AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Mathematics 4307
Specification B

Module 3 Tier H 43053H

Mark Scheme

2008 examination – March 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 3   HIGHER TIER   **43053H**

1	32×6	M1	
	192	A1	

2	$20 \times 9 \ (= 180)$	M1	$20 \div 15 \ (= 1\frac{1}{3})$ or $15 \div 20 \ (= 0.75)$
	their $180 \div 15$	M1 dep	their $1\frac{1}{3} \times 9$ or $9 \div$ their 0.75
	12	A1	

3	$\frac{24}{40} \times 100 \ (= 60)$	M1	$\frac{65}{100} \times 40 \ (= 26)$
	Ben	A1	Only accept if 60 or 26 or $\frac{60}{100}$ or $\frac{26}{40}$ seen

4(a)	3.58644(…)	B1	
4(b)	3.59	B1 ft	ft any (a) > 3 sf

5(a)	0.8 or $\frac{4}{5}$	B1	oe Do not accept $\frac{1}{1.25}$
5(b)	1024	B1	
5(c)	11	B1	Allow -11 or ± 11
5(d)	0.013	B1	oe
	1.3×10^{-2}	B1 ft	ft if converted to standard form from answer seen that is < 1

6(a)	$5a$ should be $6a$	B1	Should multiply the 3 and $2a$ Has added 3 and $2a$ $5(a + 3)$
6(b)	$2(x + 4)$	B1	
	$(x + 2)(x + 4)$	M1	$(x + a)(x + b)$ when $ab = \pm 8$
	$\frac{x+2}{2}$	A1	oe eg $\frac{x}{2} + 1$

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7(a)	0.97 or $\frac{97}{100}$	B1	
7(b)	68 000 × 0.97 (= 65 960)	M1	68 000 – 0.03 × 68 000 61880 seen
	their 65 960 × 0.97 (= 63981.2) and their 63981.2 × 0.97 Note: their 65 960 × 0.97^2 is M1 dep	M1 dep	their 65 960 – 0.03 × their 65 960 (= 63981.2) and their 63981.2 – 0.03 × their 63981.2 Note: 68 000 × 0.97^3 is M1M1 dep
	62 061.(…) or 62 062	A1	
	62 100	B1 ft	ft from value seen unless already a multiple of 100 Answer 62 100 with no incorrect working gets full marks

8	(numerator =) 5^{24}	B1	
	(denominator =) 5^6	B1	
	their 24 – their 6	M1	
	5^{18}	A1	

9(a)	$y = kx^2$	M1	$y \propto x^2$
	$200 = k \times 10^2$	M1	$200 = k \times 10^2$ implies M2
	$y = 2x^2$	A1	Allow for $k = 2$ if $y = kx^2$ seen earlier SC2 $k = 2$ seen $2x^2$ seen
9(b)	Parabola through the Origin	B1	Within 2 mm of origin

10	72 499	B1	
	15 750	B1	
	Their Max crowd – their min females	M1	
	56 749	A1	Answer 56 750 **with no working** implies B0 B1 M1 A0

11	Any two of 5, 7, 20 and 10 seen	M1	140 seen
	5, 7, 20 and 10 all seen	A1	5, 140 and 10 seen
	135	A1	

12(a)	14.25	B1	
12(b)	37.5	B1	
12(c)	142.5 + 3.75	M1	$3.75 \times 40 - 3.75$
	146.25	A1	

13(a)	$\frac{(9)}{12} (-) \frac{(4)}{12}$	M1	Valid common denominator with at least one numerator correct Accept 0.75 – 0.33(33…)
	$\frac{5}{12}$	A1	oe fraction Accept 0.42 or better
13(b)	$\frac{3}{5} \times \frac{1}{4}$	M1	$0.6 \div 4$
	$\frac{3}{20}$	A1	oe eg 0.15
13(c)	$56^0 = 1$	B1	(56) – 1
	55	B1	
13(d) (i)	Cube root (of 27 is 3)	B1	3 cubed is 27
13(d) (ii)	$\frac{1}{3}$	B1	

14	$\frac{84}{4} (\times 5)$	M1	21 (× 5) if correct
	105	A1	
	$\frac{150}{5} \times 3$	M1	30 × 3 if correct
	90	A1	
	195	A1 ft	ft their 105 + their 90 if both M marks awarded SC2 144

15(a) (i)	3.79×10^8	B1	
15(a) (ii)	1.4×10^{-7}	B1	
15(b)	5.2×10^{-3}	B1	

16(a)	Plots 8 points within $\frac{1}{2}$ square	B1	
	Joins points to make smooth curve	B1 ft	ft their points (at least 7) but must be shape of U quadratic curve
16(b)	Their intersection with x axis $\pm \frac{1}{2}$ sq	B1 ft	Must be graphical solution Ignore negative solutions
16(c) (i)	Draws correct line	B1	Length over an x interval of 2 units
16(c) (ii)	$x^2 - 6x - 1 = 2 - x$	M1	or subtracts one function from the other
	$x^2 - 5x - 3 = 0$ or $3 + 5x - x^2 = 0$	A2	Note: Award only A1 for either $x^2 - 5x - 3$ or $3 + 5x - x^2$ or $x^2 - 5x + k = 0$ or $x^2 + px - 3 = 0$ A1 for correct equation not in required form

17	$\pi \times (2\sqrt{3})^2 \times \dfrac{1}{\sqrt{2}}$	M1	Allow absence of brackets if recovered later
	$(2\sqrt{3})^2 = 12$	B1	
	$\dfrac{1}{\sqrt{2}} \times \dfrac{\sqrt{2}}{\sqrt{2}}$	M1	
	$\dfrac{\sqrt{2}}{2}$	A1	
	$6\sqrt{2}\,\pi$	A1	$6\pi\sqrt{2}$ or $6 \times \pi \times \sqrt{2}$