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Mark Scheme (Results)

June 2012

GCSE Statistics
Paper: 5ST1F/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- If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 a 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.

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication 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 awrt – anything which rounds to

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		Bar heights 29.0 and 33.5	2	B2 both correct (½ line tolerance) (B1 one correct) Ignore width and shading of bars
	(b)		United Kingdom	1	B1 accept UK or ft their bar chart SC: if B0 is scored in (a) for no bars drawn, then allow B1ft for France
	(c)		Spain	1	B1cao
2	(a)		Pie chart	3	M1 for one correct angle calculation (implied by one sector drawn in tolerance or 20 or 300 seen) A1 all correct sectors drawn B1 for labelling a 3-sector pie chart with marriage types or a correct key
	(b)	Two from: • Higher (proportion) first marriage for **neither** in 2005 • Lower (proportion) first marriages for **both** in 2005 • First marriage for **one** (proportion) increased • First marriage for **both** is largest (proportion) in both years • First marriage for **neither** is smallest (proportion) in both years o.e.		2	B2 for any two correct comparisons (B1 for one correct comparison) Allow sensible ft from their 3-sector pie chart. Allow converse statements about 1955. Assume comment is about 2005 if no year mentioned.

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		<table><tr><td></td><td></td><td>40</td></tr><tr><td>57</td><td>25</td><td></td></tr></table>	2	B2 all correct (B1 for at least one correct)
	(b)(i)		$\frac{42}{82}$	1	B1oe Allow equivalent fractions or awrt 0.51 or 51%
	(ii)		$\frac{23}{82}$	1	B1oe Allow equivalent fractions or awrt 0.28 or 28%
	(c)	Conclusion: Does not support the claim/females **are** well represented For a reason which compares figures or totals in the two-way table: e.g. • Male/female numbers are similar • There are more females overall • Probability of female close to half • Females are well represented in the string section • Claim is only true for wind section not for entire orchestra		2	B2 for a correct decision supported with a reason based on evidence from the table (B1 for a correct comparison from the table with no decision)
4	(a)		Scatter graph	1	B1 Accept scatter
	(b)		response	1	B1
	(c)	$\frac{208}{8}$	26	2	M1 for (14+14+ ….) ÷ 8 A1 cao

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a)	ANY TWO FROM THREE: 1. Cheaper 2. Less time/quicker 3. Less data/easier (to handle)		2	B2 for two correct (B1 B0 for one correct) Accept equivalent statements. Accept two statements in one answer. Accept converses if clearly refer to 'census'. (One comment only from each type.) (Do not allow contradictory comments.)
	b)	Electoral **roll** or electoral register OR **A list of** council tax payers/residents (register or database are equivalent to list)		1	B1 A suitable list of the population is required. (incomplete lists: e.g. telephone directory is B0; all council tax payers is B0)
	(c)	ANY TWO OF: • This is not a good sample. • This is biased. • Not all residents have an equal chance of being selected. • Only asks North Street residents. • Residents elsewhere cannot give opinions. • Residents in one street may have similar interests/views. • North Street may not be representative. • (Sample) too small.		2	B2 Two correct statements (B1 for one correct statement). Allow sensible equivalent wording suggesting bias, restricted opinions, or too small sample. Ignore excess reasons if not contradictory.
	(d)	EITHER This is biased/leading. OR This is trying to persuade you to agree oe EITHER The boxes overlap/You do not know which box for £2 (or £1, or £0) OR It doesn't say how often (weekly/monthly etc) OR No option for not wanting one.		2	B1 B1 Accept e.g. it should say £1 to £1.99 e.g. it should say how much per week/month etc

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		Points plotted at (81, 76.7), (82.5, 78.6)	2	B1 B1 half small square tolerance for each
	(b)	Positive (correlation) Interpretation: Areas with greater female life expectancy also have greater male life expectancy.		2	B1 positive (Positive skew is B0) B1 allow equivalent & converse statements in context Condone 'As female life expectancy increases, male life expectancy increases' Must be life expectancy or equivalent (Females live longer than males is B0)
	(c)	Line of best fit	Line drawn between (80.5, 75.9-76.4) and (83.0, 78.9-79.4)	1	B1
	(d)		<table><tr><td></td><td>77.2</td></tr><tr><td></td><td>80.3</td></tr></table>	2	B1 answer in range 76.9-77.5 B1 answer in range 80.0-80.6 (If not in range ft from straight line with positive gradient- half small square tolerance)
	(e)	Lancashire Reason: • Within range of data/interpolation • Bucks is outside range of data/extrapolation		2	B1 Lancashire or '77.2' B1 Any equivalent answer stating Lancashire being inside the given data or Buckinghamshire being outside/beyond the given data is acceptable. Note: Lancashire is closer to other points is B0.

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(a)	e.g. Pupils eat more healthily now.		1	B1 any sensible hypothesis about healthy meals (B0 for a question)
	(b)	<u>All</u> students (in the school)		1	B1 oe Condone 'Everyone in the school'/'the entire school'
	(c)	Qualitative Continuous Discrete		2	B2 all correct (B1 for one correct)
	(d)	ANY **one** from: • makes sure questionnaire gets relevant answers • makes sure questions are understood • to check response rate • identifies ambiguity • checks the methods/design work • identifies likely responses • allows for changes to questions • checks how long it will take		1	B1 allow sensible equivalent answers. Do not allow: • Check spelling/proofread • Check for bias/leading questions • Check not offensive
	(e)(i)	ANY one from: • Open question • No response boxes • Allows for too many answers • Difficult to process results		1	B1 allow sensible equivalent answers.
	(e)(ii)	Question with answer boxes/options. e.g. What is your favourite vegetable? carrots □ peas □ beans □ other □		1	B1 allow options without boxes
	(f)	$\frac{315}{1260} \times 40$	10	2	M1 correct fraction $\times 40$ oe A1 cao

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)(i)		Illness (not medical or dental appt.)	1	B1 Accept 'illness'.
	(ii)		Other unauthorised circumstances	1	B1 Accept 'other'.
	(b)		Excluded, no alternative provision	1	B1 Accept 'excluded'. May be seen in a sentence.
9	(a)			2	B2 if all 6 correct (B1 for 5 correct)
	(b)		Top right of grid	2	B1 Accept equivalent descriptions, including reference to individual squares in this area. (...but not just a single square) e.g. "Square F1" is B0. "Around square F1" is B1 "along E" is B0. "Top of E" is B1 Accept North East.
			Squares are shaded darkest in this area. oe		B1 Accept sensible equivalent wording. (Reference to individual numbers is B0) e.g. ... most black/solid squares B1 ... most 16-24 squares B1 BUT ... likely to be where a building stood B0

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		Decreasing oe	1	B1 for falling/negative/downward oe Negative correlation is B0 Do not allow year on year comments/It goes up then it goes down
	(b)		Vertical axis does not start at zero	1	B1 oe
	(c)	3.8 – 3	0.8	2	M1 for 3.8 - 3 A1 for 0.8 (accept 800 000)
	*(d)	Four <u>comparisons</u> from: • Year 9 has higher **median**. • Year 9 has greater **interquartile range**/(**IQR)** • Year 9 has greater **range** • Both have same **skew** /Neither is **symmetric** • Contextual interpretation of one of the above. (e.g. more viewers in Year 9; viewing figures varied more in Year 9)		4	B1 B1 B1 B1 Allow equivalent converse statements about Year 10. Must use the statistical words in **bold**.

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)		26, 53, 80, 97, 100	1	B1 for all numbers correct
	(b)	Correct plotting of points and joining with curve or straight lines	Correct Horizontal Plots Correct Vertical Plots Join with straight lines or curve.	3	B1 B1 ft (½ square tolerance for these two marks) SC If B0 B0 then five correct points is B1 B1ft (Must be increasing) (Ignore any line to left of 20 – i.e. (16, 0) not needed)
	(c)	line from 50 on 'vertical' scale	29.5	2	M1 (implied by A1ft within tolerance) (Allow use of their $\Sigma f \div 2$) A1 ft (Accept value in range **29 up to but less than 30**, OR ft value from a line/curve with positive gradient, ±1 small square)
	(d)		The age (at which women have their first child) has gone up.	1	B1 ft from (c) (If no answer to (c), then B0) Accept equivalent clear comparison of 2008 and 1990 e.g. "is/was lower" is B0 but "is/was lower in 1990" is B1 (Ignore any figures. e.g. gone up by x years) Must be comparison, not just stating values.

5ST1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)	Correct order:	B C (A) E D	2	B2 all correct (B1 for any two in correct place)
	(b)		Use past records ✓	1	B1
	(c)(i)		0.1	1	B1 oe
	(ii)	0.4 + 0.2	0.6	2	M1 0.4 + 0.2 A1 oe
	(iii)	0.3 × 0.3	0.09	2	M1 0.3 × 0.3 A1 oe
13	(a)		Bar 110-120, height 10 Bar 120-130, height 4 Labels weight & frequency	3	B1 for a clear intention at a bar height of 10 B1 for a clear intention at a bar height of 4 B1 allow *w or kg* and *f*
	(b)	(5×85+7×95+…) ÷32	105.3125	3	M1 for $f \times w$ with at least 3 w consistently within interval (including ends) This may be seen in table M1(dep) $\Sigma fw \div 32$ A1 awrt 105.3 Note: 105 with no working is M0M0A0

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