

Mark Scheme (Results)

Summer 2013

GCSE Statistics 5ST1F_01 (Foundation)

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NOTES ON MARKING PRINCIPLES

- 1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- 2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- **3** All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- **4** Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- **5** Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- 6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:
 - i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
 - Comprehension and meaning is clear by using correct notation and labeling conventions.
 - ii) select and use a form and style of writing appropriate to purpose and to complex subject matter

Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) organise information clearly and coherently, using specialist vocabulary when appropriate.

The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

8 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.

9 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 canceling 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.

10 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).

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.

11 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.

12 Parts of questions

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

13 Range of answers

Unless otherwise stated, when an answer is given as a range, e.g [3.5 - 4.2] then this is inclusive of the end points and includes all numbers within the range.

Guidance on the use of codes within this mark scheme

M1 – method mark

A1 – accuracy mark (dependent on method mark)

B1 – working mark

C1 – communication mark

QWC – quality of written communication

awrt – answer which rounds to

oe – or equivalent

cao - correct answer only

ft - follow through

sc - special case

dep – dependent (on a previous mark or conclusion)

indep – independent

isw – ignore subsequent working

Question	5ST1F_01 Mark Scheme		
1. (a)	A tally or frequency table with 5 colour categories		
	table with at least 2 columns	B1	
	column labelled tally or frequency or amount/number of cars	B1	
	five given colours in first column	B1	(2)
(b)	Any one of: Bar chart/graph, Pie chart, Pictogram or Vertical line graph/chart	B1	(3)
(b)	Any one of. Bai chart graph, Fie chart, Fictogram of Vertical line graph/chart		(1)
			[4]
	Notes		L - J
(a)	1 st B1: Allow rows instead of columns.		
	2 nd B1: Condone blank tally column heading if chart clearly labelled 'tally chart'.		
	3 rd B1: Condone 'other' as an extra label in colour column.		
<i>a</i> .			
(b)	If they draw a suitable diagram rather than use the word give the mark.		
	Condone 'line graph/chart'.		
2. (a)	France	B1	
. (,			(1)
(b)	Japan	B1	
			(1)
(c)	(The %) has gone up (except in France) or It has risen. oe	B1	
			(1)
	Notes		[3]
(c)	Must be an indication of increase but allow 'increased or stayed the same'		
(5)	Condone 'all increased' and 'number increased'. Do not allow 'none decreased'.		
	Do not accept reference to just one or two countries.		
2 ()	A TY 1'1 1	D.1	
3. (a)	A: Unlikely B: Evens	B1 B1	
	C: Likely	B1	
	C. Likely		(3)
(b)	X nearer to 0 than 0.5, but not at 0	B1	(-)
. ,		((1)
(c)	X at 0.5	B1	
			(1)
(d)	X to right of 0.5 but nearer to 0.5 than 1		/4\
	Notes		[0]
(a)			
(4)			
(b)(c)(d)	Condone labelling with A, B, C instead of X.		
	More than one X in each scores B0		
(d) (a) (b)(c)(d)		B1	(1) [6]

Question	5ST1F_01 Mark Scheme	Marks	<u> </u>
4. (a)	7 12 19 all four entries correct	B2	
	5 6 11 (OR at least two correct scores B1)		
	12 18 30		(2)
(b)(i)	$\frac{7}{2}$ (accept awrt 23% or awrt 0.23)	B1	
	30 (accept awit 25% of awit 0.25)	DI	
(b)(ii)	11'	D.1.0	
	$\frac{11}{30}$ (accept awrt 37 % or awrt 0.37) – follow through their 11 from table	B1 ft	(2)
			(2) [4]
	Notes		[ד]
(b)	For probabilities allow truncated to 2 decimal places or awrt 2 decimal places		
	F F F		
		T	
5. (a)	$\frac{5}{6}$ for first dice, not a six	B1	
		D1	
	$\frac{5}{6}$, $\frac{1}{6}$, $\frac{5}{6}$ for second dice outcomes in correct order	B1	
	6 6 6		(2)
(b)	Yes she is right (oe) as chance of getting two sixes is 1 in 36 or $\frac{1}{6} \times \frac{1}{6}$ or $\frac{1}{36}$ or	B2	
	0.02(777), o.e. (allow 0.02/0.03)		(2)
	(OR incomplete answer scores B1)		
			[4]
(1)	Notes		
(b)	Calculation may be with tree diagram. B2 requires correct conclusion with a reason referring to both dice, with no contradictory		
	1 1		
	comments, no incorrect answer to $\frac{1}{6} \times \frac{1}{6}$.		
	6 6 Other acceptable reasons (not exhaustive):		
	e.g. 'only 1/6 chance <u>on each</u> dice', or 'there are five other numbers <u>on each</u> dice'.		
	eng. only 1/0 chance on each area, or there are five other numbers on each area.		
	If B2 not scored then allow B1 for		
	EITHER:		
	• Correct reason (or working) with no conclusion/wrong conclusion,		
	OR:		
	• Correct conclusion with partially correct reason, e.g.:		
	o with incorrect answer to $\frac{1}{6} \times \frac{1}{6}$		
	o with reference to only one dice being unlikely		
	(condone 'less than even chance of a six') o condone 'only 1/6 (or 2/12) chance of 2 sixes'		
	·		
	NB: reference to adding fractions scores 0/2		

Question	5ST1F_01 Mark Scheme	Mar	ks
6. (a)	Somerfield	B1	(1)
(b)	1 890 000 (allow 1 890)	B1	(1)
(c)	2009: 30.1+17.2+16.2 +11.7 = 2010: 30.4+17.0+16.3+12.3 =	M1	(1)
	<u>75.2</u>	A1 A1	(2)
(d)	A correct comment (follow through their figures)	B1ft	(3)
			(1)
			[6]
	Notes		
(c)	M1 for 4 figures added together with at least three correct for either year (may be implied by one correct total). Do not isw here. If there is division by 4 (or 100), then M0 A1 for 75.2 or 76 (allow 76.0)		
	A1 for both answers correct and associated with correct year		
(d)	B1ft for a correct comment based on two values found in (c). (Ignore figures in their statement). Do NOT allow comments about individual supermarkets only. Accept: both about 3/4 / they are similar / there is little change / it has increased etc.		
7. (a)	5 at end of the second line and 1 on the fourth line. Both required, no extras.	B1	(1)
(b)	3 (allow 03 or 3 beetles)	B1 ft	(1)
(c)	12	B1 ft	(1)
(d)	$\left(\frac{121}{11}\right)$ attempt to add the numbers <u>and divide by 11</u> (implied by correct answer)	M1	
	11	A1	(2)
(e)	The mean or '11' (ie their answer to (d))	B1	(2)
	It takes into account all the values, oe	B1dep	(2)
	Notes		[7]
(b)	May be a follow through if they have added many leaves to the stem plot		
(c)	If nothing is added to the given stem plot then median of 6 is B1ft		
(d)	Must attempt sum of numbers, not just leaves, <u>and</u> divide by 11 for M1 SPECIAL CASE:		
	for $\frac{75}{9}$ or 8.3 award M1A0 as misread (using only the original 9 results)		
(e)	If more than one average is mentioned, their <u>choice</u> of average must be clear to award the 1 st B1 2 nd B1 is dependent upon scoring the 1 st B1 Do not accept 'more accurate' for reason. But more <u>representative</u> is B1. SC: Median (or their '12') with a sensible reason scores B1B0 (eg half the days had		
	more & half less, or not affected by extreme values)		

Question	5ST1F_01 Mark Scheme	Marl	ks
8. (a)	Point (30,95) uniquely identified.	B1	
(b)	Sensible attempt at <u>ruled</u> line of best fit, neither above nor below all points.	B1	(1)
(c)	Positive The greater the (body) length the greater the (brain) weight, oe	B1 B1	(1)
(d)(i)	Line on graph from 120 to their lobf Answer in Range 52 to 64 (answer in range scores both marks)	M1 A1	(2)
(d)(ii)	Reliable/yes AND interpolation/in range of data (oe), or strong correlation	B1	(2)
(e)(i)	Line on graph from 180 to their lobf Answer in Range 80 to 92 (answer in range scores both marks)	M1 A1	
(e)(ii)	Unreliable/no Extrapolation or outside range of <u>data</u> or mammal may not be the same as the type used for the graph oe.	B1 B1	(2)
			[11]
	Notes		
(b)	Line should be between tramlines on overlay & extend at least as far as indicated.		
(c)	Converse comments are fine.		
(d)(i)	If answer not in range and no line seen from 120, then award M1A0 if their answer follows correctly from their lobf (½ square tolerance)		
(ii)	Must have both conclusion and reason. Reason should relate to interpolation or to correlation being strong. (Do not accept eg 'inside range of graph')		
(e)(i)	If answer not in range and no line seen from 180, then award M1A0 if their answer follows correctly from their lobf (½ square tolerance)		
(ii)	Reason should relate to extrapolation, or mammal being of different type. Do NOT accept eg 'outside range of graph', 'no points at/near 180'.		

Question	5ST1F_01 Mark Scheme	Mai	k s
9. (a)	Box with at least one whisker (condone missing median)	B1	
	At least 4 out of 5 values correct on graph (½ square tolerance, line or cross etc)	B1	
	Fully correct box plot within tolerance.	B1	
			(3)
(b)*	1. Zoo deer have a higher median	B1	
	2. Wild deer have a greater IQR (or interquartile range)	B1	
	3. Wild deer have a greater range	B1	
	(Accept converse statements for 1, 2 & 3)		
	4. Wild deer have positive skew AND zoo deer have negative skew	B1 ft	(4)
			[7]
	Notes		
(a)	Condone freehand provided lines fully within tolerance.		
(b)	QWC: To give these marks correct statistical terms must be used - shown in bold.		
	Must be explicit <u>comparisons</u> , not just listing (e.g. simply stating the two medians is B0)		
	Do NOT allow comparison of any individual weights other than median.		
	Ignore extra statements but do not accept contradictory comments.		
	1. Condone misspelling but 'medium' is B0. 'mean' is B0.		
	2&3. Allow greater/higher/larger/bigger. Do not allow 'wider' or 'longer'.		
	4. Skew comment should follow through from their box plot.		
	('positive/negative distribution' etc is B0)		

10. (a)(i)	7.8 + 11.5 + 12 + 6.7 add	ing 4 numbers (at least 3 correct)	M1	
	4 inte	ention to divide sensible sum by 4	M1	
	= 9.5 cao (May	see in table. Answer alone scores 3/3)	A1	(3)
(a)(ii)	Point in correct place between Q2 and Q3	2009 at 9.5 (½ square tolerance)	B1ft	(1)
(b)	3 (accept Quarter 3, Q3, etc but reference	e to a particular year is B0)	B1	(1)
(c)	Downward (trend) or (it is) falling		B1	(1)
	There are less overseas visitors as time goes by, (oe) (eg 'Numbers are smaller and smaller'/'fewer each year'.		B1	(2)
	'Numbers have decreased.')			[7]
		Notes		
(a)	For 2 nd M1 they should be dividing an attempt at the sum of any four numbers from the correct column.			
(b)	e.g. 'Quarter 3, 2007' is B0, but 'Q3 ever	y year' is B1		
(c)	1 st B1: Correct <u>description</u> of trend. Accept decreasing/negative as descriptions BUT negative <u>correlation</u> / <u>skew</u> on its own is B0			
	2 nd B1: Correct <u>interpretation.</u> ('numbers not interpret <u>trend</u>)	going up and down' scores B0, as this does		
	NB "visitors are falling" on its own will s not a description.	score B0B1 as it is an interpretation of trend		

Question	5ST1F_01 Mark Scheme	Mar	ks
11. (a)	Advantage:	B1	
	• People can give a more considered response/feel less pressured / take their time		
	Avoids possible interviewer bias / ensures all get questions asked the same way		
	Cheaper/no need to pay interviewers		
	Faster way to collect lots of data		
	Disadvantage:	B1	
	 Questions cannot be explained if not understood 		
	 May have many non-responses 		(2)
(b)	One reason from each of:		
(6)	Biased/leading question or says "do you agree"	B1	
	 Open question (allows for too many different answers) or no response boxes 	B1	
	open question (anows for too many unferent answers) of no response coxes		(2)
(c)	e.g. How much would you be willing to pay to park at the theatre (per visit)?	B1	
	Set of unique boxes – must include units	B1	
			(2)
(d)	Any two of:	B1 B1	
	• A sample is quicker	DIDI	
	A sample is easierA sample is cheaper to do		
	• A sample is convenient		(2)
	 A sample has less data to handle 		· /
	11 sample has less data to handle		
(e)	Any two of:	B2	
	 Not a good sample 		
	• Sample too small		
	 Not everyone is in telephone directory 		
	• Sample not representative		
	Not everyone has a chance of being asked		(2)
	 Not random/Is biased 		
	Notes		[10]
	For part (a), (b), (d) and (e) ignore excess comments if not contradictory.		
(a)	B1 for a suitable advantage.		
	Condone 'quicker'. Condone 'may be more honest' / 'anonymous'		
	B1 for a suitable disadvantage which does not contradict their advantage.		
	Condone 'cannot ask follow up questions'.		
	Do not allow 'cannot expand on answers'		
(b)	B1 for biased or leading or a comment which directly implies biased/leading		
	B1 for open question or equivalent Both marks may be scored in one line		
(c)	B1 for a suitable non-biased question about the cost of parking		
	B1 for at least 3 response boxes. (Must be non-overlapping but need not be exhaustive)		
	but must include units (\pounds/p) in the question or response boxes.		
(d)	B1 B1 for any two correct statements. Both marks may be scored in one line.		
	Do not allow converse statements about census unless compared with sample.		
(e)	B2 for any two correct statements		
	(B1 for any one correct statement)		
	, , , , , , , , , , , , , , , , , , ,		

Question	5ST1F_01 Mark Scheme	Marks
12*	One mark for each of three aspects: 1. Number all the boys/pupils (from 0 to 159) or put all names on piece of paper, oe	B1
	2. EITHER: Generate eight random numbers OR: draw out eight numbers/names from a hat, oe	B1
	3. Boys/pupils (with the) drawn (numbers) are selected for sample.	B1 [3]
	Notes	
	If describing a method other than simple random, then score 0/3 e.g. mention of 'picking every 20 th boy/pupil' is B0B0B0 e.g. 'choosing the same number from each class/group' is B0B0B0	
	'words' in brackets not needed.	
	For aspect 1. allow use of a numbered list/numbered register	
	For aspect 3. Accept e.g. Boys drawn represent the school / boys with those numbers are used, etc. NB: 'eight boys are drawn from a hat' on its own scores B1 for aspect 2 (but without 'names put on paper' etc is B0 for aspect 1, and, without 'are used' etc is B0 for aspect 3).	

13. (a)	Using the new fertiliser gives a heavier crop (than if the previous/no fertiliser is used) oe.	B1	
(b)(i)	To <u>compare</u> the crop weights with the new fertiliser / <u>compare</u> how effective the fertiliser is.	B1	(1)(1)
(b)(ii)	He grows a plot with the previous/no fertiliser and a plot with the new fertiliser. The plots must be the same size/ have same conditions	B1 B1	(2) [4]
	Notes		
(a)	Must be a statement, not a question. Other hypotheses possible and converses acceptable. Must mention new fertiliser and wheat/crop AND imply a comparison. Condone 'wheat grows faster with new fertiliser' e.g. 'new fertiliser produces a higher crop' B1 BUT 'new fertiliser produces a high crop' B0 (no comparison) 'Will new fertiliser produces a higher crop' B0 (a question) 'He will find out if the new fertiliser produces a higher crop' B0 (an aim not a hypothesis about what will happen)		
(b)(i)	Other equivalent answers acceptable but must be clearly implying it is to allow a <u>comparison</u> .		
(b)(ii)	1 st mark is for planting two crops with/without new fertiliser. 2 nd mark for aiming to eliminate other variables such as different: land area/watering/amount of fertiliser/drainage/sunlight etc (e.g. 'using two halves of <u>same field</u> ' or 'compare crop per hectare' is B1) Do not accept 'same time' as a similar condition. Do not accept 'half the crop' on its own as a similar condition.		

Question	5ST1F_01 Mark Scheme	Marks
14. (a)	They have gone up	B1
	by 12%	B1
		(2)
		3.54
(b)	$\frac{123}{100} \times 14000 (OR \frac{23}{100} \times 14000 + 14000)$	M1
	100 100 100	
	= £17 220	A1cao
		(2)
		[4]
	Notes	
(a)	B1 for gone up/higher/more. Accept was lower in 2000	
	B1 for 12% / 112% of what it was / £1 680 / now £15 680	
	Gone up by 112% is B1 B0	
	Solic up by 112/0 to D1 D0	
(b)	M1 for a fully correct method	
	A1 cao	

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles: ±5°

Measurements of length: ±5 mm

PAPER	: 5ST1F	_01		
Question	n	Modification	Notes	
Q2		Bar chart: 2008 changed to stripes, 2009 changed to dotty. They are 1.5cm bars with 1.5cm spacing. Grid y axis is 1.5 cm for 5. Bars changed: 2008 2009 GB 40 60 France 45 45 Germany 35 55 US 45 55 Japan 15 65	Standard mark scheme	
Q3		The Probability scales measure 16cm	Standard mark scheme	
Q5	(a)	Wording added "There are four spaces to fill."	Standard mark scheme	
Q6		Iceland, Aldi and Farm Foods removed from table.	Standard mark scheme	
Q8		Grid is 2cm. Crosses changed to filled in circles.	Standard mark scheme	
Q9		Grid is 2cm.	Standard mark scheme	

PAPER: 5ST1F_01						
Question		Modification	Notes			
Q10	(b)	Grid is 2cm. Crosses changed to filled in circles. Trend line marks kept the same.	Standard mark scheme			

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