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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 4302

Specification B

Module 3 Tier H 43003H

Mark Scheme

2008 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.

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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 43003H

1(a)	19.8545(…)	B1	At least 6 significant figures Accept $\frac{1092}{55}$
1(b)	19.9	B1 ft	ft from (a) if 2 dp or more visible

2	Obtains £30 for 2nd day price	B1	
	$\frac{165-45}{30}(+1)$	M1	oe eg build-up
	5	A1	SC2 9 days

3(a)	126 ÷ their (1 + 6)	M1	
	18 adults	A1	
	108 children	A1	SC2 answers wrong way round
3(b)	(their adults) + 9 and their children	M1	Further 'method' gets M0 eg 18 + 9 + 108
	Intention to divide both sides by their 27 in one or more steps	M1 dep	M2 for their 4 : 1 or their $\frac{1}{4}$
	1:4	A1 ft	or states $k = 4$ If ft, 2sf or better must have correct rounding Must process improper fractions

4	Sight of 24 or 0.4	B1	$\frac{84}{60}$ or 1.4 or 140 condone 24%
	their $\frac{24}{60} \times 100$	M1	$\frac{84}{60} \times 100 - 100$ or $\frac{84}{60} - 1 \times 100$
	40	A1	

5(a)	9.6×10^6	B1	
5(b)	$0.32 \times 1.656 \times 10^8$	M1	oe or 32% approx $\frac{1}{3}$ $1.656 \times 10^8 \div 3$ or use of 30% or 33%
	52 992 000 or 49 680 000 or 54 648 000	A1	oe 0.552×10^8 (5.52×10^7)
	China	A1	must see evidence
Alt 5(b)	$\frac{5.3\times10^7}{1.656\times10^8} \times 100$	M1	oe $\frac{\text{any country no}}{\text{total}} \times 100$
	32.00(…)	A1	oe no sight of incorrect working
	China	A1	must see evidence

6	Sight of 0.96	B1	
	100×0.96^9	M1	
	69.3 or better	A1	(69.25…) Accept 69.2
Alt 6	$100 \times 0.04 = 4$ $100 - 4$ (= 96)	B1	$100 \times 0.04 = 4$ $4 \times 9 = 36$ $100 - 36$ (=64)
	8 more calculations of finding 4% and subtracting	M1	Evidence could be 96, 92.16, 88.47(36), 84.93(4656), 81.53(7269), 78.27(5778), 75.14(4746), 72.13(8956)
	69.3 or better	A1	(69.25…) Accept 69.2

7(a)	377	B1	
7(b)	their (a) + 289	M1	
	Total = 666	A1	
	Shows that $a = 6$ in the expression also gives 666	B1	

8	$x = \frac{k}{\sqrt{y}}$	M1	oe
	$3.6 = \frac{k}{\sqrt{1.44}}$ so $k = 3.6 \times 1.2$	M1	
	$x = 4.32y^{-0.5}$	A1	oe $x = \frac{4.32}{\sqrt{y}}$ Stating $k = 4.32$ is enough if equation previously seen with k in

9	Sight of 45 or 55 or 995 or 1050	B1	oe correct recurring notation
	Sight of 0.044765 or 0.044775	B1	
	$\frac{\textit{their}\ \min P \times \textit{their}\ \min Q}{\textit{their}\ \max R}$	M1	Must be a min or max as required but does not have to be correct
	1 000 000	A1	oe

10(a) (i)	348 880	B1	
10(a) (ii)	3560	B1	
10(b)	their 3560 × 2	M1	
	7120	A1 ft	

11	Uses time = $\frac{\text{distance}}{\text{speed}}$ with some attempt to substitute values correct substitution into formula in any form	M1	Scaling method
	$\frac{1}{6}$ hour	A1	oe 0.17 or better 1 mile in 2 minutes
	10 minutes	A1	

12(a)	Valid common denominator with at least one numerator correct	M1	$\frac{21}{35}$ (–) $\frac{10}{35}$ oe 0.6 (–) 0.29 or better
	$\frac{11}{35}$	A1	oe fraction
12(b)	$1\frac{11}{35}$	B1 ft	ft their (a) + 1 oe eg $\frac{46}{35}$

13	1 and 64	B2	B1 for each; allow unprocessed powers for B1B0 eg 1^2(or 1^3) and 8^2(or 4^3) gets B1B0

14(a)	8 = 2 (×) 2 (×) 2	M1	Shown on factor trees, repeated divisions or lists oe Allow × 1
	24 = 2 (×) 2 (×) 2 (×) 3	M1	
	$2^6 \times 3$	A1	or $2^6.3$
Alt 14(a)	192 to a factor pair with one prime factor	M1	2,96 or 3,64
	2 (×)2 (×)2 (×)2 (×)2 (×)2 (×) 3	M1	Allow × 1, shown on factor trees, repeated divisions or lists oe
	$2^6 \times 3$	A1	or $2^6.3$
14(b)	x	B1	

15(a)	0.000 072	B1	
15(b)	720 ÷ 36 or 72 ÷ 3.6	M1	ft method from incorrect (a) into workable form
	20	A1	Accept 2×10^1
Alt 15(b)	$7.2 \times 10^{-5} \div 3.6 \times 10^{-6}$ attempted with either the 2 or 10^1 correct	M1	
	20	A1	Accept 2×10^1

16	0.025	B2	B1 $\frac{1}{40}$ or 40^{-1}

17	Sight of 1.25, 125 or $\frac{5}{4}$	B1	
	$\frac{375}{125} \times 100$	M1	oe eg $\frac{375}{5} \times 4$
	300	A1	

18	Either $\sqrt{20} = 2\sqrt{5}$ or $\sqrt{45} = 3\sqrt{5}$ or $\sqrt{80} = 4\sqrt{5}$	B1	
	All three of $2\sqrt{5}$ $3\sqrt{5}$ $4\sqrt{5}$	B1	or $9\sqrt{5}$
	$p = 9$ and $q = 5$	B1	

19	$81^{-\frac{1}{4}} = \frac{1}{3}$	M1	
	so $81^{-\frac{3}{4}} = \frac{1}{27}$	A1	
	$(3^3)^{-1} = \frac{1}{27}$	B1	
	Convincing method to show decimal is $\frac{37}{999}$	M1	
	Shows cancelling of $\frac{37}{999} = \frac{1}{27}$ (so Charlie is right)	A1	