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General Certificate of Secondary Education
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Statistics 43101F

(Specification 4310)

Unit 1:Statistics Written Paper (Foundation)

Mark Scheme

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process 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 standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised 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.

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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 Mathematics 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 $\frac{1}{2}$

Unit 1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	2	B1	
1(b)	2	B1	
1(c)	5	B1	
1(d)(i)	The average (mode) was higher in 1959	B1	oe
	The range was higher in 1959 / a greater spread of numbers of people lived in the houses in 1959	B1	oe
1(d)(ii)	Structure - bars equal width with gaps	B1	Allow all but first B1 for diagram that is not a bar chart as long as it is appropriate for discrete data
	Highest 'bar' for 4	B1	
	Range of 7 (probably 1 - 8 people)	B1	
	Total frequency = 22	B1	
1(d)(iii)	Pictogram / vertical line diagram	B1	oe Accept stick graph Accept dual or component bar chart
2(a)	Elephant	B1	
2(b)	$\frac{4}{20}$	B1	oe
2(c)	0	B1	oe
2(d)	$\frac{8}{20} + \frac{2}{20}$	M1	oe
	$\frac{10}{20}$	A1	oe
2(e)	$1 - \frac{1}{20}$	M1	oe eg, $\frac{8}{20} + \frac{5}{20} + \frac{4}{20} + \frac{2}{20}$
	$\frac{19}{20}$	A1	

Q	Answer	Mark	Comments
3(a)	Stem of 1, 2, 3, 4	B1	
	Leaves correct and ordered	B2	B1 One or two errors Count not ordered as one error 6 8 8 9 9 1 2 3 3 7 7 8 9 0 0 0 1 3 0
3(b)	References 15th value in some way	B1	
3(c)	Some cars are breaking the speed limit	B1	oe Most cars are under speed limit
4(a)	Milk	B1	
4(b)	The price had stayed the same	B1	oe
4(c)	80 × 1.2	M1	oe
	96	A1	oe SC1 0.96 (p) or £96
5(a)	Clearly over half of readings are > 10	B1	oe
5(b)	25 correctly shaded squares	B3	B2 20 - 24 correctly shaded squares B1 16 - 19 correctly shaded squares
5(c)	T in top left square	B1 ft	oe Accept on either diagram ft Or correct Only ft for maps with one “dotty” square

Q	Answer	Mark	Comments
6(a)	Reference to the 3D nature of the chart / at an angle / cannot measure the angles	B1	oe eg, B1 Should not be 3D
	Reference to a specific potato type and how it is misrepresented	B1	oe eg, B1 Roasts look bigger than should be
6(b)	Correct method for one angle	M1	Or at least one angle correct (seen or in drawing)
	All angles correct (seen or drawn)	A1	90, 180, 72, 18
	Pie chart accurate for their angles	B1 ft	Can only ft if total is 360 degrees and exactly four sectors
	Key or labels for each section	B1 ft	ft But must be four sectors and correct in order of magnitude according to table
6(c)	Chips favourite for children, roasts for adults	B1	oe

Q	Answer	Mark	Comments
7(a)(i)	A - Too few class intervals / loss of detail	B1	oe eg, too large a gap between 1st and last value (in a group)
	B - A gap in the class intervals	B1	oe
7(a)(ii)	Does not cover the lowest value	B1	oe
	Unnecessary final class interval	B1	oe
7(b)	Attempt at cumulative frequency	M1	4, 4 + 7, ... (oe)
	Cumulative frequencies all correct 4, 11, 22, 56, 88, 100	A1	
	Plotted at upper class bounds	A1 ft	Accept 39 - 40 inclusive etc Must be an increasing graph
	Their cumulative frequencies plotted and joined	A1 ft	Must be an increasing graph Curve or polygon
	Their estimate, x, worked out correctly from their graph in the range $66 \leq x < 70$	A1 ft	Answer only with no graph is zero Max M1A1 from table
Alt 7(b)	Any attempt at a histogram	M1	Minimum is two joined rectangles
	Heights and widths correct	A1	Using frequencies (or frequency density)
	Halves total frequency (sight of 50)	B1 Dep	Dep on attempt at histogram
	Identifies rectangle containing 50th value	M1 Dep	Any indication Dep on attempt at histogram
	Their estimate, x, worked out correctly from their graph in the range $66 \leq x < 70$	A1	Answer only with no graph is zero

Q	Answer	Mark	Comments
8(a)	9648 ÷ 2179	M1	Accept 6.7 ÷ 2179
	[4.42, 4.43] or 4.4	A1	
	4.43	B1 ft	ft Any value of 3 or more decimal places SC1 0.23
8(b)	At least three correct midpoints 1.5, 4, 6, 9, 18	M1	
	Attempt at midpoint × frequency with at least three correct	M1 Dep	1.5 × 276 = 414 4 × 1282 = 5128 6 × 596 = 3576 9 × 23 = 207 18 × 2 = 36 (3 correct products gets M2)
	9361 ÷ 2179	A1	Has to be seen (oe eg, 4.296007343... to at least 3 decimal places) Do not allow embedded 4.30 in calculation
8(c)	(a) is rounded OR (b) is an estimate OR (b) uses midpoints OR (a) and (b) are different estimates	B1	oe
9(a)	Experiment	B1	Ignore any reference to types of experiment
9(b)	Identifies the incorrect scaling	B1	oe
	Still will be a negative correlation (but not strong)	B1 Dep	oe eg, conclusion not reliable / incorrect (as not strong)

Q	Answer	Mark	Comments
10(a)	Two different valid reasons from Easier / quicker / less data to work Cheaper Ever-changing population	B2	oe B1 One valid reason
10(b)(i)	Rental amount	B1	oe Age, gender, income
10(b)(ii)	Want opinions of people from different rental values	E1 ft	oe (for their choice or correct general statement)
10(c)	In the last year….	B1	oe Any specific time frame mentioned
	...how many complaints have you made?	B1	oe
	Response section (open or closed)	B1	Allow one error for option boxes if used
10(d)(i)	Advantage to suit their choice	B1 ft	ft Their choice eg, telephone and it's quick to do eg, door to door and get better response rate eg, internet survey and can be done in participant's own time
10(d)(ii)	Problem relevant to their choice	B1 ft	ft Their choice eg, telephone and you may get no reply eg, door to door and it takes a long time eg, internet survey and tenants may not have internet
11(a)	(percentage of) people who lost **all** of their passport, tickets and money	B1	oe
11(b)	100 – (10 + 13 + 9 + 14 + 23 + 11 + 8)	M1	100 – 88
	12	A1	
11(c)(i)	0.1	B1	oe eg, 10%
11(c)(ii)	0.11	B1	oe eg, 11% SC1 $\frac{11}{88}$ if answer $\frac{10}{88}$ seen in (c)(i) Accept equivalents for SC1 as long as 88 seen somewhere.
11(d)	4100 × 0.14	M1	oe
	574	A1	

Q	Answer	Mark	Comments
12(a)	The same candidates were judged differently by the two panel members	E1	oe
12(b)	Agreed rules before / had training / done a practice run	E1	oe
12(c)	Observer's own eye contact / attentiveness / possible (sun)light	B1	oe
13(a)	The total population is increasing	E1	oe
13(b)	The 85+ population increases or stays same every year in North Lincs but not in Eastbourne	E1	oe
13(c)(i)	More 85+ people in Eastbourne	E1	oe Calculations not required
13(c)(ii)	The rest of the age profile is unknown (not shown)	E1	oe