General Certificate of Secondary Education

Statistics 3311

Foundation Tier

Mark Scheme

2007 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.

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.

Foundation Tier

Q	Answer	Mark	Comments
1(a)	4	B1	
1(b)	11 – 3	M1	
	8	A1	
1(c)	2 + 11 + 8 + 4 + 3	M1	Allow one error (but not one omission) If total wrong must see + sign or intention to add
	28	A1	

Q	Answer	Mark	Comments
2(a)	Tallies to at least one five bar gate	B1	
	Tallies correct (with or without five bar gates)	B1	1 TV - I̶H̶H̶ III 2 TVs - I̶H̶H̶ I̶H̶H̶ II 3 TVs - I̶H̶H̶ I 4 TVs - IIII
	Frequencies 8, 12, 6, 4	B2	B1 2 or 3 correct frequencies
2(b)	2	B1ft	ft Their frequencies ft Their tallies if frequencies not completed
2(c)	3 full symbols for 2TVs	B1ft	ft Their frequencies or correct answer
	1 and a half symbols for 3TVs	B1ft	ft Their tallies if frequencies not completed or correct answer
	1 full symbol for 4TVs	B1ft	

Q	Answer	Mark	Comments
3(a)	225 – 5	M1	
	220	A1	
3(b)	Correctly orders data	M1	Allow one omission but not one error
	12	A1	
3(c)	Ticks Higher and gives good reason eg, the mean is affected by the really high value	B2	B1 Ticks Higher and attempts a reason B0 Ticks Higher nothing written B0 No tick

Q	Answer	Mark	Comments
4(a)(i)	Labels the $\frac{1}{2}$ and 1 correctly	B1	oe Do not accept 50 and 100 without % sign
4(a)(ii)	Event A at halfway $\pm 2\,\text{mm}$	B1	**Line is 12cm long**
	Event B above 0 below $\frac{1}{4}$	B1	
	Event C above $\frac{3}{4}$ below 1	B1	
4(a)(iii)	B and C	B1	
	Explains that both cannot happen at the same time	B1	oe eg, no overlap
4(b)	$\dfrac{5}{8}$	B2	oe B1 numerator, B1 denominator (must be a probability) Marks are for 'sight of' unless from incorrect working Do not allow 5:8, 5 in 8, 5 out of 8

Q	Answer	Mark	Comments
5	Lists the 5 names correctly	B4	23 – Shah 23 – Shah 20 – Patel 14 – Imeson 09 – Fernandez 01 – Anderson 18 – Morgan 21 – Paybet 14 – Imeson 15 – Joab B3 Correct numbers but not names B2 Correctly shows that can deal with too big or 00 or first three names or numbers correct For B2 must be clear evidence of starting with either 23 B1 Chooses 5 pairs of two digit numbers from list 23 39 …

Q	Answer	Mark	Comments
6(a)	Plots the remaining 6 months of data	B2	B1 For five correct Tolerance $\pm\frac{1}{2}$ small square
6(b)	Negative	B1	Ignore references to strength
6(c)(i)	Attempts to add and divide by 12	M1	At least $6 + 7 + 11\ldots$ and $\div 12$
	9	A1	
6(c)(ii)	Attempts to plot (9.4, Their 9) and draws an appropriate line	M1	Must be a clearly visible plot 'Appropriate' means negative gradient and straight but not necessarily ruled
	Lobf passes through gates (15, 1) to (15, 4) and (4,14) to (4, 17)	A1	
6(d)(i)	5	B1ft	Accept non integers
6(d)(ii)	16	B1ft	ft Only if straight line visible or marks indicate method
6(e)	The first (13 days) as this is interpolation not extrapolation	B2	oe B1 Choice of first with incorrect reason B0 Choice of first no reason attempted

Q	Answer	Mark	Comments
7(a)	A census considers every member of a population	B1	Idea of 'everyone'
	A sample takes just part of the population	B1	Idea of 'some' or 'part of'
7(b)(i)	3	B1	
7(b)(ii)	Attempts '*fx*' column or working with at least one correct	M1	27, 40, 51, 64, 100 eg, sight of 40
	Sums 'Their *fx*' and divides by 100	M1dep	282/100
	2.8(2)	A1	
7(b)(iii)	Any reasonable comment that compares the two values	B1	eg, first value is bigger They are similar **No ft**

Q	Answer	Mark	Comments
8(a)	Much larger numbers of people in 2050	B1	oe
8(b)	50 - 54	B1	
8(c)	1.3 - 0.6	M1	Allow 1.25 - 1.35 and 0.6 - 0.65
	0.7	A1ft	

Q	Answer	Mark	Comments
9(a)	$\frac{3}{10}$ or 0.3, or 30% or 3 out of 10 or 3 in 10	B1	oe Do not accept 3:10 or 'equivalent answers' such as $\frac{6}{20}$ etc…
9(b)	She has more data	B1	oe
9(c)	0.15	B1	oe Do not accept 15 out of 100, 15 in 100, 15:100
9(d)	Not fair / biased (against red)	B1	
	Lower than expected red (relative) frequency	B1	oe eg, should be (about) 0.2

Q	Answer	Mark	Comments
10(a)	71 × 109/100	M1	
	77(.39)	A1	or 77.4
	77	B1ft	Round their answer to nearest penny If not 77 must see number to 1dp before rounding
10(b)	95/71 × 100	M1	
	133.8…	A1	or better (133.8028169) SC1 - 134 no working (134 with correct working gets M1A1)

Q	Answer	Mark	Comments
11(a)	All 20 squares correct	B3	B2 18 or 19 correct B1 10 or more correct
11(b)	D marked in any cell Reason matches position	B1	Anything sensible

Q	Answer	Mark	Comments
12(a)(i)	Choices are given	B1	oe Imply some choice
12(a)(ii)	Groups can be given as choices so people are not revealing their age	B1	oe Easier to analyse Allow general implication of age eg, 'better response rate'
12(b)	Collect them himself	B1	Pre-paid envelope / telephone / internet / rewards / incentives / more closed questions / shorter questions / fewer questions / interviews
12(c)	Test it on a small sample	B1	Idea of pilot Do not accept ' be more careful' / 'should have checked it'
12(d)	No time frame given in question	B1	It is two questions not one
	No response boxes	B1	Why ask about pub – he is thinking of a restaurant Might be difficult to recall or average out 'It varies' Accept attempts to rewrite eg, B2 How many times per week do you … B1 How often do you eat per week? B1 How many times do you eat?

Q	Answer	Mark	Comments
13(a)(i)	All correct	B3	B2 2 correct pairs of probabilities B1 Sight of 0.25 (oe) on any branch
13(a)(ii)	The phone that one call goes to does not affect which phone the second will go to	B1	oe If words 'not dependent' used must be qualified in a sentence.
13(b)	0.75×0.75	M1	ft Their tree (if probabilities) or correct
	0.56(25)	A1	oe $\frac{9}{16}$ also allow 0.563

Q	Answer	Mark	Comments
14(a)	Allocates a single number to Emergency	B1	
	Allocates a single number to Non-urgent	B1	
	Allocates the remaining 4 numbers to Urgent	B1	'Others', 'rest of' (alternatives to 'remaining')
14(b)	All correct	B2ft	ft An allocation using 1 - 6 only alternatively accept, if no allocation, 1 number with an E, 1 number with an N and the remaining numbers with U's B1ft One or two errors (B1 only available for a shown allocation)

Q	Answer	Mark	Comments
15(a)	Shortening of vertical scale	B1	oe eg, increase exaggerated / should have used a break mark
	Labelling of horizontal scale not consistent	B1	oe
15(b)	The proportion of drivers over 79 in fatal crashes could be large The number of drivers over 79 may be small	B2	oe Mark positively (ignore incorrect or irrelevant statements) B1 Don't know how many there are over 79 B1 Shows numbers not proportions B1 They might have lots of other non-fatal crashes B1 Only one year's data B1 1988 data but present tense in question

Q	Answer	Mark	Comments
16(a)	18	B1	
16(b)	Two people	B1	
16(c)	Rounding effects	B1	oe
16(d)	All dividing lines within tolerance	B3	–1eeoo Tolerances (working up) 25 - 30 60 - 65 75 - 80 90 - 95 Count no shading as 1 error Ignore bar width
16(e)	Similarity - the % of 2 (or 3 or 4)	B1	Allow ft or correct answers
	Difference - the % of 1 (or 5+)	B1	Ignore incorrect or irrelevant answers

Q	Answer	Mark	Comments
17(a)	All correct and linked	B2	One plotting error or not linked B1
17(b)	General increase over time	B1	
	Peaks in Q3 or troughs in Q1	B1	oe Do not accept references to 'summer' or 'winter' but allow correct months listed