AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Mathematics 4302
Specification B

Module 5 Paper 1 Tier H   43005/1H

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.

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   43005/1H

1	$\frac{1}{2} \times (5 + 7) \times 4$	M1	oe
	24	A1	
	cm^2	B1	Units mark

2(a)	$x^2(x - 4)$	B2	B1 for $x(x^2 - 4x)$
2(b)	196 or 784 or 2744	B1	
	196×10 or $2744 - 4 \times 196$ or $14 \times (196 - 56)$	M1	$14^2(14 - 4)$ or $14(14^2 - 4 \times 14)$
	1960	A1	

3	Line 7 cm drawn or line 5 cm drawn	B1	± 1 mm
	Angle of 70º	B1	± 2º
	Parallelogram completed - fully correct	B1	

4(a)	$360 - 40$ or 160×2	M1	oe Accept 40 seen as acute $<$ next to x
	320	A1	
4(b)	$180 - 320 \div 2$ or $180 - 160$ or $40 \div 2$	M1	Accept 20 seen on diagram either opposite to y in parallelogram or alternate to y
	20	A1	

5(a)(i)	12	B1	
5(a)(ii)	n	B1	
5(a)(iii)	$100 \times (100 + 1) \div 2$ or $(100^2 + 100\,(\times 1)) \div 2$	M1	oe Condone missing brackets
	5050	A1	

5(b)	1, 3, 5, 7	B2	B1 for 3 terms correct
			eg 3 5 7 9
			   −1 1 3 5
			    0 3 5 7
			    1 4 5 7
			B1 for 1, 3
			B0 for 1 2 3 4
			B0 for 1 4 6 8

6(a)	$6x - 2x = 7 - 9$	M1	
	$4x = -2$	A1	
	$-\dfrac{1}{2}$	A1	
6(b)	$21a - 15b + 8a - 6b$	M1	Allow one error
	$29a$ or $-21b$	A1	
	$29a - 21b$	A1	Do not allow further working
6(c)	$\dfrac{8 + -3}{1 \times -5}$	M1	Award M1 for 5 in numerator or −5 as answer to denominator
	$\dfrac{5}{-5}$	A1	
	-1	A1	

7	5×200	M1	or $1440 \div 5$	$540 \div 5$
	$1440 - 1000$ or 440	M1 dep	288	$200 - 108$
	$440 \div 5$	M1 dep	$288 - 200$	$180 - 92$
	88	A1		

8(a)	8^9	B1	
8(b)	w^4	B1	
8(c)	$3 \times 4 = 12$	B1	oe
	Should be x^6	B1	oe Should have added the powers
8(d)	$3y^4z^2$	B2	B1 for two correct terms

9(a)	2nd and 4th boxes indicated	B2	B1 for one or two correct (and one incorrect)
9(b)	Example of formula with two letters that is not area	M1	Accept eg $2l + 2w$ (represents length) Condone $2\pi r$ length Condone $\pi r^2 h$ (volume) Condone use of π as a letter
	Not correct	A1	May be implied

10(a)	$5^2 + 12^2$	M1	
	$\sqrt{5^2 + 12^2}$	M1 dep	Allow unsimplified
	13	A1	Measuring 13 scores 3 12.9 - 13.1 scores 2 12.8 - 13.2 scores 1
10(b) (i)	$\dfrac{10 - -2}{0 - 5}$	M1	oe
	$-\dfrac{12}{5}$	A1	oe
10(b) (ii)	$y = -\dfrac{12}{5}x + 10$	B1 ft	oe ft their gradient

11(a)	$10x(2x + 3)$	M1	Area of base = 90 or $900 \div 10 = 90$
	$20x^2 + 30x = 900$	A1	$x(2x + 3) = 90$
	$2x^2 + 3x = 90$ or $20x^2 + 30x - 900 = 0$	A1	
11(b)	$(2x \pm a)(x \pm b)$ where $ab = 90$	M1	Use of formula (allow one error)
	$(2x + 15)(x - 6)$	A1	Use of formula with no errors $(x =) \dfrac{-3 \pm \sqrt{3^2 - 4(2)(-90)}}{2 \times 2}$
	$\left(-\dfrac{15}{2} \text{ and }\right) 6$	A1	oe
11(c)	$\left(\dfrac{1}{2}\right)^3$ seen	M1	$1:2^3$ or $2^3:1$ seen Sight of 3 or 7.5 or $\dfrac{1}{2}x$ or $x + 1.5$
	$900 \div 2^3$ or $900 \div 8$	M1 dep	$5 \times 3 \times 7.5$
	112.5	A1	

12	$\dfrac{2x + 5}{3x}$	B3	B1 for $(2x - 5)(2x + 5)$ B1 for $3x(2x - 5)$

13(a) (i)	$2\mathbf{s} + \mathbf{t} + \mathbf{s} + 2\mathbf{t}$ or $3\mathbf{s} + 3\mathbf{t}$	M1	
	$3AB$ or $3(\mathbf{s} + \mathbf{t})$	A1	
13(a) (ii)	3 : 1	B1	
13(a) (iii)	Collinear	B1	oe
13(b)	$\overrightarrow{FG} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$ or $FG^2 = 17$ or $\overrightarrow{FH} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ or $FH^2 = 17$	B1	Gradient of $FG = -4$
	$\overrightarrow{GH} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$ or $GH^2 = 34$	B1	Gradient of $FH = \dfrac{1}{4}$ $\overrightarrow{FH} . \overrightarrow{FG}$
	Cos $F = \dfrac{17 + 17 - 34}{2 \times \sqrt{17} \times \sqrt{17}}$ $(= 0)$	M1	$-4 \times \dfrac{1}{4}$ $(= -1)$ or $17 + 17 \ (= 34)$ (Pythagoras) or $\overrightarrow{FH} . \overrightarrow{FG} = 4 - 4 \ (= 0)$
	$= 0$ and $F = 90$	A1	$= -1$ and $F = 90 = 34$ (Pythagoras) $\therefore$ 90º or $= 34$ and $F = 90$ or $\overrightarrow{FH} . \overrightarrow{FG} = 0$ and $F = 90$