)	$9^2 + 9^2$	M1	or $\frac{9}{\text{hyp}}$ = sin or cos 45º
	√ their 162	M1dep	$\frac{9}{\sin 45^\circ}$ or $\frac{9}{\cos 45^\circ}$
	12.7 to 12.73	A1	Accept 13 if at least one M gained
11(b)	cos	M1	**Complete** method using DE... M2
	$\frac{7.4}{15.3}$ = cos F	M1dep	(= 0.48…)
	61 to 61.1	A1	Answer 28.9 or 29 → M2 A0 only if angle at E marked or named
12(a)	Equal arcs from A and B	M1	Arcs > $\frac{1}{2}$AB Must have 2 intersections
	Perpendicular drawn	A1	
12(b)	Arc of circle, radius 3 cm, centre C	M1	Arc at least from one intersection with perpendicular to the other
	Correct area shaded	A1	
	If (a) not correct, award M1 in (b) for arc of correct circle, at least $\frac{1}{4}$ circle		
13	2.8 m → 280 cm	B1	or 10 cm → 0.1 m
	275	B1	Answer 285 scores B1 B0 2.75 scores SC1

Q	Answers	Mark	Comments
14	Trial for $2 < x \leq 3$	B1	Note: 4th column earns the marks 2.5 → 33.75 3 → 57
	Trial at 2.6 or 2.7 (or between)	B1	2.6 → 37.752 2.66 → 40.30… 2.61 → 38.16… 2.67 → 40.73… 2.62 → 38.58… 2.68 → 41.17… 2.63 → 39.01… 2.69 → 41.62… 2.64 → 39.43… 2.7 → 42.06… 2.65 → 39.86… (allow 42) All trials correct to, or truncated to 1 decimal place
	Trials at 2.65 and 2.7	B1	or any 2 trials for $2.65 \leq x \leq 2.7$ which bracket 40
	2.7	B1dep	Dependent on third B1
15	$\pi \times 4.5^2$ (= 63.6)	M1	Allow $\pi \times 9^2$ (= 254)
	their 63.6 × 14.5 (= 922)	M1dep	or 1000 ÷ their 63.6
	922	A1	15.7(19…)
	No	A1	Must have 922 or 15.7
16(a)	$8y - 10 - 3y - 6$	M1	Allow one error
	$5y - 16$	A1	$5y - 4$ with no working… SC1
16(b)	$p^2 + 5p - 5p - 25$	M1	for 3 correct terms $p^2 + 25$ scores M0
	$p^2 - 25$	A1	
16(c)	$(q \pm 5)(q \pm 7)$	M1	
	$(q - 5)(q + 7)$	A1	
16(d)	$r + 5$ seen	M1	or $2r = x - 10$
	$2(r + 5)$	A1	or $2r + 10$

Q	Answers	Mark	Comments
17	Attempt at $\frac{y \text{ span}}{x \text{ span}}$	M1	eg, $\frac{12}{6}$ $\frac{8}{4}$ $\frac{4}{2}$
	Gradient 2	A1	
	$2x - 4$	A1	