



General Certificate of Secondary Education

Mathematics 3302

Specification B

Module 5 Paper 2 Tier H 33005H2

Mark Scheme

2005 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.

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 Paper 2 HIGHER TIER**33005/H2**

1(a)	$19^2 - 9^2 (= 280)$	M1	or $a^2 + 9^2 = 19^2$
	$\sqrt{\text{(their 280)}}$	M1 dep	
	16.7(33...)	A1	or 17 with working (1st M1)
(b)	Sight of tangent	M1	M2 for any complete method
	Angle = $\tan^{-1}(11 \div 24)$ or $\tan R = \frac{11}{24}$	M1 dep	$\tan^{-1} 0.458(33\dots)$
	24.6(2...)	A1	or 25 dep on both M1s
2	$3x + 6$	B1	
	$5x - 3x$ or $6 + 1$	M1	
	3.5 $3\frac{1}{2}$ or $\frac{7}{2}$	A1	Allow embedded answer If contradiction M1A0
3	Trial between 5 and 6	B1	
	Trials at 5.3 and 5.4 or better that bracket 110	B1	5.3 \rightarrow 106(.47...) 5.4 \rightarrow 114(.26...)
	Trial at 5.35 and answer 5.3	B1	5.35 \rightarrow 110.3(3...)
4	$\pi \times 3.7^2 (= 43.0\dots)$ or $2\pi \times 3.7^2 (= 86.0\dots)$	M1	or 42.9... or 85.9... If 43 multiplied by 5.7 at any stage... M0 unless also used as an add on
	$2\pi \times 3.7 \times 5.7 (= 132.5\dots)$	M1	or 132.4...
	2 (their 43.0) + (their 132.5)	M2 dep	M1 for top missing Dep on both M1s
	218 to 220	A1	
5(a)	$8x - 4 + 3x + 18$	M1	Allow one error
	$11x + 14$	A1	Ignore further working if they go on to solve $11x + 14 = 0$
(b)	$4x^2 - 2x^3$	B2	B1 each term
(c)	$x^2 - 3x + x - 3$	M1	Allow one error May appear in a grid
	$x^2 - 2x - 3$	A1	
(d)	$8x^7y^6$	B2	B1 for any 2 of 8, x^7 or y^6

6(a)	$4x + 3y = 33$	B1	Ignore £ signs
(b)	$6x + 6y = 57$	B1	Note: $4x + 3y$ and $6x + 6y$ without right hand side... SC1
(c)	Equalised coefficients	M1	Lhs correct + attempt to multiply either rhs
	$x = 4.5$	A1	
	$y = 5$	A1 ft	$x = 4.5$ and $y = 5$ with no working... SC1 or by trial and improvement SC1

7(a)	Q and S	B2	1 right + 1 wrong... B1 2 right + 1 wrong... B1 1 right + 2 wrong... B0
(b)	$\frac{56}{42}$ or $\frac{42}{56}$ oe	M1	or $\frac{27}{42}$ or $\frac{42}{27}$
	their $(\frac{56}{42}) \times 27$ or $27 \div$ their $(\frac{42}{56})$	M1	or their $(\frac{27}{42}) \times 56$ or $56 \div$ their $(\frac{42}{27})$
	36	A1	Use of 1.3 \rightarrow 35.1 A0 Use of 1.33 \rightarrow 35.9 A1 Use of 1.333 \rightarrow 35.991 A1

8(a)	Circle, centre O , radius 3	B1	
(b)	$y = 3$	B1	

9	150° seen	B1	
	$4.5^2 + 6.2^2 - 2 \times 4.5 \times 6.2 \times \cos 150^\circ$	M1	Can be scored from correct use of incorrect angle
	$\sqrt{\text{(their 107)}}$	M1	As for first M1
	10.3(4...)	A1	

10(a)	Continuation at least once more	M1	$5^3 - 4^3 = 61$ $6^3 - 5^3 = 91$ (allow this to be prime if stated)
	Justification that the answer is not prime	A1	eg $91 = 7 \times 13$ $8^3 - 7^3 = 169 = 13 \times 13$
(b)	$n^2 + 10n + 25 - (n^2 + 6n + 9)$	M1 A1	M1 for expanding and subtracting (allow one error) A1 for all terms, bracket or correct signs
	$4n + 16 = 4(n + 4)$	A1	Factorisation must be shown

11	$\frac{4}{3} \pi 7.5^3$ or $\frac{2}{3} \pi 7.5^3$	M1	
	883.1 to 883.6	A1*	
	18.5 used as height	B1	
	$\frac{1}{3} \pi 7.5^2 18.5$	M1	Allow 26 here
	1089.1 to 1089.75	A1*	* score one of these only
	1972 to 1973.35	A1	Use of r as 15 throughout gives 9660 SC2

12(a)	$12.5 - x$	M1	oe
(b)	$x(12.5 - x) = 38$	M1	
	Sorting to $2x^2 - 25x + 76 = 0$	A1	Need valid intermediate step
(c)	$\{25 \pm \sqrt{(25^2 - 4 \times 2 \times 76)}\} \div 4$	M1 A1	M1 allow one error A1 for correct substitution
	7.28 or 5.22 or both	A1	

13	$\frac{\theta}{360} \times \pi \times 12^2 = 98$	M1	or $\pi \times 12^2 \div 98$ or inverse
	$98 \times 360 \div (\pi \times 12^2)$	M1	360 \div their (4.6) or inverse
	77.9 to 78.15	A1	

14	Sight of sin	M1	
	$TQ = 2.5/\sin 6^\circ$	M1	= 23.9(16...)
	their $23.9^2 + 3.8^2$	M1 dep	= 586(.459...) or 585(.65)
	$\sqrt{(\text{their } 586)}$	M1	
	24(.2...)	A1	
	Alternative method		
	$QR = 2.5/\tan 6^\circ$	M1	= 23.7(85...)
	their $23.7^2 + 3.8^2$	M1	= 580(.209...)
	their $580 + 2.5^2$	M1 dep	= 586(.459...) or 585(...)
	$\sqrt{(\text{their } 586)}$	M1	
	24(.2...)	A1	

15	$2(2y - 3) + 3(y + 1) [= 7y - 3]$	M1	Allow invisible brackets if recovered later
	$(y + 1)(2y - 3)$	M1	As denominator or on right hand side
	their $7y - 3 =$ their $(y + 1)(2y - 3)$	M1 dep	dep on both M1s, need quadratic
	$2y^2 - 8y = 0$	A1	Allow $2y^2 = 8y$ or $y^2 = 4y$
	$y = 0$ or 4	A1	