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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 4307

Specification B

Module 5 Paper 2 Tier H 43055/2H

Mark Scheme

2009 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.

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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 HIGHER TIER 43055/2H

1	Correct shape in correct place	B3	Bottom left at (2, 4)
		B2	Correct shape in wrong position
		B1	At least 3 sides correct

2(a)	–2	B1	
	10	B1	
2(b)	"their" 7 points plotted correctly	M1	$\pm \frac{1}{2}$ square
	Smooth curve through correct plots, dropping below –2 between $x = -2$ and $x = -1$	A1	(Note: **not** ft) Must go through all **correct** plots ($\pm \frac{1}{2}$ square)
2(c)	$(x =) -1.5$ or $-1\frac{1}{2}$	B1 ft	
	$(y =)[-2.3, -2.2]$	B1 ft	

3	$x + x + 4x = 180$	M1	oe
	30	A1	
	$x + 4x + 4x = 180$	M1	oe
	20	A1	

4(a)	$\pi (\times) 2.5^2$	M1	oe for example 6.25π
	19.6(…)	A1	Accept 20 with working
4(b)	$\pi \times (2.5 + 0.9)^2$ – their (a)	M1	Note: large circle = 36.3… but this does not earn M1 until subtraction done
	[16.67, 16.72]	A1	
	16.7 or 17	B1 ft	

5	Complete & correct trapezium	B4	–1 eeoo (listed below) Angle S ≠ 90º Angle R ≠ 50º QR ≠ 6 cm (± 2 mm) PQ not parallel to SR

6(a)	–8	B1	
6(b)	$8x - 2 = 18$	M1	$4x - 1 = 9$
	Collecting terms eg $8x = 18 + 2$	M1	eg $4x = 9 + 1$
	2.5 or $2\frac{1}{2}$ or $\frac{5}{2}$	A1	
6(c)	$\frac{1}{4}y = 7 - 5$ oe	M1	$20 + y = 28$ oe
	8	A1	
6(d)	$4(2t + 1) + 3(5 - t)$ as numerator	M1	$(= 5t + 19)$
	Right hand side $3 \times 4 \times 3$ (= 36)	M1	
	$5t + 19 = 36$	A1	
	3.4 or $\frac{17}{5}$ or $3\frac{2}{5}$	A1	SC2 for –3.2

7	Attempt at one rectangular face	M1	6×8 (= 48) or 3×8 (= 24) or $6 \times 8 \times 2$ (= 96) or $3 \times 8 \times 4$ (= 96)
	Attempt at area of L-shape	M1	$6 \times 3 + 3 \times 3$ (= 27) or $3 \times 3 + 3 \times 3 + 3 \times 3$ oe eg $[3(3 \times 3)]$ or $6 \times 6 - 3 \times 3$
	(2 × their 48) + (4 × their 24) + (2 × their 27)	M1 dep	Dep on both method marks
	246	A1	

8(a)	m^8	B1	
8(b)	x^6	B1	
8(c)	$25y^{10}$	B2	B1 for y^{10}

9(a)	Sight of sine	M1	No marks for scale drawing
	$(\sin x =) \frac{3.3}{4.1}$	M1 dep	
	[53.5, 53.6]	A1	Allow 54 with working
9(b)	Sight of cosine (but **not** cos 42)	M1	or sin 42
	$4.1 \times \cos 48$	M1	or $4.1 \times \sin 42$
	[2.7, 2.75]	A1	

10(a)	$(x-2)^2 + (x-7)^2 = x^2$	M1	Must have brackets
	$x^2 - 2x - 2x + 4$ or $x^2 - 7x - 7x + 49$	M1	Or better
	$x^2 - 2x - 2x + 4$ $+ x^2 - 7x - 7x + 49 = x^2$ simplified to become given equation	A1	
10(b)	$\frac{18 \pm \sqrt{18^2 - 4(\times 1) \times 53}}{2}$	M1 A1	Allow one error Fully correct substitution
	14.2(…) or 3.7(…)	A1	Does not have to be 1 dp here
	Choice of 14.3	A1	Rejection of 3.7

11(a)	Alternate segment	B1	Both words needed Ignore extra wording
11(b)	Angle ABC = 58º	M1	Working could be on diagram
	$180 - 2 \times 58$	M1	
	64	A1	

12	$x(t-2) = 3t - 5$ or $xt - 2x = 3t - 5$	M1	Clearing the fraction
	$xt - 3t = 2x - 5$ oe	M1 dep	Collecting terms with t Allow one error
	$t(x-3)$ [$= 2x - 5$]	M1 dep	Correct factorisation of lhs
	$\frac{2x-5}{x-3}$ oe	A1	eg $\frac{5-2x}{3-x}$

13(a)	Translation $\begin{pmatrix} 0 \\ 9 \end{pmatrix}$	B1	Rough symmetry
13(b)	Translation $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$	B2	Rough symmetry Same minimum value of y B1 for translation $\begin{bmatrix} -2 \\ 0 \end{bmatrix}$ ie to the left or translation $\begin{pmatrix} 2 \\ p \end{pmatrix}$

14	$50^2 + 27^2 - 2 \times 50 \times 27 \times \cos 82$	M1	2853
	√ their 2853	M1 dep	
	53.4(…)	A1	
	$\frac{PS}{\sin 38} = \frac{\text{their } 53.4}{\sin(\text{their } 118)}$	M1	their 118 from 180 – (24 + 38)
	$\frac{\text{their } 53.4 \times \sin 38}{\sin(\text{their } 118)}$	M1	
	[37.2, 37.3]	A1	