

General Certificate of Secondary Education

Mathematics 3302 Specification B

Module 3 Tier I 330031

Mark Scheme

2005 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.

Μ	Method marks awarded for a correct method.
Α	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
В	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 INTERMEDIATE TIER

33003I

1(a)	4.8(0) ÷ 3 or 4.8(0) × 0.33 or 4.8(0) × $\frac{1}{3}$	M1	4.8(0) × 1.33 or 4.8(0) × $1\frac{1}{3}$ Allow 480 for 4.8(0) Also allow 8 × 80 or 0.08 × 80
	6.40	A1	6.4 A0
(b)	8.3(0) × 0.69	M1	
	5.727	A1	
	5.73	B1 ft	ft from value or calculation seeneg $8.3(0) \div 0.69 = 12.03$ 12.03 seenB1SC1Answer 5.72
	-		
2(-)	$32 \times 0.5(0)$	N(1	oe

2(a)	$\frac{32}{100} \times 9.5(0)$	M1	Build up must be totally correct eg $10\% = 0.95$ $30\% = 2.85$ 2% = 0.19 and adds 2.85 and 0.19
	3.04	A1	
(b)	6.46	B1 ft	ft 9.50 – their (a)

3(a)	Sight of 0.75 or $\frac{3}{4}$	B1	Allow 75%
	7×0.75 or $7 \times \frac{3}{4}$	M1	$7 \times 75(\%)$ is M0 unless recovered
	5.25 or $5\frac{1}{4}$	A1	Allow $\frac{21}{4}$ Just 525 seen is no marks SC1 Answer of $1\frac{3}{4}$ oe
(b)	$3 \div 0.25 \text{ or } 3 \div \frac{1}{4} \text{ or } 3 \times 4$	M1	3000 ÷ 250 oe
	12	A1	Build up must be totally correct (0 or 2)

4	$\frac{17.5}{100} \times 7.7(0)$	M1	oe Build up must be correct 10% = 0.77 5% = 0.38(5) allow 0.39 $2\frac{1}{2}\% = 0.19(25)$ allow 0.195/0.20 and adds
	$\frac{17.5}{100} \times 7.7(0) + 7.7(0)$	M1 dep	oe
	9.05 and Saverstore	A1	Need both Allow 9.04 or 9.0475 Allow 9.06 from build up method

Alt 4	Sight of 1.175	M1	
	$7.7(0) \times 1.175$	M1 dep	
	9.05 and Saverstore	A1	Need both Allow 9.04 or 9.0475

Alt 4	Sight of 1.175	M1	
	8.99 ÷ 1.175	M1 dep	
	7.65() and Saverstore	A1	Need both

Alt 4	$\frac{17.5}{100} \times 7.7(0)$	M1	oe Build up must be correct 10% = 0.77 5% = 0.38(5) allow 0.39 $2\frac{1}{2}\% = 0.19(25)$ allow 0.195/0.20 and adds
	8.99 - 7.7(0)	M1 dep	
	1.29 and 1.35 and Saverstore	A1	Allow 1.34 or 1.3475 for 1.35 Need all three

5	$\frac{7}{9} \times 279\ 000$	M1	For the 9 allow their sum of 2 and 7
	217 000	A1	SC1 Answers of 62 000 or both of 62 000 and 217 000

6(a)	9.45656()	B1	
(b)	9.46	B1 ft	ft from any (a) $>$ 3 sf

7	8.5	B1	
	9.5	B1	Accept 9.49 ^r or 9.49 or 9.49

8(a)	J(upiter)	B1	Accept 1.9×10^{27}
(b)	$\frac{6.0 \times 10^{24}}{3.3 \times 10^{23}} \{= 18.()\} \text{or}$ $1.8 \times 3.3 \times 10^{23} \; (= 5.94 \times 10^{23} \text{ or } 5.9 \times 10^{23} \text{ or } 6 \times 10^{23})$ $\text{or} \frac{6.0 \times 10^{24}}{1.8} (= 3.3 \times 10^{24})$	M1	Allow 3 to be used for 3.3 (giving 20) Allow 2 to be used for 1.8 (giving 6.6×10^{23}) Allow 3 to be used for 3.3 (giving 5.4×10^{23}) Allow 2 to be used for 1.8 (giving 3×10^{24})
	No and valid explanation (No may be implied by explanation)	A1	eg For explanation - obtains the answers given in M1 or refers to powers of 10 being different SC2 No calculations seen but totally convincing answer in words eg States that it is about 18 times as heavy
(c)	$6.53(0) \times 10^9$	B1	Allow any number of zeros after the 3

9(a)	2500 × 1.02 (= 2550)	M1	2% of 2500 + 2500
	their 2550×1.02^2 Note: 2500×1.02^3 scores M1M1	M1 dep	2% of their 2550 + their 2550 (= 2601) 2% of their 2601 + their 2601
	2653.02	A1	Do not accept 2653 unless full value seen earlier (however answer of 2653 implies M2) SC1 Answer of 4320 or 2650
(b)	221.45 = 103%	M1	1.03 seen
	$\frac{221.45}{103} \times 100$	M1 dep	oe
	215	A1	Beware of answer rounded to 215 from using 97% SC2 Answer 6.45

10	An attempt to scale to same number of matches		eg (30 matches) (Andy scores) 12×3 and (Ben scores) 21×2
	eg (5 matches) (Andy scores) 12 ÷ 2 and (Ben scores) 21 ÷ 3	M1	Allow $10 \div 12$ and $15 \div 21$ eg (1 match) (Andy scores) $12 \div 10$ and (Ben scores) $21 \div 15$
	Correct answers for their scaling		eg 36 and 42
	eg 6 and 7	A1	Allow $\frac{5}{6}$ and $\frac{5}{7}$
			eg 1.2 and 1.4
			Allow $1\frac{2}{10}$ and $1\frac{6}{15}$
	Ben		ft if two values found with one
		A1 ft	correct (and MT awarded)
		2 1 1 1	Note: If $1\frac{2}{10}$ and $1\frac{6}{15}$ must see
			valid comparison to award A1

11(a)	i) 623.7	B1	
	ii) 62.37	B1 ft	ft as their (i) \div 10
(b)	i) $\frac{5}{8}$ (-) $\frac{2}{8}$	M1	Allow any pair of correct fractions that have a common denominator Allow 0.625 (–) 0.25
	$\frac{3}{8}$	A1	oe fraction or decimal No %
	ii) $\frac{2}{30}$	B1	oe fraction
12(a)	27	B1	

12(a)	27	B1	
(b)	1 or 8 or 64 or 125 or 1000 or	B1	Allow 1^3 or 2^3 etc $1 \times 1 \times 1$ etc Do not accept 27 or 216 or

r			
13(a)	(B) no (C) no (D) no (E) yes (F) no (G) yes	В3	B2 for 4 or 5 correct B1 for 2 or 3 correct Allow \checkmark for Yes and \times for No
(b)	Valid explanation and No eg Would need 30 (litres) of white (with 20 litres of red) eg 2 (litres) of red has more than 3 (litres) of white eg 20:35 = 2:3.5 eg 55 (litres) shared in the ratio 2:3 gives 22 (litres) and 33 (litres) eg 20 \div 2 = 10, 35 \div 3 is not 10	B1	Note: No may be implied from the explanation Do not accept 20:35 = 4:7 unless also see 2:3 = 4:6
14	Attempt to scale eg Work out 400 miles or 100 miles or 50 miles or 1 mile or 1 litre	M1	eg 400 miles uses 25×2 litres or 100 miles uses $25 \div 2$ litres or 50 miles uses $25 \div 4$ litres or 1 mile uses $25 \div 200$ litres or 1 litre for $200 \div 25$ miles eg $(50) + \frac{1}{2} \times 25$
	Fully correct method	M1 dep	or $4 \times (12.5) + \frac{1}{2} \times (12.5)$ or $9 \times (6.25)$ or $450 \times (\frac{1}{8})$ or $450 \div (8)$
	56.25	A1	SC1 Answers of 56.2 or 56.3 with no working

15	$\frac{500(\times)2}{40(+)60} \text{ or } \frac{505(\times)2}{40(+)60} \text{ or } \frac{510(\times)2}{40(+)60}$	M1	Two out of four correct
	10 or 10.1 or 10.2	A1	Condone for 2 marks $\frac{500 \times 1.9}{100} = 9.5$ and $\frac{505 \times 2}{101} = 10$ and $\frac{505 \times 1.9}{101} = 9.5$

16(a)	i) 5	B1	oe
	ii) $\frac{4}{3}$	B1	oe
(b)	$\frac{1}{6}$ and $\frac{2}{3}$	B1 B1	One or two correct and one incorrect answer given will be B1B0 One or two correct and both incorrect answers given B0B0
(c)	0.2	B1	Accept 0.2 ^r or 0.2

17(a)	2 (x) 18 or 3 (x) 12 or 2^2 (x) 9 or 4 (x) 3^2 or 2 (x) 3 (x) 6	M1	For correct use of prime and other factor(s) May be seen on 'exploding tree' or 'division' list List of factors is M0 unless paired and includes 2, 18 or 3, 12
	$2 \times 2 \times 3 \times 3$ or 2.2.3.3	A1	$2^2 \times 3^2$ "1 ×" included is A0
(b)	45 = 3 (x) 3 (x) 5	M1	36, 72, 108, 144, 180, and 45, 90, 135, 180,
	180	A1	Accept $2^2 \times 3^2 \times 5$ SC1 Answer of any other common multiple eg 360, 540, 720 etc

18(a)	4.72×10^{-1}	B1	
(b)	Attempt to work out $2.4 \div 5$ or knowing to subtract powers (10^2 seen)	M1	Attempt to convert to normal form Allow one number to be one zero out Also allow both numbers to be the same number of zeros out (in the same direction) (Conventional correct version is 2 400 000 ÷ 50 000)
	0.48×10^{2} or 4.8×10 or 4.8×10^{1}	A1	$\frac{240}{5}$
	48	A1	