



## General Certificate of Secondary Education

# Mathematics 3302

## *Specification B*

*Module 1 Tier H 33001H*

# Mark Scheme

*2006 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.

**The following abbreviations are used on the mark scheme:**

<b>M</b>	Method marks awarded for a correct method.
<b>A</b>	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
<b>B</b>	Marks awarded independent of method.
<b>M dep</b>	A method mark which is dependent on a previous method mark being awarded.
<b>ft</b>	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
<b>SC</b>	Special Case. Marks awarded for a common misinterpretation which has some mathematical worth.
<b>oe</b>	Or equivalent.
<b>eeoo</b>	Each error or omission.

**MODULE 1 HIGHER TIER****33001H****Note: Probability - Accept fraction, decimal or percentage. Do not accept ratio.**

1 out of 3 or 1 in 3 penalise once on whole paper.

1(a)(i)	$\frac{2}{5}$ ignore 2 if seen as well	B1	oe 0.4, 40%
1(a)(ii)	$\frac{5}{10}$ ignore 5 if seen as well	B1	oe 0.5, 50%
1(b)	These results support Ronnie's claim because $\frac{11}{20}$ is greater than 50%	B1	or $\frac{11}{20}$ He pots more than he misses Pots more than 50% ( $\frac{1}{2}$ )
1(c)	Strong positive box ticked	B1	
1(d)	Danger of extrapolation	B1	Also accept Ronnie may be tired after practising for 4.5 hours or that Ronnie cannot win more than 8 games in a match ie the idea that the relationship will change

2(a)	Sight of $\frac{10}{30}$	B1	oe anywhere in (a)
	Any pair of branches with $\frac{2}{3}$ and $\frac{1}{3}$	M1	$\begin{array}{c} \frac{2}{3} \\ \swarrow \searrow \\ \frac{1}{3} \end{array}$ <p>0.33, (0.66, 0.67 or better) Accept <math>\left. \begin{array}{l} 0.66 \\ 0.34 \end{array} \right\}</math> for M marks</p>
	All 6 ‘correct’ $\frac{1}{3}$ and $\frac{2}{3}$ probabilities on tree  (ignore snow labels at this stage so one or more probabilities $\frac{1}{3}$ and $\frac{2}{3}$ could be interchanged)	M1	$\begin{array}{c} \frac{2}{3} \\ \swarrow \searrow \\ \frac{1}{3} \end{array}$ $\begin{array}{c} \frac{2}{3} \\ \swarrow \searrow \\ \frac{1}{3} \end{array}$ $\begin{array}{c} \frac{1}{3} \\ \swarrow \searrow \\ \frac{2}{3} \end{array}$ $\begin{array}{c} \frac{1}{3} \\ \swarrow \searrow \\ \frac{2}{3} \end{array}$
	Fully correct including all “Snow” and “No snow” labels	A1	Check the labels to probs are correct
2(b)	One correct product $\frac{2}{3} \times \frac{1}{3}$ (or $\frac{2}{9}$ )	M1	ft unambiguous probabilities (pairs of probs must sum to 1)
	Adding both correct products $\left(\frac{2}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{2}{3}\right)$	M1 dep	ft unambiguous probabilities (pairs of probs must sum to 1)
	$= \frac{4}{9}$	A1	Watch for $\frac{2}{3} \times \frac{2}{3} = \frac{4}{9} \Rightarrow$ M0A0 $\frac{4}{9}$ with no working = SC1

3(a)	Any suitable random method	B1	Number all population and draw numbers (names) from hat/random number tables/raffle, use random numbers
3(b)	Correct method seen eg $\frac{12100}{61500} \times 1000$	M1	Can be implied by any correct value
	Any two correct answers	A1	Accept decimals here also 196.7... 411.3... 269.9... 121.9... 1 dp rounded or truncated
	All four correct answers 197, 411, 270, 122	A1	Must be integers Use of 100 $\Rightarrow$ misread M1 only if seen or follows scheme with 2 correct decimals or integers

4(a)	$\frac{3}{5} \times p = \frac{7}{20}$	M1	Correct equation seen in any form
	$p = \frac{7}{12}$	A1	oe 0.58, 58% <b>not</b> 0.6 or 60%
4(b)	$1 - \frac{7}{20}$	M1	or $\frac{2}{5} + [\frac{3}{5} \times (1 - \text{their (a)})]$
	$= \frac{13}{20}$	A1	oe $\frac{39}{60}$ , 0.65, 65%
			For (b) Note incorrect method leading to correct answer $\begin{array}{r} \frac{7}{20} \\ \text{cafe} \\ \text{not cafe} \end{array}$ $\begin{array}{r} \frac{3}{5} \quad \text{T} \quad \frac{13}{20} \\ \text{NT} \end{array}$ $\begin{array}{r} \frac{2}{5} \\ \frac{7}{20} \\ \text{cafe} \\ \text{not cafe} \end{array}$ $\frac{13}{20}$ $\left(\frac{3}{5} \times \frac{13}{20}\right) + \left(\frac{2}{5} \times \frac{13}{20}\right)$ $= \frac{39}{100} + \frac{26}{100} = \frac{65}{100} = \frac{13}{20}$

5(a)(i)	Leading	B1	Accept biased, unfair or suggestive
5(a)(ii)	Biased because she has only delivered it to the houses on her street	B1	Restricted sample. Biased Also accept Sample size too small
5(b)	Suitable question	B1	eg “What do you think is the latest time that under-16s should be indoors?”
	Suitable response section At least 3 tick boxes for times (gaps OK)	B1	eg <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 10px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 10px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 10px;"></div> </div> before 9 pm    9-10 pm    10-11 pm (Condone continuous boundaries overlapping)

6(a)	100 – “their attempt at reading at 25” Allow misread of scale	M1	100 – 88, 84 – 100, 89 – 100, 84, 89 88 – 100 OK
	12	A1	
6(b)	14	B1	Allow a value of 13.5 to 14.5 inclusive
6(c)	Locating and subtracting the quartiles	M1	“19” – “10” (allow $\pm \frac{1}{2}$ square on each reading)
	8 to 10	A1	Depends on correct M mark if seen

7	$\frac{1}{12} \times \dots$ or $\frac{2}{12} \times \dots$ or $\frac{3}{12} \times \dots$	M1	Any first probability multiplied by some other probability seen
	$\frac{1}{12} \times \frac{1}{11}$ or $\frac{2}{12} \times \frac{2}{11}$ or $\frac{3}{12} \times \frac{2}{11}$	M1	Any correct product of two probabilities
	$\times 2$	M1	All correct products doubled (may come later)
	$\left(\frac{1}{12} \times \frac{1}{11}\right) + \left(\frac{2}{12} \times \frac{2}{11}\right)$ $+ \left(\frac{3}{12} \times \frac{2}{11}\right)$	M1	Adding exactly 3 (or 6) correct products
	$= \frac{1}{6}$	A1	oe 0.16, 0.17, 16% or 17% from correct method SC3 for question with replacement fully correct $\Rightarrow \frac{22}{144}$

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8(a)	Frequency density $\times$ class width seen	M1	
	20, 34, 28, 60	A2	2 or 3 correct A1
8(b)	$\frac{1}{3} \times$ their “total” (= “74”)	M1	Not $\frac{1}{3}$ of 222 alone
	$\frac{\text{“74”}-\text{“60”}}{\text{“28”}} = \frac{1}{2}$ of 10 minutes	M1	Correct linear interpolation of T
	25 minutes	A1	Watch for incorrect working leading to 25