GCSE
STATISTICS
8382/1F

Foundation Tier Paper 1

Mark scheme

June 2021

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2 1 6 G 8 3 8 2 / 1 F / M S

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 Examiner.

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 Statistics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

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.
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.
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.
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.
[a, b)	Accept values $a \leq$ value $< b$
3.14…	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

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

Questions which ask students to show working

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

Questions which do not ask students to show working

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

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student 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.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Q	Answer	Marks	Comments
1	60%	B1	

Q	Answer	Marks	Comments
2	The colour of the horse	B1	

Q	Answer	Marks	Comments
3	–0.86	B1	

Q	Answer	Marks	Comments
4	0.8	B1	

Q	Answer	Marks	Comments
5(a)	Title of 'Tally' for second column	B1	
	Value of 8 for frequency of 1	B1	
	Tallying of 7 for 3 including 5 bar-gate	B1	
	Additional Guidance		
	Number of matches watched in a week / Tally / Frequency 0 / ||| / 3 1 / 𝍸 ||| / **8** 2 / 𝍸 𝍸 𝍸 ||| / 18 3 / 𝍸 || / 7 4 / ||| / 4		

Q	Answer	Marks	Comments
5(b)(i)	0	B1	oe value as a decimal, fraction or percentage
	Additional Guidance		
	$\frac{0}{40}$		B1
	zero		B1
	nothing, none, no, impossible, not possible		B0
	0 out of 40, 0 in 40, 0 : 40		B0
	ignore non-contradictory words with a correct answer eg 0%, impossible eg 0, unlikely		 B1 B0

Q	Answer	Marks	Comments
5(b)(ii)	$\frac{18}{40}$ or 0.45 or 45%	B2	oe B1 18 as a numerator of a valid probability or 40 as a denominator of a valid probability
	Additional Guidance		
	18 : 40 or 9 : 20		B1
	Ignore any attempt to simplify or convert a correct answer		

Q	Answer	Marks	Comments
5(b)(iii)	$\frac{11}{40}$ or 0.275 or 27.5%	B1	oe

Q	Answer	Marks	Comments
6(a)	(3 – 1) × 4	M1	oe eg 12 – 4
	8	A1	

Q	Answer	Marks	Comments
6(b)	2 and a half symbols, similar size and vertically aligned	B2	B1 symbols to represent between 8 and 12 exclusive or 2 and a half symbols but badly aligned or sized
	Additional Guidance		
	Mark intention		

Q	Answer	Marks	Comments
6(c)(i)	**Alternative method 1 – using actual values**		
	4 + 4 + 4 + 4 + 3 or 19	M1	oe
	4 + 12 + their 19 + 10 or 45	M1dep	oe
	$\frac{19}{45}$	A1	oe fraction, decimal or percentage accept 0.42 or better accept 42% or better
	Alternative method 2 – using number of symbols		
	4 + 0.75 or 4.75	M1	oe
	1 + 3 + their 4.75 + 2.5 or 11.25	M1dep	oe
	$\frac{19}{45}$	A1	oe fraction, decimal or percentage accept 0.42 or better accept 42% or better

Q	Answer	Marks	Comments
6(c)(ii)	Each cushion was equally likely to be chosen or All of the cushions were available to buy	B1	oe
	Additional Guidance		
	None of the cushions had sold out		B1
	They're all the same price/size/material		B1

Q	Answer	Marks	Comments
7(a)(i)	480	B1	

Q	Answer	Marks	Comments
7(a)(ii)	Value recorded in minutes (not hours)	B1	oe
	8	B1	
	Additional Guidance		
	Didn't put the decimal point in 4.8(0)		First B1 Second B1

Q	Answer	Marks	Comments
7(b)(i)	Data that has not been sorted	B1	oe
	Additional Guidance		
	Data that has not yet been organised		B1
	Date that has not yet been processed		B1

Q	Answer	Marks	Comments
7(b)(ii)	Extreme/unusual values are removed or All of the data are given with the same units	B1	oe
	Additional Guidance		
	To correct the units (of the data) To correct the data		B1 B0

Q	Answer	Marks	Comments
7(b)(iii)	… worthwhile analysis can take place … appropriate findings/conclusions can take place … data is no longer contaminated by extreme values … data is more reliable	B1	oe
	Additional Guidance		
	… extreme values are removed so they are no longer in the data		B1
	… extreme values are removed		B0

Q	Answer	Marks	Comments
8(a)	Stem from 1 to 5	B1	
	Leaves fully correct and ordered	B2	B1 leaves with 3 or 4 correct rows and ordered or leaves fully correct but not ordered
	Leaves aligned and key completed	B1	
	Additional Guidance		
	1 1 2 3 3 4 5 6 6 6 7 2 0 1 1 4 3 4 8 4 0 0 2 5 5 6		

Q	Answer	Marks	Comments
8(b)	Indicates on the ordered diagram that the median is the 11th value	B1	
	Additional Guidance		
	Accept any clear indication eg crossing off 10 numbers either side of 20	B1	
	Numbers ordered in the working space and 20 indicated	B1	
	It's the 11th (= 20)	B0	

Q	Answer	Marks	Comments
8(c)	All the values are more than 20	B1	oe Do not accept an answer achieved through calculation
	Additional Guidance		
	The values at the weekend are more than 20	B1	
	The values are more than 20	B0	

Q	Answer	Marks	Comments
8(d)	Clear intention to add all 15 weekday values or 285	M1	eg 14 + 16 + 12 + … allow one error or omission
	(285 ÷ 15 =) 19	A1	oe
	Box for 'true' ticked and 19	A1ft	oe ft their 285 ÷ 15

Q	Answer	Marks	Comments
9(a)	Use of midpoints with at least one correct	B1	
	Attempt at row totals with at least one correct	M1	frequency × their midpoints their midpoints must be consistent and within the class
	Sum of their 5 row totals divided by their total frequency	M1dep	their 522 ÷ their 116
	4.5	A1	oe
	Dr Cho is incorrect	B1ft	oe ft if B1M2 awarded
	Additional Guidance		

Length, t (mins)	Frequency	Midpoint	Row total
$0 < t \leqslant 2$	8	1	8
$2 < t \leqslant 4$	44	3	132
$4 < t \leqslant 6$	43	5	215
$6 < t \leqslant 8$	11	7	77
$8 < t \leqslant 10$	10	9	90

Q	Answer	Marks	Comments
9(b)(i)	5 points plotted correctly	B2	B1 3 or 4 points plotted correctly
	Additional Guidance		
	Tolerance is half a small square		

Q	Answer	Marks	Comments
9(b)(ii)	She is wrong, there is no correlation (between the two variables)	B1	oe
	Additional Guidance		

Q	Answer	Marks	Comments
10(a)	Cannot tell	B1	

Q	Answer	Marks	Comments
10(b)	Correct group labels for rows 3 and 4	B1	$40 < t \leq 60$ and $60 < t \leq 80$
	Correct frequencies for rows 2 and 4	B1	29 and 23
	Additional Guidance		
	<table><tr><th>Length of Vlog, *t* (minutes)</th><th>Frequency</th></tr><tr><td>$0 < t \leqslant 20$</td><td>4</td></tr><tr><td>$20 < t \leqslant 40$</td><td>29</td></tr><tr><td>$40 < t \leqslant 60$</td><td>44</td></tr><tr><td>$60 < t \leqslant 80$</td><td>23</td></tr></table>		

Q	Answer	Marks	Comments
10(c)	Bars drawn to correct widths and Bars drawn to correct heights	B2	B1 Bars drawn to correct widths or Bars drawn to correct heights
	Additional Guidance		
	Bars should be intended straight, tolerance is half a small square		

Q	Answer	Marks	Comments
10(d)	Correct comment about the average/modal group eg gaming Vlogs are longer on average	B1	oe
	Correct comment about the range or the possible maximum eg gaming Vlogs have more varied lengths eg gaming Vlogs were up to 80 minutes long whereas fashion Vlogs were up to 60 minutes long	B1	oe
	Additional Guidance		
	Mode is bigger for gaming Vlogs		First B0
	Mode is bigger for gaming Vlogs, so the average is longer		First B1
	Range is bigger for gaming Vlogs		Second B0
	Range is bigger for gaming Vlogs, so the lengths of the gaming Vlogs are more spread out		Second B1

Q	Answer	Marks	Comments
11	Allocate each of her friends a (different) number between 1 and 6	B2	oe B1 Allocate each of her friends a different number or References 1 to 6
	(Roll the dice and) match the number rolled with the friend with that number	B1	oe

Q	Answer	Marks	Comments
12(a)	124	B1	

Q	Answer	Marks	Comments
12(b)	140 or 136	M1	
	4	A1	

Q	Answer	Marks	Comments
12(c)	$2 < t \leq 4$ chosen for modal class	B1	
	Sight of one correct frequency other than 30 for $0 < t \leq 2$	M1	oe
	There are more calls in the $2 < t \leq 4$ group than in any other group or Correct frequencies 30, 50, 12, 24, 8, 12, 4	A1	oe

Q	Answer	Marks	Comments
12(d)	Three of these errors clearly identified: missing vertical label horizontal scale error (two 8s or 6 is missing) should not be bars (or should be a curve/line) points should be plotted at the upper bounds incorrect use of scale break incorrect first (bar) height	B3	oe B2 2 of the errors clearly identified B1 1 of the errors clearly identified
	Additional Guidance		
	She's drawn a histogram (implies should not be bars)		B1
	No title		B0

Q	Answer	Marks	Comments
13(a)	Curry sauce	B1	

Q	Answer	Marks	Comments
13(b)	Any two valid reasons, eg (It's not representative as) they've only asked adults The sample size is (too) small (It's biased as) they've only asked people at fish and chip shops (fish and chips are available elsewhere) Each area will have a different population There isn't a response from all areas Not all side orders were an option / No other box	B2	oe B1 any one valid reason
	Additional Guidance		
	Only asked 670 adults		B1
	Only asked adults		B1
	Only asked 670		B1
	Asked adults		B0
	Asked 670		B0

Q	Answer	Marks	Comments
14(a)	Any reasonable hypothesis relating Year 7, Year 11 and homework eg Year 11 receive more homework than Year 7	B1	oe
	Additional Guidance		
	Allow older (students) to imply Year 11, younger (students) to imply Year 7		
	Y11 students get more homework (than Y7 students)		B1
	Older students get more homework (than younger students)		B1
	16-year-olds have more homework (than 11-year-olds)		B1
	Year 11 spend more time on their homework than Year 7		B1
	Year 11 homework takes longer (on average) than Year 7 homework		B0

Q	Answer	Marks	Comments
14(b)	All Year 11 and All Year 7 students (in Tom's school)	B1	oe
	Additional Guidance		
	All Year 11 and Year 7 (students)		B1
	The Year 11 and Year 7 students		B1
	The Year 11s and Year 7s		B1
	Year 11 and Year 7 students		B0
	(All) students (at Tom's school)		B0

Q	Answer	Marks	Comments
14(c)	Method A named correctly as random (sampling) and any advantage or disadvantage given about Method A eg In A every student has an equal chance of being selected (which is not true of B and/or C)	B2	B1 Method A named correctly as random (sampling) or any advantage or disadvantage given about Method A
	Method B named correctly as convenience/opportunity (sampling) and any advantage or disadvantage given about Method B eg In B this excludes any students who do not go to the dinner hall	B2	B1 Method B named correctly as convenience/opportunity (sampling) or any advantage or disadvantage given about Method B
	Method C named correctly as quota (sampling) and any advantage or disadvantage given about Method C eg In C we do not know the selection method to be used	B2	B1 Method C named correctly as quota (sampling) or any advantage or disadvantage given about Method B
	Method chosen with a correct advantage given and a correct advantage or a correct disadvantage given for the other two methods	B1	
	Additional Guidance		
	Do not award the final B1 with an incorrect (or contradictory) advantage or disadvantage seen for any of the three methods		
	‘At random’ does not imply the name of Method A		
	‘Avoids bias’ is an advantage for Method A		
	Time can be an advantage for Method B, a disadvantage for Method A, a disadvantage for Method C		

Q	Answer	Marks	Comments
14(d)	Any two valid problems, eg There is no time frame given 'How much' is unclear – hours/pieces/nights There are no options given (so answers might be hard to collate)	B2	oe B1 any one valid problem
	Additional Guidance		
	It is an open question meaning data is harder to process		B0
	Reference to some people not getting any homework		B0
	There isn't a place to answer the question (implies no response section)		B1

Q	Answer	Marks	Comments
14(e)	On average, Year 11 have (3 hours) more homework (than Year 7) or On average, Year 7 have (3 hours) less homework (than Year 11)	B1	oe but must state 'on average' or similar, eg generally
	Additional Guidance		
	Condone spend/spent for received/receive		
	Year 11 have more homework than Year 7		B0

Q	Answer	Marks	Comments
14(f)	Students at Tom's school have more homework (on average) than students at other UK schools	B1	oe
	Students at Tom's school have less homework (on average) than students in Shanghai (– China) (schools)	B1	oe Any correct comparison of Tom's data with one of the other countries
	Additional Guidance		
	Ignore any specific times (per week) that are given unless clearly incorrect		

Q	Answer	Marks	Comments
14(g)	The secondary data is for 15-year-olds whereas Tom's data is for Year 11 (who are 15 and 16-year-olds) or The chart could be from several years ago	B1	oe
	Additional Guidance		
	The data from the Internet had no source		B0

Q	Answer	Marks	Comments
14(h)	Tom's as the internet chart had no source (so we have no idea where the data has come from) or The internet data as we don't know how Tom eventually collected his data or The internet data as it is likely to have been collected from more than one school in those countries (whereas Tom's is just from one school)	B1	oe
	Additional Guidance		
	The internet data as it has been collected from more than one school in those countries (this is not known for sure)		B0