



General Certificate of Secondary Education

Mathematics 4302

Specification B

Module 3 Tier H 43003H

Mark Scheme

2008 examination – March series

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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	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)	0.97 or $\frac{97}{100}$	B1	
6(b)	$68\,000 \times 0.97 (= 65\,960)$	M1	$68\,000 - 0.03 \times 68\,000$ 61880 seen
	their $65\,960 \times 0.97 (= 63981.2)$ and their 63981.2×0.97 Note: their $65\,960 \times 0.97^2$ is M1 dep	M1 dep	their $65\,960 - 0.03 \times$ their $65\,960$ ($= 63981.2$) and their $63981.2 - 0.03 \times$ their 63981.2 Note: $68\,000 \times 0.97^3$ 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

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

8(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
8(b)	18	B1 ft	ft on their $k \times 3^2$
8(c)	Parabola through the Origin	B1	Within 2 mm of origin

9	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

10	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	

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

12(a)	$\frac{3}{5} \times \frac{1}{4}$	M1	$0.6 \div 4$
	$\frac{3}{20}$	A1	oe eg 0.15
12(b)	$56^0 = 1$	B1	$(56) - 1$
	55	B1	
12(c) (i)	Cube root (of 27 is 3)	B1	3 cubed is 27
12(c) (ii)	$\frac{1}{3}$	B1	

13	$\frac{84}{4} (\times 5)$	M1	21 ($\times 5$) 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

14(a)	3.79×10^8	B1	
14(b)	1.4×10^{-7}	B1	

15(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
15(b)	Their intersection with x axis $\pm \frac{1}{2}$ sq	B1 ft	Must be graphical solution Ignore negative solutions
15(c) (i)	Draws correct line	B1	Length over an x interval of 2 units
15(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

16	$\pi \times (2\sqrt{3})^2 \times \frac{1}{\sqrt{2}}$	M1	Allow absence of brackets if recovered later
	$(2\sqrt{3})^2 = 12$	B1	
	$\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$	M1	
	$\frac{\sqrt{2}}{2}$	A1	
	$6\sqrt{2}\pi$	A1	$6\pi\sqrt{2}$ or $6 \times \pi \times \sqrt{2}$