AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Mathematics 4307
Specification B

Module 5 Paper 1 Tier H   43055/1H

Mark Scheme

2009 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   43055/1H

1(a)	$5 \times 3 \times 2$	M1	$50 \times 30 \times 20$ seen in (a) or (b)
	30	A1	
1(b)	30000	B1 ft	ft (a) $\times$ 1000

2(a)	Sphere	B1	
2(b)	Cuboid Prism Cube	B2	B1 for 2 or 3 correct (and one incorrect) or B1 for 1 correct (and none incorrect)

3(a)	$2\pi r$	B1	oe
3(b)	$2 \times 3.14 \times 3$	M1	Must be 3.14
	18.8(4)	A1	
3(c)(i)	their 18.8(4) $\div$ 4 (= 4.7(1))	M1	
	their 4.7(1) + 12	M1 dep	oe their 18.8(4) $\div$ 4 + 12
	16.7(1)	A1 ft	$1.5\pi + 12$ oe
3(c)(ii)	90 or 60 seen	B1	May be on diagram
	360 − 90 − 60 − 60	M1	
	150	A1	
	30	A1 ft	ft 180 − their 150

4(a)	(length =) 4 seen or (height =) 8 seen	M1	
	4×8	M1 dep	$10 \times 8 - 2 \times 0.5 \times 6 \times 8$
	32	A1	
4(b)	$8^2 + 6^2$	M1	
	$\sqrt{8^2 + 6^2}$ or $\sqrt{100}$	M1 dep	
	10 (+ 10 + 4 + 4)	A1	
	28	A1	SC1 8 + 8 + 3.2 + 3.2 or 22.4

5(a)	5 × 0.4 (−) 4 × 2.5 or 2 (−) 10	M1	8 implies M1
	−8	A1	
5(b)	4*x* – 28	B1	
	7*x* – 4*x* = – 28 – 11	M1	oe for collecting their terms
	−13	A1	

6(a)	Straight sloping line	B1	
6(b)	Valid coordinates	B1	eg (0, −1) (1, 1) (2, 3) (3, 5)
	Different valid coordinates	B1	
6(c)(i)	(2.8 + 1) ÷ 2 or 2*x* = 3.8	M1	
	1.9	A1	Embedded answer M1A0
6(c)(ii)	*x* < 1.9	B1 ft	

7	Measurement of M to V [2.4, 2.6] and Measurement of V to N [5.9, 6.1]	B1	M to V = 2.5 cm V to N = 6 cm
	their 6 ÷ their 2.5 or their 2.5 ÷ their 6 or 1 cm = 120 (km)	M1	
	300 × their 6 ÷ their 2.5	M1 dep	
	[680, 765]	A1	720
	Alternative method		
	M to V (2.5 cm) V to F (2 cm) and F to R (2.8 cm) and R to N (2.2 cm)	B1	V to F (2 cm) and F to N (4.8 cm) tolerances as above
	their 7 ÷ their 2.5 or their 2.5 ÷ their 7 or 1 cm = 120 (km)	M1	
	Attempt to multiply by scale factor 300 × their [6.6, 7.3] ÷ their [2.4, 2.6]	M1 dep	
	[760, 920]	A1	840 or 884

8(a)	$4(5x - 3)$	B1	
8(b)(i)	$(x + 3)(x + 4)$	B2	B1 for $(x + a)(x + b)$ where $ab = \pm 12$
8(b)(ii)	0	B1	
8(c)	$3(x + 3) + 2(2x - 1) (= 42)$	M1	
	$3(x + 3) + 2(2x - 1) = 42$ or $3x + 9 + 4x - 2 (= 42)$	M1 dep	
	$3x + 4x = 42 - 9 + 2$ or $7x = 35$	M1 dep	oe
	5	A1	

9(a)	1.5 or $\frac{2}{3}$ seen in (a) or (b) or $\frac{15}{12}$ or $\frac{5}{4}$	M1	$\frac{z}{15} = \frac{8}{12}$ oe 0.66 or 0.67 or better
	$15 \div 1.5$ or $15 \times \frac{2}{3}$ or $8 \times \frac{15}{12}$ or $8 \div \frac{12}{15}$	M1	oe
	10	A1	
9(b)	$y = 1.5x$	B1	oe eg $2y = 3x$ $y = \frac{3x}{2}$

10(a)	$360 - 80$	M1	
	280	A1	Check diagram
10(b)	50	B1	Check diagram

11	D	B1	Accept $y = -x^2$	Need to accept $y = -x^2$ for D and $y = -x^3$ for A
	A	B1	Accept $y = x^3$	

12	$x^2 + 2bx + b^2$ or $2b = 12$ or $(x + 6)^2 + a - 36$	M1	$x^2 + bx + bx + b^2$ $(x + 6)^2 + a = (x + b)^2 + 36$ $(x + 6)^2 = x^2 + 12x + 36$
	$b = 6$	A1	
	$a = 36$	A1	

13(a)	$\frac{1}{3} \times 15 \times 16$	M1	
	80	A1	
13(b) (i)	$\frac{1}{8}$	B2	B1 for unsimplified fraction equivalent
13(b) (ii)	their $80 \div 8 \times 7$	M1	oe their $80 \times$ their $\frac{7}{8}$ oe their $80 \times (1 -$ their $\frac{1}{8})$ Note: If volume used, must use $\frac{15}{4}$ for area of base of small cone
	70	A1 ft	

14(a) (i)	$12x^2 - 8xy + 3xy - 2y^2$	B1	Fully correct
14(a) (ii)	1	B1	
14(b)	Use of $12x^2 - 5xy - 2y^2$ State that first or last term is even	M1	Can also use the factorised form
	Middle term (x) is a multiple of 2	M1	
	Even + even + even	A1	
	= even	A1	
	Alternative method		
	If y is odd $(4x + y)$ is odd $(3x - 2y)$ is even	M1	Even + odd = odd and Even – even = even
	Odd × even = even	A1	
	If y is even $(4x + y)$ is even $(3x - 2y)$ is even	M1	Even + even = even and Even – even = even
	Even × even = even	A1	
	Alternative method 2		
	If y is odd $(3x - 2y)$ is even	M1	
	If y is even $(4x + y)$ is even	M1	
	Even × anything or Anything × even	A1	
	Even	A1	