AQA

A S S E S S M E N T **and**

Q U A L I F I C A T I O N S

A L L I A N C E

General Certificate of Secondary Education

Mathematics 3302
Specification B

Module 3 Tier H 33003H   THREE TIER

Mark Scheme

2007 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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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   33003H

1(a)	1.3659795…	B1	
1(b)	1.37	B1 ft	Their (a) to 3 significant figures

2	$50 \div 400$	M1	$\frac{3.5(0)}{4} \times 100$ or $1 - \frac{3.5}{4}$
	$\times 100$	M1 dep	$100 -$ above or above $\times 100$
	12.5	A1	SC1 87.5

3(a)	One pair of factors for 200 which include a prime number eg 2×100	M1	
	All prime factors correct eg $2(\times)2(\times)2(\times)5(\times)5$	A1	any order
	$2^3 \times 5^2$	B1	either order
3(b)	Shows $(75 =) 3 \times 5 \times 5$	B1	or shows multiples of each number up to 600 all correct
	$2 \times 2 \times 2 \times 3 \times 5 \times 5$ or 600	B1	or index form (any order)

4	Attempts the correct prime factorisation for at least 1 of the numbers	M1	$24 = 2^3 \times 3$ $60 = 2^2 \times 3 \times 5$ $108 = 2^2 \times 3^3$
	At least 2 prime factorisations correct in any form	M1	
	12	A1	6 SC2 3 or 4 SC1

Alt 4	Attempts to list all the factors for at least 1 of the numbers (at least four factors)	M1	$24 - 1, 2, 3, 4, 6, 8, 12, 24$ $60 - 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60$ $108 - 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108$
	Lists all factors correctly for at least 2 out of 3 (allow 1 and number itself omitted)	M1	
	12	A1	6 SC2 3 or 4 SC1

5(a)	3.8×10^{-7}	B1	
5(b)	Their (a) $\times 100$	M1	
	3.8×10^{-5}	A1 ft	

6	Sight of 0.65	B1	or 65% = 26 (million)
	26 ÷ their 0.65	M1	
	40 (million)	A1	

7(a)	$T \propto \dfrac{1}{W^2}\ or\ T = \dfrac{k}{W^2}$	M1	
	$20 \times 12^2\ (= k)$	M1	2880 implies M2
	$T = \dfrac{2880}{W^2}$	A1	or $k = 2880$ and equation seen using k
7(b)	$W^2 = \dfrac{\text{their } 2880}{30}$	M1	
	(W = their $\sqrt{96}$ =) their 9.79….	A1 ft	
	so need 10 waiters.	A1 ft	ft answer rounded up if M1 awarded.

8	Attempts to subtract the two quadratics	M1	
	draws line $y = 2x - 5$ correctly	A1	as far as points of intersection
	solutions are 6.7 and 0.3	A1	each solution +/– 0.1 (must have line)

9	Bales are 17.5 - 18.5 inches	B1	B1 for either limit
	surface of trailer is 35.5 - 36.5 inches	B1	B1 for either limit
	6 × their 18.5 + their 36.5	M1	
	147.5	A1	SC2 for 147.5 without working

10	rounds at least two numbers to 1sf 800, 2, 0.4	B1	
	1600 ÷ 0.4	M1	
	4000	A1	

11(a)	42 ÷ 3 × 5	M1	
	70	A1	
11(b)	both division correct	M2	either division attempted M1 242 ÷ 12 = 20 remainder 2 or 20.(1…) 385 ÷ 20 = 19 remainder 5 or 19.(25)
	19	A1	SC1 19 no working

12	28 000 − 5000 (= 23 000)	M1	
	0.2 × their 23 000	M1 dep	oe
	4600	A1	

13	Attempts to divide 15 by $1\frac{1}{5}$	M1	
	$= 15 \times \frac{5}{6}$	M1	
	$= 12.5$	A1	oe assume working is in hours unless written otherwise

14(a)	7.18×10^7	B1	
14(b)	6×10^{10}	B3	B1 sight of 0.6 or 6 B1 sight of 10^{11}

15(a)(i)	$\frac{1}{5}$	B1	or 0.2
15(a)(ii)	0	B1	accept words
15(b)(i)	$125^{\frac{1}{3}} = 5$	M1	sight of 5 as long as not from wrong working
	$5^2 = 25$	A1	
15(b)(ii)	common denominator $\frac{10(\Pi)}{35} - \frac{7(\Pi)}{35}$	M1	denominators and one fraction correct
	$\frac{3\Pi}{35}$	A1	oe fraction
15(c)	let $x = 0.898989\ldots$ $100x = 89.898989\ldots$ so $x = \frac{89}{99}$	M1	
	$\frac{89}{990}$	A1	

16(a)	$\sqrt{20} \times \sqrt{5} \times \dfrac{1}{\sqrt{2}} = \dfrac{\sqrt{100}}{\sqrt{2}}$	M1	$\sqrt{10} \times \sqrt{5}$
	$= \dfrac{10}{\sqrt{2}}$	A1	$\sqrt{50}$
	$= 5\sqrt{2}$	A1	
16(b)	$(2 \times h \times w =) 2 \times \sqrt{20} \times \sqrt{5} = 20$	B1	
	either $2 \times h \times t = 2 \times \sqrt{20} \times \dfrac{1}{\sqrt{2}}$ **or** $2 \times w \times t = 2 \times \sqrt{5} \times \dfrac{1}{\sqrt{2}}$	M1	substituting and simplifying to a correct single fraction
	$= 20 + 3\sqrt{10}$ as required	A1	Must be convincing eg must see $2\sqrt{10}$ and $\sqrt{10}$ separately