

# Mark Scheme (Results)

June 2011

GCSE Statistics (5ST1F\_01)  
Foundation Paper 01

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## NOTES ON MARKING PRINCIPLES

### 1 Mark Schemes

These should be applied positively. Candidates should all receive the same treatment. They should be rewarded for what they have shown they can do rather than penalised for omissions.

### 2 Types of mark

M marks: method marks

A marks: accuracy marks Note: you cannot give an A mark if you have given M0

B marks: unconditional accuracy marks (independent of M marks)

### 3 Abbreviations

cao - correct answer only

ft - follow through

isw - ignore subsequent working

SC: special case

oe - or equivalent (and appropriate)

dep - dependent

indep - independent

awrt - anything which rounds to

QWC - quality of written communication

( ) - brackets round words mean these are not essential

### 4 No working

If no working is shown then correct answers normally score full marks

If no working is shown then incorrect (even though nearly correct) answers score no marks.

### 5 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

**6 Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**7 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**8 Probability**

Probability answers must be given as fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths), unless it states otherwise on the mark scheme.

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**9 Linear equations**

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**10 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

11 **Range of answers**

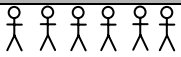
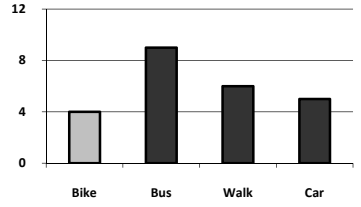
Unless otherwise stated, when an answer is given in a range (e.g. 3.5 - 4.2) then this is inclusive of the end points, and includes all the numbers in between.

12 **Quality of Written Communication**

This is denoted by an asterisk near the question number/part (\*). Mark schemes will indicate within the table how marks are to be allocated.

In this subject we need to see that correct statistical terms are used.



5ST1F_01				
Question	Working	Answer	Mark	Notes
1			1	B1
(a)		Liberal Democrat	1	B1 Allow 'Lib Dem' etc
(b)		3	1	B1
(c)		8	2	M1 subtraction with 11 and 3; OR '4' seen A1
(d)	11 – 3 or 4 (× 2)			
2		Car	1	B1
(a)		Walk	1	B1 allow Walking
(b)		6	1	B1
(c)			2	
(d)				
(e)		Pie chart; shows fraction of the whole	1	B1 Pie chart chosen or bar chart dismissed (may be implied by their comment). Allow correct equivalent reason which dismisses bar chart.

5ST1F_01							
Question		Working	Answer			Mark	Notes
3	(a)				30	2	B2 all correct (or B1 for two correct)
					20		
			20	20			
	(b)(i)		Petrol			1	B1ft
	(ii)		$\frac{10}{50}$ o.e.			1	B1 equivalent probability
	(iii)		$\frac{7}{50}$ o.e.			1	B1 equivalent probability
4	(a)		2 different comments from: <ul style="list-style-type: none"> <li>• Small sample size.</li> <li>• Monday/morning only</li> <li>• Excludes those at work.</li> <li>• Excludes children.</li> <li>• Not all readers use the library.</li> <li>• Biased/not random</li> </ul>			2	B1 B1 Equivalent sensible comments. (Only allow one comment for each option)
	(b)		1 comment from: <ul style="list-style-type: none"> <li>• Ask more people.</li> <li>• Use other days/times.</li> <li>• Also ask non-library users/do elsewhere</li> <li>• Include children</li> <li>• Choose sample at random</li> </ul>			1	B1 Equivalent sensible comment.



5ST1F_01				
Question	Working	Answer	Mark	Notes
5 (a)		25000	1	B1 c.a.o.
(b)		Increased (every year/5 years)	1	B1 (Do not allow direct comparison of two years. e.g. 'increased by 40000' is B0)
(c)		2 sensible comments. e.g. <ul style="list-style-type: none"> <li>• <b>both</b> increased</li> <li>• Not all who start finish</li> <li>• Numbers not finishing changes little</li> <li>• Proportion/% of starters who finished increased</li> </ul>	2	B1 B1 Equivalent sensible comments allowed. Comments about only 'starters increasing' or only 'finishers increasing' is B0  (Do not allow direct comparison of two years)
(d)		One comment, e.g. <ul style="list-style-type: none"> <li>• Non-starters increasing</li> <li>• More drop out before start than after start</li> </ul>	1	B1 Equivalent sensible comment allowed. (Do not allow direct comparison of two years) (Do not allow comment about one year only)

5ST1F_01				
Question	Working	Answer	Mark	Notes
6 (a)		Drinking cocoa (before bedtime) reduces/may help blood pressure.	1	B1 Converse accepted Any equivalent expression accepted (Ignore reference to numbers) B0 if written as a question
(b)		Any two of: <ul style="list-style-type: none"> <li>• It is quick to do.</li> <li>• It is easier to do.</li> <li>• It is cheap to do.</li> <li>• It is convenient</li> <li>• There is less data</li> </ul>	2	B1 B1 Accept equivalent statements. Accept the opposites if the word <u>census</u> is included. e.g. A census is slower.  May get two reasons in one comment.
(c)		<b>A list/register/database of the students</b> (at the university) OR A register of the university	1	B1 Any equivalent answer accepted.  Note: Do not give this mark if it refers to the sample. e.g. A list of the students in the sample B0
(d)		Stratified	1	B1
(e)		It helps to check whether the effects felt is due to <b>cocoa</b> or is <b>psychological</b> oe. OR Comparing a group having cocoa with one not having <b>cocoa</b> (the control group) helps to assess the effect of having <b>cocoa</b> .	1	B1  Equivalent answers that suggest comparing a group with and without cocoa makes assessment easier is acceptable  Allows you to compare genders is B0

5ST1F_01				
Question	Working	Answer	Mark	Notes
7 (a)		Point plotted at (26.0, 12.5)	1	B1 Allow half a small square tolerance.
(b)		Negative (correlation) The greater the weight the lower the life expectancy	2	B1 (Do not accept 'negative skew') B1 Converse accepted. Any equivalent statement in context accepted
(c)(i)		Point plotted at (34.1, 11.2)		B1 Allow half a little square tolerance.
(ii)		Ruled straight line of best fit through their mean point.	2	B1 Needs to lie between : (25,12) and (25,12.8) and also (55, 8) and (55, 8.8) and needs to cover x from 12 to 54
(d)		Any one of: <ul style="list-style-type: none"> <li>• It involves extrapolation.</li> <li>• It is outside the data set.</li> <li>• It uses data from only 8 dogs.</li> <li>• Border terriers are not one of the types of dog used so may not fit in to the data set.</li> </ul>	1	B1 Any equivalent answer relating to it being beyond the given data is acceptable. Note: It is far away from other points is B0

5ST1F_01				
Question	Working	Answer	Mark	Notes
8 (a)		2	1	B1
(b)		17	1	B1
(c)		LQ = 10 UQ = 28	2	B1 B1 Special case: 10, 28 wrong order is B1B0
(d)			3	M1 box with whiskers (allow half unit tolerance; lines need not be ruled) A1 whiskers 0, 47 A1 ft (their 10, 17, 28)
*(e)		<p>Four <u>comparisons</u> from five possible:</p> <ul style="list-style-type: none"> <li>• CDs have higher <b>median</b>.</li> <li>• CDs have greater <b>range</b></li> <li>• CDs have greater <b>IQR</b></li> <li>• Both positive <b>skew</b> OR both same <b>skew</b></li> <li>• Contextual interpretation of one of the above</li> </ul>	4	B1 B1 B1 B1 Max one mark from each of the five options.  Allow equivalent converse statements about downloads. Comparison of individual values other than median is B0  *QWC: the words in bold must be used. (Condone poor spelling but 'medium' is B0)

5ST1F_01				
Question	Working	Answer	Mark	Notes
9 (a)		7.1	1	B1 No other answer accepted
(b)		West Midlands	1	B1 No other answer accepted
(c)	$40.2 + 19.5 + 1.2$	60.9	2	M1 For effort to add correct numbers or to do $100 - (19.6 + 9.1)$ could be implied by 71.3 A1 Correct answer only Note: 1. Do NOT ignore subsequent working 2. 60.9 no working gets both marks. 3. 67.968 no working gets M0A0. 4. 60.9 in working but 60/61 on answer line is M1A1
(d)	$42.8 + 20.1 + 2.1 + 19.8 + 6.8$	91.6	2	M1 For effort to add five correct numbers A1 Correct answer only. Do NOT ignore subsequent working 91.6 in working but 91/92 on answer line is M1A1
(e)		Any one of: Some graduates might not have been contacted or replied or have given the required information	1	B1 Any equivalent answers accepted. Not all graduated or some dropped out or did not study in UK all B0. Reference to rounding errors is B0.

5ST1F_01				
Question	Working	Answer	Mark	Notes
10 (a)		$\frac{25}{40}$ o.e.	1	B1 equivalent probability
(b)		Repeat more times	1	B1 Anything which implies more results (with the same coin) B0 for use another/more coins
(c)	1 - 0.6	0.4 o.e.	1	B1
(d)			1	B1 All probabilities 0.6, 0.4
(e)(i)	$0.6 \times 0.6$	0.36 o.e.	2	M1 correct product of their probabilities on tree (probabilities must be between 0 and 1) A1 ft (0.36 OR ft from their tree)
(ii)	1 - (i) or $0.6 \times 0.4 \times 2 + 0.4 \times 0.4$	0.64 o.e.	2	M1 for 1 - (i) OR $1 - P(H) \times P(H)$ ft from tree OR sum 3 correct products from their tree (probabilities used must be between 0 and 1) A1 ft (0.64 OR correct ft) Must check for ft if no working shown.

5ST1F_01				
Question	Working	Answer	Mark	Notes
11 (a)		<p>Method 2/Questionnaire.</p> <p>Any one of:</p> <ul style="list-style-type: none"> <li>• Method 1 only allows those people already using facilities to give their views.</li> <li>• Method 1 is biased.</li> <li>• Method 2 gives all residents the chance to say what they think</li> <li>• Method 2 is more reliable.</li> <li>• Method 2 could mean more people (participate).</li> <li>• Method 2 (probably) uses a greater variety of people.</li> </ul>	2	<p>B1 could be implied by dismissing Method 1</p> <p><b>B1 dependent on first B1</b> Equivalent expressions accepted.</p> <p>Note: Method 2 is more accurate is B0</p>
(b)		<p>Any one from:</p> <ul style="list-style-type: none"> <li>• This is an open question.</li> <li>• This will allow for too many answers.</li> <li>• This has no answer boxes.</li> <li>• Assumes use of facilities</li> <li>• Can't answer if do not use facilities.</li> <li>• Difficult to show/process the results.</li> </ul>	1	<p>B1 Equivalent expressions accepted.</p> <p>Note: B0 for 'It is a leading question' on its own B0 for 'Only uses for recycling'.</p>
(c)		<p>How often do you use the recycling facilities (each month)?</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Once a week/month</p> <p><input type="checkbox"/> More than once a week/month.</p> <p><input type="checkbox"/> Other</p>	2	<p>B1 An unbiased question related to recycling</p> <p>B1 Must have at least 3 non-overlapping all inclusive answer boxes <b>and</b> reference to a time frame either in the question or in the response boxes. Actual boxes do not need to be shown. Note: This is discrete data so boxes such As 0 – 2, 3 – 5, 6+ are acceptable if there is a time frame in the question. They cover all options and include 6 and above.</p>

5ST1F_01				
Question	Working	Answer	Mark	Notes
12 (a)			2	B2 all correct heights (within half small square) AND all widths correct. (no gaps) (or B1 for one correct bar added)  Ignore shading.
(b)		$80 \leq t < 100$	1	B1 allow "80 to 100 minutes"
(c)		Positive (skew)	1	B1 Positive <u>correlation</u> is B0
13 (a)	$\frac{627}{501} \times 100$	125	2	M1 (full method but allow slip e.g. 672) A1 (awrt 125) Correct answer with no working is M1A1 but <b>125%</b> with no working is M0A0
(b)		<p>Two <u>comparisons</u> from:</p> <ul style="list-style-type: none"> <li>• Both increased.</li> <li>• Chocolate bar sales increased most</li> <li>• Chocolate sales changed by 17%; fruit &amp; veg by 6.5%</li> <li>• Chocolate bar sales change is more than double fruit &amp; vegetables change</li> </ul>		<p>B1 B1 Allow equivalent/converse statements.</p> <p>Both marks may be gained in one statement (e.g. either of last two statements with 'increase' rather than 'change')</p>



5ST1F_01				
Question	Working	Answer	Mark	Notes
14 (a)(i)		$(12 + 100 + 175 + 13) \div 4$	2	B1 for full calculation (answer given).
(ii)		Point plotted at height 75, half way between 2 & 3 in 2008.		B1 Allow half a small square tolerance.
(b)		Numbers steady over the years.	1	B1 no upward/downward trend. e.g. Up and down is B0 Up and down <u>a little</u> is B1 Any indication of seasonal variation alone B0
(c)		More visitors in 3 <sup>rd</sup> quarter	1	B1 allow 'summer' or 'Jul-Sep' But 'summer 2007' is B0
(d)		2 <sup>nd</sup> quarter	1	B1 Allow 'Apr-Jun' or 'spring' But e.g. 'spring 2007' is B0

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