



General Certificate of Secondary Education

Statistics 3311

Foundation Tier

Mark Scheme

2009 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.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Statistics papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
E	Explain marks are awarded for a full and detailed explanation.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

Foundation Tier

Q	Answer	Mark	Comments
1(a)	4	B1	
1(b)	$2\frac{1}{2} \times 4$	M1	oe eg, $4 + 4 + 2$
	10	A1 ft	ft Their (a) but only if 2, 4 or 6
1(c)	Exactly 3 whole faces	B1	
	A good attempt at $\frac{1}{4}$ of a face	B1	0 face < their symbol < 0.5 face
1(d)	Remaining 4 heights correct ((4), 10 or their 10, 8, 12, 13)	B2 ft	B1 2 or 3 of remaining heights correct ft Their 10 but not their Key
	Single vertical lines within half a large square of correct position	B1	Not bars Not joined across tops etc
1(e)	Can immediately see frequencies	E1	oe eg, does not need Key No interpreting of part symbols

2(a)	More 1s than any other	B1	oe Accept any indication which shows they know what the mode is
2(b)	Reference putting values in order	B1	
	Reference choosing the middle value	B1	
2(c)	Cannot have part of a person	E1	oe referencing decimal
2(d)(i)	The majority of the values are 1 or most cars have just one person	E1	oe
2(d)(ii)	Small sample	E1	oe might not be teachers / only one school
2(e)	Data is for America not England	E1	oe (Secondary data on internet) might not be reliable Sample size unknown

3(a)(i)	0	B1	
3(a)(ii)	0.5	B1	oe
3(a)(iii)	1	B1	100%
3(b)(i)	(Very) likely	B1	oe eg, almost certain
3(b)(ii)	Unlikely	B1	oe eg, not (very) likely

Q	Answer	Mark	Comments
4(a)	No, the lines joining the points have no meaning	E2	oe eg, it is discrete data, can't score $1\frac{1}{2}$ etc E1 For No, with a reason attempted
4(b)	Yes, data correctly shown as separate values	E2	oe eg, it is discrete data Accept 'better' (oe) for 'Yes' E1 For Yes, with a reason attempted
4(c)(i)	$\frac{7}{20}$	B1	oe Fraction, decimal, percentage or words No ratios
4(c)(ii)	$\frac{7}{20}$	B1ft	ft Part (c)(i) for integers 0 - 8 or probabilities Fraction, decimal or percentage not words
4(c)(iii)	$\frac{1}{6}$	B1	Fraction, decimal (0.16 - 0.17 inclusive) or percentage (16% - 17% inclusive)
5(a)	2	B1	
5(b)	6	B1	
5(c)	At least two non-zero product calculations shown (may be in table with \times) or at least 3 products shown	M1	No + signs required for M1
	$17 + 16 + 9 + 8 + 5$	A1	Answer given so need to be convinced If total other than 55 stated, max M1A0
5(d)	$\frac{55}{52}$	B2	Decimal 1.05 - 1.06 inclusive B1 $55 \div (21 + 17 + \dots)$

Q	Answer	Mark	Comments
6(a)	$\frac{25}{8000}$	M1	$\frac{1}{320}$
	$\times 1000$	M1 dep	M2 $\frac{25}{8}$
	3.125	A1	Allow 3.1 or better without working or 3 with working
6(b)	Down, as the death rate exceeds the birth rate	E2 ft	E1 ft Down with reason attempted Strict follow through
Alt 6(b)	Cannot tell, as people may have moved in and out of the village	E2	E1 Cannot tell with reason attempted
6(c)	$\frac{15}{25}$ for 1 st baby girl	B1	oe
	$\frac{15}{24}$ for 2 nd baby girl	B1	oe
	$\frac{10}{24}$ and $\frac{14}{24}$ for 2 nd baby boy and girl respectively	B1	oe
7(a)	All 28 correct	B3	B2 26 or 27 correct B1 20 – 25 correct
7(b)	Letter T in the centre of 2 nd row	B1	‘39’ rectangle
8(a)	8 correct plots	B2	B1 6 or 7 correct plots Ignore up to 2 additional points Tolerance is 1 small square
8(b)	Moderate...	B1	Accept ‘weak’ but not ‘strong’
	...Negative	B1	
8(c)	Intended straight lbf passing through plotted double mean and negative gradient	M1	Tolerance 1 small square
	Passes through ‘gate’ at (7, 7.5)(7, 9.5) and reaches $x = 14$	A1	No tolerance
8(d)	6.4 minutes	B1 ft	Allow rounded to nearest minute ft Only intended straight negative gradient lbf

Q	Answer	Mark	Comments
9(a)	(All) voters/adults...	B1	oe (over) 18s
	... in the town/constituency/ward/ polling district/polling area	B1	oe B2 All people who (could) use the polling station (oe) B1 Everyone in town (oe)
9(b)	Better response rate	E1	oe (for interview chosen)
	Can explain questions	E1	
Alt 9(b)	Can be done when convenient	E1	oe (for postal chosen)
	Everyone gets exactly same questions	E1	
9(c)(i)	Might not know the answer	E1	oe
9(c)(ii)	Needs option boxes	E1	oe
9(d)(i)	$(1 + 3 + 0.5 + \dots)/10$	M1	At least 3 values shown as added (must divide by 10) $\frac{40}{10}$
	4	A1	
9(d)(ii)	Leave out the outlier (24)	E1	oe divides 16 by 9
9(e)	Increased sample size	E1	oe, eg more information Allow references to improving the survey Do not accept references to reliability, bias or accuracy
10(a)	Multiple or dual or comparative bar chart or diagram or graph	B1	Also accept multiple/dual/comparative frequency diagram
10(b)	5	B1	
10(c)	Not possible to tell, the % is higher (slightly) but we do not know whether the population of 5 year olds is larger / necessary data not available	E2	E1 Not possible to tell, reason attempted
Alt 10(c)	True, population sizes will be similar (so % increase means actual increase)	E2	E1 True, reason attempted. Allow 'Yes' for true. E0 False or No

Q	Answer	Mark	Comments
11(a)	It takes exact values	B1	oe eg, data separate, goes up in steps
11(b)	Lengths and weights	B1	Accept any indication. Both required
11(c)(i)	5.5	B1	Accept 5 mins 30 s(econds) but not 5.30 or 5 mins 30
	8.5	B1	or any correct recurring decimal notation for 8.49 recurring Do not accept 8.30 8.4, 8.49 etc
11(c)(ii)	Correct heights	B1	For attempt at frequency diagram
	Equal widths +/- 1 small square minimum width 6 – 8 etc or any frequency diagram with no gaps	B1	
	Correct placement ie, 5.5 to 8.5 etc	B1	
Alt 11(c)(ii)	Correct heights	B1	For attempt at frequency polygon Ignore work outside first and last plots
	All midpoints correct	B1	
	Points joined with straight lines intended	B1	

Q	Answer	Mark	Comments
12(a)(i)	0.3	B1	oe
12(a)(ii)	0.3×0.3	M1	ft Their 0.3 as long as it is a valid probability
	0.09	A1ft	oe
12(a)(iii)	Independence	E1	Accept description of independence
12(b)	Adults 00 - 31	B1	or any 32 values
	Teenagers 32 - 61 and Children 62 - 99	B1	or any distinct 30 and distinct 38 values respectively SC1 Any one allocation set within 1 of being correct
12(c)	C A T T A C T A C T	B2ft	B1 ft 8 or 9 correct ONLY ft if B1 or better awarded in part(b) and where it is possible to check a unique allocation (ie, no overlap)
12(d)	27 in male children cell	B1	
	30 in female children cell	B1	
	4 in male teenager cell and 4 in female teenager cell	B1	
	15 in male adult cell and female under 13 + female adult = 50	B1ft	
12(e)(i)	$\frac{57}{100}$	B1 ft	oe ft Their table denominator must be 100
12(e)(ii)	$\frac{4}{100}$	B1 ft	oe ft Their table denominator must be 100
12(e)(iii)	$4 + 15$ or $\frac{4}{100} + \frac{15}{100}$	M1	Sight of their 19 from table
	$\frac{19}{100}$	A1ft	oe ft Their table Denominator must be 100

Q	Answer	Mark	Comments
13(a)	5 correct plots and joined	B2	B1 4 correct plots and joined or 5 correct plots not joined Tolerance one small square
13(b)	Café closes early / some workers day off	E1	oe eg, unpopular set lunch
13(c)	Takings are highest each Friday	E1	oe One comment about the pattern within a week, one comment about the trend across weeks
	Takings are reducing week by week	E1	
14(a)	England	B1	
14(b)(i)	65 + 18.4	M1	Allow, for M1, 65 + any value from column 4 or 65 + 15.5 if working shown
	83.4	A1	Accept 83
14(b)(ii)	Getting to 65 excludes those who die before then (so average age to which they live is higher)	E1	oe
14(c)	England has a much higher population (so its higher average has more effect than the values for other countries)	E1	oe references to different population (sizes) in different countries