AQA Qualifications

GCSE

STATISTICS

43101F Unit 1: Statistics Written Paper (Foundation) Mark scheme

43101F
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Version/Stage:V1.0 Final

Mark schemes are prepared by the Lead Assessment Writer 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 associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' 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.

Further copies of this Mark Scheme are available from aqa.org.uk

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.
M dep	A method mark dependent on a previous method mark being awarded.
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.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
E	Explain marks are awarded for a full and detailed explanation
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 $\frac{1}{2}$
[*a*, *b*]	Accept values between *a* and *b* inclusive.

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a candidate has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised.

Questions which ask candidates to show working

Instructions on marking will be given but usually marks are not awarded to candidates who show no working.

Questions which do not ask candidates to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Unit 1 Foundation Tier

Q	Answer	Mark	Comments
1(a)	10, 10, anything	B1	eg 10, 10, 10 or 10, 10, 4 Any order
1(b)	(Mode =) 6 or (Range =) 9 – 6 or 3	M1	
	(Mode =) 6 and (Range =) 3	A1	
	Ticks yes or Sarah is correct	A1ft	ft if M1 awarded using their range and their mode No contradiction allowed
2(a)	Fully correct dot plot	B2	B1 10 or 11 column correct
2(b)	Almost all (7) are 10 or more or Average is 10 or more	B1	oe
2(c)(i)	$\frac{3}{8}$	B2	B1 $\frac{6}{16}$ or numerator 6 in a proper fraction or their proper fraction simplified fully
2(c)(ii)	No, too many 9s	B1	oe

Q	Answer	Mark	Comments
3(a)	Only 0.4, 0 and 1 circled	B2	B1 3 correct and 1 incorrect or 2 correct and up to 1 incorrect
3(b)	$\frac{1}{2}$ or 0.5 or 50%	B1	oe fraction eg $\frac{50}{100}$
3(c)	10% or 0.1 or $\frac{1}{10}$	B1	oe fraction eg $\frac{10}{100}$
4(a)	10 + 6 + 8 + 8 + 7 + 4 + 5 + 8 or 56	M1	Allow one error or omission
	their 56 ÷ 8	M1	their 56 must be in the range [46, 66]
	7	A1	SC2 49
4(b)	8 × 7.5	M1	oe
	60	A1	
4(c)	Erin, she has the higher mean (or total)	B1ft	oe B1 Cannot tell, means are very similar
4(d)	Range or IQR or median or mode	B1	Also accept standard deviation

Q	Answer	Mark	Comments
5(a)	Bars drawn to equal widths	B1	No gaps ½ square tolerance
	Heights correct (10), 35, 42, 10, 3	B2	B1 two or three heights correct ½ square tolerance
5(b)(i)	Highest frequency	B1	oe
5(b)(ii)	Tallest bar	B1	oe
5(c)	$\frac{13}{100}$	B2	oe B1 numerator 13 within a proper fraction or $\frac{3}{100}$ or $\frac{10}{100}$ or 13 ÷ 100

Q	Answer	Mark	Comments
6(a)	7	B1	
6(b)	$\frac{21+1}{2}$ or 11 or 11^{th} position identified	M1	
	4	A1	
6(c)	**Alternative Method 1**		
	Yes, 3 (lifeguards) is less than their 4 (median)	B2ft	B1ft 3 with no comparison or an incorrect comparison
	Alternative Method 2		
	Yes, 12 (days) is more than half (of 21)	B2	B1 12 with no comparison or an incorrect comparison
	Alternative Method 3		
	Yes, 9 (days) is less than half (of 21)	B2	B1 9 with no comparison or an incorrect comparison
7(a)	A suitable hypothesis stated	B1	eg pupils behave worse when it is windy oe
7(b)	Observation or Survey or Questionnaire or Interview	B1	
7(c)	Any suitable variable	B1	eg Time of day

Q	Answer	Mark	Comments
8(a)	5 boxes correct 09 11 12 16 25	B3	Any order B2 3 or 4 boxes correct B1 1 or 2 boxes correct
8(b)	Suitable question	B1	eg What do you think about the street becoming one way?
	Suitable response section	B1ft	eg Like it, Don't like it, Not sure
9(a)	It is less than 100	B1	Any indication
9(b)	1.1 × 500	M1	oe
	550	A1	
10	Any two from - No label on vertical axis - Symbols wider as well as taller / other referencing of 2D (allow 3D) issue - Difficult to read off values - Title incomplete / unclear	B2	oe B1 any one correct reason
11(a)	Continuous	B1	Any indication
11(b)	Discrete	B1	Any indication
11(c)	Qualitative	B1	Any indication

Q	Answer	Mark	Comments
12(a)	Completes key appropriately	B1	
	Correct ordered leaves 7 8 9 9 4 6 1 2 5 6 1 3 9 6 8	B2	B1 up to two errors or omissions Count unordered as one error
12(b)	Evidence of selecting their middle value(s)	M1	8^{th} if from correct stem-and-leaf
	102	A1ft	ft their values as long as ordered SC1 101.5 SC1 2
12(c)	4th position identified (LQ) or 12^{th} position identified (UQ)	M1	ft for 15 ordered values
	89 or 113	A1	
	113 – 89 (= 24)	A1	Allow embedded 24
12(d)	Higher average (on Sunday)	B1ft	oe
	Smaller interquartile range (on Sunday)	B1	oe

Q	Answer	Mark	Comments
13(a)	Convenience or judgement	B1	
13(b)	**Alternative method 1**		
	$\frac{185}{400}$ or 0.4625	M1	oe
	their 0.4625 × 50 or 23.125	M1	oe
	23	A1	SC1 25 or 2
	Alternative method 2		
	400 ÷ 50 or 8 or 50 ÷ 400 or $\frac{1}{8}$	M1	oe
	185 ÷ their 8 or 185 × their $\frac{1}{8}$ or 23.125	M1	oe
	23	A1	SC1 25 or 2
13(c)	(Advantage) Convenient or easier or quicker or cheaper	B1	oe
	(disadvantage) Access issues	B1	oe

<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="4">14(a)</td><td>70 total Angus</td><td>B1</td><td></td></tr>
<tr><td>85 total Ayrshire</td><td>B1ft</td><td>ft 280 – 125 – their 70</td></tr>
<tr><td>All 8 remaining values correct</td><td>B3ft</td><td>B2ft 4 – 7 remaining values correct
B1ft 1 – 3 remaining values correct
ft 40% of their 70 or 60% of their 70 and 40% of their 85 or 60% of their 85 only</td></tr>
<tr><td colspan="3"><table>
<tr><th></th><th>Angus</th><th>Hereford</th><th>Ayrshire</th><th>Total</th></tr>
<tr><td>Tested</td><td>28</td><td>50</td><td>34</td><td>112</td></tr>
<tr><td>Not Tested</td><td>42</td><td>75</td><td>51</td><td>168</td></tr>
<tr><td>Total</td><td>70</td><td>125</td><td>85</td><td>280</td></tr>
</table></td></tr>
<tr><td>14(b)(i)</td><td>$\frac{\text{their } 75}{280}$</td><td>B1ft</td><td>oe eg 0.27 or better or $\frac{15}{56}$
ft their table</td></tr>
<tr><td rowspan="2">14(b)(ii)</td><td>their 70 + 125 or 280 – their 85 or 195</td><td>M1</td><td>oe</td></tr>
<tr><td>$\frac{195}{280}$</td><td>A1ft</td><td>oe eg 0.70 or better or $\frac{39}{56}$</td></tr>
<tr><td>15(a)</td><td>East</td><td>B1</td><td></td></tr>
</table>

Q	Answer	Mark	Comments
15(b)	11.6 or – 6.3 seen	M1	
	17.9	A1	SC1 5.3 or – 17.9
15(c)	**Alternative method 1**		
	107.3 + 6.4 + 16.1 + 8.7 or [138,139)	M1	Allow one error or omission
	16.1 ÷ their [138,139) or 0.116…	M1dep	oe
	their 0.116… × 360 or 41.8…	M1dep	oe allow 41.9
	42	A1	SC3 17 or 23 or 76 or 84 or 90 or 279 SC2 [16.6, 16.7] or [22.6, 22.7] or [76.1, 76.2] or [83.9, 84.0] or [89.5, 89.6] or [278.9, 279.0]
	Alternative method 2		
	107.3 + 6.4 + 16.1 + 8.7 or [138,139)	M1	Allow one error or omission
	360 ÷ their [138, 139) or 2.599… or 2.6	M1dep	oe
	their 2.599… × 16.1 or 41.8…	M1dep	oe allow 41.9
	42	A1	SC3 17 or 23 or 76 or 84 or 90 or 279 SC2 [16.6, 16.7] or [22.6, 22.7] or [76.1, 76.2] or [83.9, 84.0] or [89.5, 89.6] or [278.9, 279.0]