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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 3302
Specification B

Module 5 Paper 1 Tier H 33005H1

Mark Scheme

2006 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.

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 Paper 1 HIGHER TIER 33005/H1

1(a)	$18p + 6q$	B1	
1(b)	$-4p - 6q$	B1	
1(c)	$14p$ (+ $0q$)	B1 ft	ft for 2 p terms and 2 q terms (of the form ap + bq)

2(a)	90 – 20 or 360 – 70 or 50 + 20	M1	oe
	70 or 290	A1	Ignore orientation
2(b)(i)	Translation 4 units to the right	B1	5 points correct B1B0
	Translation 1 unit down	B1	
2(b)(ii)	$\begin{pmatrix} -4 \\ 1 \end{pmatrix}$	B1	Condone division line

3(a)	$4n$	B1	$n \times 4$ not $n4$
3(b)	$4n + 1$	B2 ft	oe B1 for $4n + c$, $c \neq 0$ ft for their (a) + 1 (provided algebraic) $\times$ 4 + 1 scores B1

4	14×14 or 14^2	M1	
	196	A1	

5(a)	$2x^3 - 8x$	B2	B1 for each term
5(b)	$y(y - 4)$	B1	
5(c)	(x =) $y - 3$	B1	

6	$n^2 - 2n + 3n - 6$	M1	3 terms correct
		A1	4 terms correct
	$n^2 - 2n + 3n - 6 + 6 - n$	M1	
	n^2	A1	Must see some indication of $-6 + 6 = 0$ and $-2n + 3n - n = 0$ eg $-6 + 6$

7(a)	Length	B1	
7(b)	Area	B1	
7(c)	Length	B1	
7(d)	None	B1	

8(a)	$x + y = 70$ or $x + 2y = 96$	B1	Answers may appear in parts (a) or (b)
8(b)	$x + 2y = 96$ or $x + y = 70$	B1	
	eg $x + 2y = 96$ – $x + y = 70$ --- $(y = 26)$ or $x + 2(70 - x) = 96$ or $x + \frac{96 - x}{2} = 70$ or $96 - 2y = 70 - y$ or $70 - y + 2y = 96$	M1	Use of algebra means both equations correct Attempt to eliminate a variable from 2 linear equations (equations need not be correct) Allow one error
	$x = 44$ or $y = 26$	A1	
	$y = 26$ and $x = 44$	A1	SC2 for both correct answers only or both answers from trial and improvement

9(a)	$9 \times \frac{1}{3}$ or $\frac{x}{9} = \frac{2}{6}$	M1	oe
	3	A1	
9(b)	Sight of $\frac{15}{2}$ or $\frac{2}{15}$ or $\frac{15}{6}$ or $\frac{6}{15}$ or $\frac{3}{2}$ or $\frac{2}{3}$	M1	oe
	$\frac{15}{6} \times 9$ or $\frac{15}{2} \times 3$ or $\frac{y}{3} = \frac{15}{2}$ or $\frac{y}{9} = \frac{15}{6}$ or $\frac{15}{2} \times$ their x	M1 dep	oe
	22.5	A1 ft	oe Accept $\frac{45}{2}$

10(a)(i)	*C* in correct position	B1	Lose 1 mark from 1st correct answer if no labels ie 4 correct B3 3 correct B2 etc If some labelled award best mark available Allow 1 missing label
10(a)(ii)	*D* in correct position	B1	
10(a)(iii)	*E* in correct position	B1	
10(a)(iv)	*F* in correct position	B1 ft	Follow through from their *E*
10(b)(i)	Parallelogram	B1	
10(b)(ii)	Trapezium from their diagram eg *CDFE* Not allowing parallelograms	B1 ft	Note: Letters must be in correct order *CDFE* *EFDC* *OADC* *DFEC* *CEFD* *OADE* *FECD* *DCEF* *OAFC* *ECDF* *FDCE* *BDFC* **Check their answer on the diagram**

11(a)	$x^2 + (x - 7)^2 = 29$	M1	
	$x^2 + x^2 - 14x + 49 = 29$	M1 dep	Allow 1 error
	$2x^2 - 14x + 20 = 0$ and $x^2 - 7x + 10 = 0$	A1	Dividing by 2 must be seen or implied
11(b)	$(x - 5)(x - 2)$	M1	M1 is for $(x + a)(x + b)$ where $ab = \pm 10$ [or use of quadratic formula or completing the square: allow 1 error]
	$x = 5, x = 2$ or $(5, -2)$	A1	
	$y = -2, y = -5$ or $(2, -5)$	A1	

12	3 congruency facts with **reasons** At least one fact must be a side Angles must use 3 letters or be clearly marked on diagram	B1 B1 B1	$AB = DC$ or $AX = CX$ or $BX = DX$ $\angle AXB = \angle CXD$ or $\angle XAB = \angle XCD$ or $\angle XBA = \angle XDC$
	States congruent reason for their facts eg RHS or AA(corr)S or SAS or SSS or accept explanation in words	B1	Note: When 3 valid facts are given: If no reasons are given award B1 If 1 or 2 reasons are given award B2

13(a)	States that angle $ABD = 32$ or angle $BAQ = 81$	M1	Note: Marks can be awarded for either part for working shown in (a) or (b) May be on diagram
	Angle $BDC = 32$ or angle $BAD = 180 - 81 - 32$ or angle $BAD = 67$	M1 dep	
	$(x =)\ 180 - 67$ or $81 + 32$	M1 dep	
	113	A1	
13(b)	$(y =)\ 180 - 113 - 32$ or $180 - (\text{their } x) - 32$	M1	
	35	A1 ft	

14(a)	$x^2 - 2bx + b^2$	M1	
	$b = 12$ or $b = -12$	A1	Note: $(x - 12)^2$ implies M1A1
	$a = 24$ or $a = -24$	A1	Note: a and b must be consistent for both A marks to be awarded
14(b)	$\frac{x-2}{x+2}$	B3	B1 for $(x - 2)^2$ or $(x - 2)(x - 2)$ B1 for $(x - 2)(x + 2)$

15(a)	1 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$ or 1 0.5 0.25 0.12(5) or 0.13 0.06...	B3	oe –1 eeoo
15(b)	Their 5 points plotted correctly	B1 ft	Must be on the grid Tolerance $\pm \frac{1}{2}$ square
	Smooth curve	B1 ft	Through their five points Tolerance $\pm \frac{1}{2}$ square
15(c)	Attempt to read off of $x = \frac{1}{2}$	M1	
	0.7	A1	Any answer between 0.65 and 0.725 inclusive