



## **General Certificate of Secondary Education**

# **Mathematics 4302**

## *Specification B*

**Module 5 Paper 2 Tier H 43005/2H**

# **Mark Scheme**

*2008 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.

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**The following abbreviations are used on the mark scheme:**

<b>M</b>	Method marks awarded for a correct method.
<b>A</b>	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
<b>B</b>	Marks awarded independent of method.
<b>M dep</b>	A method mark which is dependent on a previous method mark being awarded.
<b>ft</b>	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
<b>SC</b>	Special Case. Marks awarded for a common misinterpretation which has some mathematical worth.
<b>oe</b>	Or equivalent.
<b>eeoo</b>	Each error or omission.

**MODULE 5 HIGHER TIER**

**43005/2H**

1(a)	$70 \div \pi$	M1	
	[22.2, 22.3]	A1	or 22
1(b)	$50 \times 100$	M1	or $70 \div 100$
	their $5000 \div 70 (= 71.428\dots)$	M1	or $50 \div$ their $0.7 (= 71.428\dots)$
	71	A1	

2(a)	5, -3	B1 B1	
2(b)	At least 6 correct plots	M1	$\pm 2$ mm ft their table
	Smooth curve	A1	Must be fully correct for this mark
2(c)	[-0.5, -0.4]	B1	ft 'their' graph ( $\pm 0.1$ )
	[4.4, 4.5]	B1	ft 'their' graph ( $\pm 0.1$ )
2(d)	Graph does not go down to -5	B1	oe

3(a)	He has left out the unmarked lengths	B1	oe
3(b)	$2y + 5x + 3y + x + y + 4x$	M1	oe Allow one error or omission
	$10x + 6y$	A1	Note: May be seen in part (a) Penalise further working

4(a)	Any fully correct sf2 enlargement	B1	
	Enlarged from A	B1	dep on 1st B1
4(b)	Rotation	B1	Allow rotated, rotating
	$\frac{1}{4}$ turn, anti-clockwise	B1	or $90^\circ$ or right-angle
	About (0, 0)	B1	or about the origin

5(a)	21	B1	
	4	B1	
5(b)	$\frac{21x}{28}$ or $\frac{4x}{28}$ or $\frac{14x}{28}$ seen	M1	
	$\frac{21x}{28} + \frac{4x}{28} - \frac{14x}{28}$	M1	Allow one error
	$\frac{11x}{28}$	A1	

6(a)	$y + 4 = 12 - 4y$	M1	$\frac{y}{4} + y = 3 - 1$
	$y + 4y = 12 - 4$	M1	$\frac{5y}{4} = 2$
	1.6 or $1\frac{3}{5}$ or $\frac{8}{5}$	A1	
6(b)	-6, (-5, -4,) -3, (-2, -1,) 0, (1, 2,) 3, (4)	M1	$-\frac{6}{3} \leq n < \frac{5}{3}$ oe
	-2, -1, 0, 1	A2	-1 eeoo If A1 given, infer M1
6(c)	$8x + 2y = 10$	M1	or $12x + 3y = 15$ <b>and</b> $12x - 8y = 48$
	Fully correct addition	M1	Fully correct subtraction
	$x = 2, y = -3$	A1	

7	$\pi \times \left(\frac{55}{2}\right)^2 (= 2375)$	M1	Allow $\pi \times 55^2 (= 9503)$ for M1
	their $2375 \times 82$	M1 dep	Allow their $9503 \times 82$
	[194718, 194818]	A1	
	[194.7, 194.8] (litres) + valid comment	A1 ft	eg No, not quite, less than 200

8(a)	$3x - x^2$	B1	
8(b)	$6q^2 - 21q - 8q + 28$	M2	M1 if one wrong term
	$6q^2 - 29q + 28$	A1	

9(a)	Angle in a semi-circle	B1	Because AB is diameter oe
9(b)	Sin 48	M1	or cos 42
	$8.6 \times \sin 48$	M1	May be ( $\div \sin 90$ )
	6.39(1...)	A1	
	6.4	B1 ft	ft from their answer ( $> 1$ dp) Allow 6 with working

10	$y^2 + 2y + 2y + 4$ or $y^2 - 2y - 2y + 4$	M1	or $[y + 2 + y - 2][y + 2 - (y - 2)]$ Allow one error
	Second of these	M1	2y or 4 seen
	$y^2 + 4y + 4 - y^2 + 4y - 4$	A1	$[2y][4]$

11	$\frac{x}{5} = \frac{45}{36}$	M1	Scale factor $\frac{45}{36}$ or $\frac{36}{45}$ or $\frac{36}{5}$ or $\frac{5}{36}$
	$(x =) 5 \times \frac{45}{36}$	M1 dep	Third length $\times$ (or $\div$ ) their scale factor
	6.25	A1	

12	$f(u + v) = uv$	M1	or $fu + fv = uv$
	$fu = uv - fv$	M1	or $fv - uv = -fu$ Allow one error
	$fu = v(u - f)$	M1	$v(f - u) = -fu$ Allow one error
	$v = \frac{fu}{u - f}$	A1	$v = \frac{-fu}{f - u}$

13(a)	$\frac{1}{2} \times 14 \times 19 \times \sin 33$	M2	(Ht $\Rightarrow$ ) $14 \sin 33 (= 7.62\dots)$ M1 $\frac{1}{2} \times 19 \times$ their 7.62... M1 dep
	[72, 72.5]	A1	
13(b)	$14 \times 1.2 (= 16.8)$	M1	or $19 \times 1.2 (= 22.8)$
	$\frac{1}{2} \times$ their 16.8 $\times$ their 22.8 $\times \sin 33$	M1 dep	(Ht $\Rightarrow$ ) $16.8 \times \sin 33 (= 9.14\dots)$ <b>and</b> $\frac{1}{2} \times$ their 22.8 $\times$ their 9.14... M1 dep
	[104, 104.31]	A1	
	<b>Alternate method</b>		
	1.2 seen	M1	
	their (a) $\times 1.2^2$	M1	
	[104, 104.31]	A1	ft their (a)

14			<b>Alternate method 1</b>
	$AC^2$ (or $BD^2$ ) $= 24^2 + 15^2$	M1	$VM^2 = 16^2 - 7.5^2$
	$\sqrt{24^2 + 15^2} (= \sqrt{801} = 28.3\dots)$	M1	$\sqrt{16^2 - 7.5^2} (= \sqrt{199.75} = 14.13\dots)$
	$16^2 - (\frac{1}{2} \text{ their } 28.3)^2$	M1	(their 14.13) $^2 - 12^2$
	$\sqrt{55.75}$	M1	$\sqrt{55.75}$
	[7.46, 7.5]	A1	[7.46, 7.5]
			<b>Alternate method 2</b>
		M1	$VN^2 = 16^2 - 12^2$
		M1	$\sqrt{\text{their } 112} (= 10.58)$
		M1	their $10.58^2 - 7.5^2$
		M1	$\sqrt{55.75}$
		A1	[7.46, 7.5]

15(a)	Translation $\begin{pmatrix} 0 \\ 1 \end{pmatrix}$	B1	Move it up one unit oe
15(b)	Curve through: (0, 0) (45, 1) (90, 0) (135, -1) (180, 0) (225, 1) (270, 0) (315, -1) (360, 0)	B1	