



## General Certificate of Secondary Education

# Mathematics 3302

## *Specification B*

### *Module 1 Higher Tier*

# Mark Scheme

## *2006 examination – November 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 awarded.</b>	A method mark which is dependent on a previous method mark being awarded.
<b>ft an</b>	Follow through marks. Marks awarded for correct working following a mistake in 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****Note: Probability - Accept fraction, decimal or percentage. Do not accept ratio.**

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

Q	Answers	Mark	Comments
<b>1(a)</b>	See at least 2 correct mid-points	B1	
	$fx$	M1	eg $110 \times 18$ a product seen or any value in class $\times$ class frequency
	$\frac{\sum fx}{\sum f} = \frac{"6640"}{50}$	M1dep	Adding four products and intending to divide their total by 50. May be implied from their answer.
	= 132.8	A1	Accept 133 from correct working 133 alone SC2
<b>1(b)</b>	Plotting correct heights with LS from zero $\pm \frac{1}{2}$ square within class intervals or on boundaries	B1	Non-linear scale penalise heights marks
	Plotting at mid-points and joined by straight lines	B1	
<b>2(a)</b>	58, 74, 89, 100	B1	
<b>2(b)</b>	Plotting at UCBs	B1	(b) and (c) of this question must be an increasing function
	Their heights $\pm \frac{1}{2}$ square	B1ft	
	Joined by lines or curve	B1ft	
<b>2(c)</b>	100 – their reading at 17	M1	$\pm \frac{1}{2}$ square on vertical scale
	About “36”	A1ft	

Q	Answers	Mark	Comments
3	$\frac{680}{(240 + 680 + 150)} \times 50$	M1	
	31.7...	A1	or 31.8
	32 (nearest integer)	A1	32 alone 3 marks 31 alone 0 marks
4(a)	Attempt to calc total frequency $2 + 14 + 40 + 32 + 72$ 2 errors	M1	or total area $(1 + 7 + 20 + 16 + 36) \times 2$
	Answer 160	A1	
4(b)	Recognise median cuts the data in half (areas in half) Median position = $\frac{160}{2} = 80$ th	M1	Also accept 80.5th or half of total area = $40 \text{ cm}^2$
	$8 + \frac{24}{32} \times 4$	M1	or $12 - \frac{8}{32} \times 4$  or $8 + \frac{24.5}{32} \times 4$  or $12 - \frac{8.5}{32} \times 4$
	= 11	A1	or 11.0625 or 10.9375  (or 11.1 or 10.9 from this working seen)
5(a)	Any correct fraction seen in (a)	M1	$\frac{x}{20} \frac{3}{10} \frac{1}{10}$
	All six correct	A1	$\frac{3}{20} \frac{6}{20} \frac{3}{20} \frac{2}{20} \frac{3}{20} \frac{3}{20}$
5(b)	2, because there are a lot more 2s than any other number	B1	oe
5(c)	Their rel. freq. for $4 \times 100$	M1	or scale up by a factor of 5
	10	A1	10 out of 100

Q	Answers	Mark	Comments
6(a)	$\frac{7}{10}$ seen anywhere in part (a)	B1	
	All 6 correct probabilities on the first two sets of branches	B1	Ignore extra branches Ignore labels at this point
	Fully correct with labels	B1	No extra branches
6(b)	“ $\frac{7}{10}$ ” × “ $\frac{7}{10}$ ”	M1	Alternative $1 - \left[ \left( \frac{3}{10} \times \frac{3}{10} \right) + \left( \frac{3}{10} \times \frac{7}{10} \right) + \left( \frac{7}{10} \times \frac{3}{10} \right) \right]$ ”
	$\frac{49}{100}$	A1	
7(a)	Data is quarterly	B1	oe Not 4 different months alone
7(b)(i)	Reading their trend line at the appropriate position “72” ± $\frac{1}{2}$ sq or their correct value	B1	Trend line <b>seen</b> and read half way between June and Sept 06
7(b)(ii)	$\frac{(79 + 70 + 48 + x)}{4}$	M1	
	$\frac{(79 + 70 + 48 + x)}{4}$ = their next moving average “72”	M1dep	oe
	“91”	A1 ft	
7(b)(ii) Alt	Extend trend line to Dec 06(78)	B1	or Grad = 16 per year or 4 per quarter B1
	78 + 13 or 75 + 16	M1	“75” + 16 M1
	91	A1	91 A1

Q	Answers	Mark	Comments
8	Idea of without replacement ie, seeing $\frac{9}{19}$ or $\frac{4}{19}$	M1	
	First correct product ie, seeing $\frac{10}{20} \times \frac{9}{19}$	M1	
	Seeing second or third correct product ie, seeing $\frac{5}{20} \times \frac{4}{19}$	M1	
	Adding three correct products $\left(\frac{10}{20} \times \frac{9}{19}\right) + \left(\frac{5}{20} \times \frac{4}{19}\right) + \left(\frac{5}{20} \times \frac{4}{19}\right)$	M1	Alternative $1 - \left[ \begin{aligned} &\left(\frac{10}{20} \times \frac{5}{19}\right) + \left(\frac{10}{20} \times \frac{5}{19}\right) + \left(\frac{5}{20} \times \frac{10}{19}\right) \\ &+ \left(\frac{5}{20} \times \frac{5}{19}\right) + \left(\frac{5}{20} \times \frac{10}{19}\right) + \left(\frac{5}{20} \times \frac{5}{19}\right) \end{aligned} \right]$
	$\frac{13}{38}$	A1	oe 0.34...
			SC2 for fully correct with replacement $\left(\frac{10}{20}\right)^2 + \left(\frac{5}{20}\right)^2 + \left(\frac{5}{20}\right)^2 = \frac{3}{8} \quad \text{oe}$