



General Certificate of Secondary Education

Mathematics 4302

Specification B

Module 3 Tier H 43003H

Mark Scheme

2008 examination - November 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(a)	$\frac{3}{4} (\times 100)$	M1	oe eg $1 - \frac{1}{4} (\times 100)$
	75	A1	SC1 Answer 25 Answer 25 (and) 75 M1 A0
1(b)	$20\ 000 \div 4 (= 5000)$	M1	$\frac{\text{their } 75}{100} \times 20\ 000$
	15 000	A1 ft	Only ft if using RHS method

2(a)	48.4264(... ..) or 48.4265 or $\frac{3293}{68}$ or $48\frac{29}{68}$	B1	
2(b)	48.4	B1 ft	ft from value > 3 sf seen

3(a)	0.85 or $\frac{85}{100}$ or 85% seen	M1	0.15×68 oe (= 10.2)
	68×0.85	M1 dep	68 – their 10.2 M2 for $68 \div 1.17$ or better or $68 \div 1.18$
	57.80	A1	57.8 is M2 A0 SC1 78.2(0)
3(b)	$108 - 80 (= 28)$	M1	$\frac{108}{80} \times 100 (= 135)$ $\frac{108}{80} - 1 (= 0.35)$
	$\frac{\text{their } 28}{80} \times 100$	M1 dep	their 135 – 100 their 0.35 $\times 100$
	35	A1	

4	(20 min =) $\frac{20}{60}$ or $\frac{1}{3}$ or 0.33 (h) or (30 min =) $\frac{30}{60}$ or $\frac{1}{2}$ or 0.5 (h)	B1	(speed for 10 mins =) 6 (mph)
	$9 \times \text{their } \frac{20}{60} (= 3)$	M1	$9 + 9 + \text{their } 6 (= 24)$
	$(\text{their } 3 + 1) \div \text{their } \frac{1}{2}$	M1 dep	their 24 $\div 3$
	8	A1	

5(a)	Correct explanation eg 36 is not between 1 and 10	B1	
5(b)	$5.7 \times 10^{26} \div 8.7 \times 10^{25}$	M1	oe
	6.5(5...)	A1	oe Allow $0.66 \times 10^{(1)}$
	6.6 or 7	B1 ft	ft any value ≥ 3 sig figs seen rounded to 1 or 2 sig figs or ft any value of 2 sig figs seen rounded to 1 sig fig

6	Works out at least 3 correct multiples of each number 16 32 48 64 80 96 112 128 144 36 72 108 144	M1	(16 \Rightarrow) 2 (\times) 2 (\times) 2 (\times) 2 and (36 \Rightarrow) 2 (\times) 2 (\times) 3 (\times) 3 or (16 \Rightarrow) 4 (\times) 4 and (36 \Rightarrow) 4 (\times) 9
	144	A1	SC1 Answer 288 $2^4 \times 3^2$ is M1 A0

7(a)	$M = kr^3$	M1	$M \propto r^3$
	$128 = k (\times) 8^3$	M1	$128 = k (\times) 8^3$ implies M2
	$k = 0.25$ ($M = 0.25r^3$)	A1	Equation only needed if $M = kr^3$ not seen earlier
7(b)	their $k \times 10^3$	M1	
	250	A1 ft	

8	$\frac{7}{90}$ or $\frac{8}{9}$	M1	oe fractions Allow $\frac{0.7}{9}$
	$\frac{87}{90}$ or $\frac{29}{30}$	A1	oe fraction $\frac{8.7}{9}$ is M1 A0

9	$1 \div 1.6 (= 0.625)$ or $100 \div 1.6 (= 62.5)$	M1	Uses number for November eg 100 $1.6 \times 100 (= 160)$
	$1 - \text{their } 0.625 (= 0.375)$ or $100 - \text{their } 62.5$	M1 dep	$\frac{\text{their } 160 - \text{their } 100}{\text{their } 160} \times 100$
	37.5	A1	Condone -37.5

Alt 9	1.6N	M1	
	$\left(\frac{100-x}{100}\right) 1.6N = N$	M1 dep	
	(x =) 37.5	A1	

10	40 or 0.5	M1	
	80	A1	$\frac{80}{1}$ M1 A0

11	$\text{Odd}^2 = \text{odd}$	M1	$(2m + 1)^2 - (2n + 1)^2$
	$\text{Odd} - \text{odd} = \text{even}$	A1	$4m^2 + 4m - 4n^2 - 4n$ so even as a multiple of 4 SC1 two correct numerical examples with no incorrect examples

12(a)	1	B1	
12(b)	$346.68 - 6.42$	M1	
	340.26	A1	
12(c)	541.8	B1	

13(a)	$\frac{3 \times 7}{4}$ or $\frac{3}{4} \times \frac{7}{1}$	M1	0.75×7
	$\frac{21}{4}$	A1	oe eg $5\frac{1}{4}$ or 5.25
13(b)	Converts to a valid common denominator with at least one numerator correct	M1	eg $\frac{(22)}{6} (+) \frac{(9)}{6}$ or $(4) \frac{(4)}{6} (+) \frac{(3)}{6}$
	$4\frac{7}{6}$ or $4 + \frac{7}{6}$	A1	oe fraction eg $\frac{31}{6}$
	$5\frac{1}{6}$	A1	$5\frac{1}{6}$ then further work M1 A1 A0

14(a)	-4	B1	
14(b)	Plots all 7 points within $\frac{1}{2}$ sq	B1 ft	ft on their (a)
	Smooth curve through all of their points (at least 6) within $\frac{1}{2}$ sq	B1 ft	Curve must be U shaped parabola
14(c)	Draws $y = x + 1$ correctly	B1	Condone line not ruled
	-2.6 and 1.6	B1 ft	ft their intersections Coordinates given is B0

15(a)	1	B1	
15(b)	$(7^{18} \div) 7^6$	B1	
	7^{12}	B1 ft	ft on power of 7 from $7^{18} \div$ their 7^6 SC1 7^{18-3-3} followed by wrong answer
15(c)	6.5×10^{-5}	B1	

16	$77 \div 11 (= 7)$	M1	$\frac{11}{12}$ linked to 77
	their 7×12	M1 dep	oe eg $77 +$ their 7
	84	A1	

17	their max – their min	M1	157.5 (157.499(...)) and 142.5 seen or $157 - 143 + 1$
	15 or 14.999(...)	A1	

18(a)	$3\sqrt{3}$ (+) $2\sqrt{3}$	B2	B1 for $3\sqrt{3}$ or $2\sqrt{3}$
18(b)	$\frac{1}{5\sqrt{3}}$	M1	
	$\frac{1}{5\sqrt{3}} \times \frac{k\sqrt{3}}{k\sqrt{3}}$	M1	If denominator \sqrt{x} , allow M1 for multiplying by $\frac{\sqrt{x}}{\sqrt{x}}$
	$\frac{\sqrt{3}}{15}$ ($a = 3$ $b = 15$)	A1	oe eg $\frac{\sqrt{75}}{75}$