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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
In Statistics
5ST1H_01 (Higher)

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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 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.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

10 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.

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 in a range (e.g. 3.5 – 4.2) then this is inclusive of the end points, and includes all the numbers in between.

14 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 awrt – anything which rounds to 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	Scheme	Marks
1	Two reasons from 1) 3D / at angle / difficult to read off (vertical scale) 2) Vertical scale not from 0 3) Not all months are included	B2 **[2]**
	Notes	
	B2 Any two correct reasons accepted. **Must be from these three options**. Allow equivalent expressions, but **each bullet point once only**. (or B1 for any one correct reason) **For point 1**: Anything implying 3D, e.g. lines not straight to read off is B1 **For point 2**: Vertical scale: e.g. axis starts at 200 is B1 BUT: vertical axis <u>not accurate</u> / has big jumps ... **are B0** **For point 3**: Months: e.g. there are gaps <u>in dates</u> / not consecutive months ... are B1 BUT there are gaps / bars are spread out / x-axis not labelled ...**alone are B0** Also watch for: only for academies / figures may be cumulative / unequal gaps ... **all B0**	

Question		Scheme	Marks
2	**(a)**	All customers/people (in the offices)	B1 (1)
	(b)	Completely accurate/opinions of all customers considered/unbiased	B1 (1)
	(c)	Sample is (any two from): • Quicker • Cheaper / uses less resources • Easier (to do / to calculate ... etc) • Less data to handle	B1 B1 (1)
	(d)	All people/items have same/equal chance of selection	B1 (1)
	(e)	• Leading/biased • Open OR no answer boxes/options given	B1 B1 (2)
	(f)	Advantage (any one from): • questions can be explained • better response rate Disadvantage (any one from): • expensive • time consuming • possible interviewer bias • interviewee may be less candid / feel pressured (into giving a 'right' answer)	B1 B1 (2) **[9]**
		Notes	
	(a)	Must clearly imply ALL customers for B1 (allow people/workers/sandwich eaters etc for customers) Condone *list of* all customers. Condone all offices BUT: 'the customers' / 'the offices' ... **alone are B0** **NB: A description of taking a sample …is B0**	
	(b)	Allow equivalent statements. e.g. includes whole population / true representation / (completely) fair are all B1 Condone more accurate / more reliable / more representative for B1 BUT gets lots of data / more varied results ... **alone are B0**	
	(c)	May have two reasons in one statement. **Must be from these four options**, but **each bullet point once only**. Condone 'more convenient' as a separate point for B1 Only allow converse statements if they use the word 'census'. Note: possible non-response from census, ... **is B0**	
	(d)	completely fair / not biased / no control over choice OR just a description of how to take a random sample ... **alone are B0**	
	(e)	May have two reasons in one statement. **Must be from these two options**, but **each bullet point once only**. Note: May vary between sandwich type / question too vague, etc **... are all B0**	
	(f)	Converses are only allowed if they state face-to-face / questionnaire. Allow sensible equivalent answers. **Advantages:** quicker / more accurate results / more detailed answers / can ask follow-up questions / less likely to lie ... **are all B0** **Disadvantages:** Condone less likely to be honest (face to face) BUT: 'biased'/'not random' ... **alone is B0**	

Question	Scheme	Marks
3 (a)(i)	25-29 (Allow 25 to 29 or 25/29)	B1 (1)
(a)(ii)	35-39 (Allow 35 to 39 or 35/39)	B1 (1)
(b)	65-69 (Allow 65 to 69 or 65/69)	B1 (1)
(c)	People aged 60 and over make up a larger percentage of the population in Richmond than in Hackney. **o.e.**	B1 (1) **[4]**
	Notes	
(c)	**Must be a comparison**. Allow converse statements about lower for Hackney. Condone reference to *numbers* in this question. e.g. higher in Richmond OR lower in Hackney ... are B1 Ignore any incorrect figures. e.g. condone half as many in Hackney for B1 Assume statement is about Hackney if no name given. So 'there are fewer' is B1 BUT: reference to <u>one</u> individual age group only OR <u>one</u> gender only ... **are B0**	

4 (a)	$\frac{1187}{1042} \times 100$ $= 113.915547\ldots$ awrt 114	M1 A1 (2)
(b)	**Comparison**: (Both) price**s** have gone up / 3-bed (%) has gone up <u>more</u> **Percentage** (at least one correct (ft) from): (2-bed) <u>up 14**%**</u> OR (3-bed) <u>up 20**%**</u> OR the <u>difference is 6%</u> (allow ft (not if £) and awrt nearest unit %)	B1 ft B1 ft (2) **[4]**
	Notes	
(a)	M1 fraction correct way up and × 100(%) A1 awrt 114 BUT: 114**%** or **£**114 are both M1A0	
(b)	**1st B1ft**: must be a <u>comparison</u>, (and not '£' or 'amount'). Condone 3-bed has gone up more BUT 3-bed has gone up more *pounds* OR 2-bed is cheaper … **are B0** **2nd B1 ft**: need percentages **with** '**%**' (correct ft) for at least one comment. Not just index numbers. Note: <u>2-bed up 14**%**</u> AND <u>3-bed up 20**%**</u> …scores both marks OR <u>3-bed up by 6**%** more</u> …scores both marks	

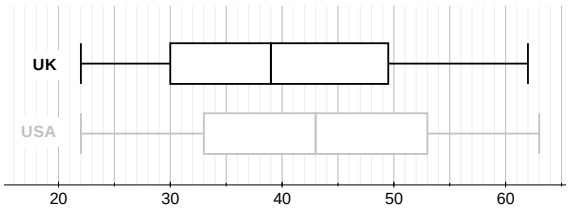
Question	Scheme	Marks
5 **(a)**	118.1	B1 (1)
(b)	Education	B1 (1)
(c)	(118.2 – 88.4 =) 29.8	B1 (1)
(d)	Individual figures have been rounded	B1 (1)
(e)	497 – 359.6 (= 137.4) $\left(\frac{'137.4'}{359.6}\times 100\right)$ = **38.2** (%) OR $\frac{497}{359.6}$ (= 1.382) $(1.382\times 100-100)$ = **38.2** (%)	M1 A1 (2) **[6]**
	Notes	
(a)	Allow 118 100 000 000	
(b)	Accept ‘category 9’ or just ‘9’	
(c)	Allow 29 800 000 000	
(d)	Condone any reference to rounding.	
(e)	M1 for either first stage of working (with correct figures from the table) May be implied by sight of 137.4 or 0.0382... or 1.382... or 138.2... Note 0.7235**... is M0** for incorrect division. A1 for awrt 38.2 (Accept 38 for M1A1 **ONLY IF** working shown.) **SC:** if no marks scored then awrt 38 is B1	

Question	Scheme	Marks
6 (a)	1 to 80	B1 (1)
(b) (i)	$\frac{9875}{'70'}$	M1
	=141.07... **awrt 141**	A1 (2)
(b) (ii)	Actual figures not known/ midpoints used	B1 (1)
(c)	Would increase <u>accuracy</u> (of estimate)	B1 (1)
(d)	Data is (+) skewed OR there are extreme values/outliers/anomalies	B1 (1) **[6]**
	Notes	
(b) (i)	M1 for 9875 ÷ 'Σf' attempted <u>with Σf in range (50~90)</u>	
(ii)	Any reference to data being grouped e.g. not raw data is B1 BUT: only a (small) sample OR any reference to rounding ...**alone are B0**	
(c)	B1: Accept 'reliable' for 'accurate' 'it will increase/decrease' or 'no change'...**are B0** but ISW if correct answer also	
(d)	B1: accept 'the few people with a large number (of friends) will increase mean' BUT: 'most people have fewer friends' ...**alone is B0** Allow 'skew' without positive for B1, BUT '<u>negative</u> skew' ...**is B0** Accept 'median is not affected by extremes' or 'mean is affected by extremes' BUT: <u>definition</u> 'median is middle value' ...**is B0**	

Question	Scheme	Marks
7 (a)	E / scatter diagram	B1 (1)
(b)	A / comparative box plots	B1 (1)
(c)	B / composite percentage bar chart	B1 (1)
(d)	F / Spearman's rank correlation coefficient	B1 (1)
(e)	H / standardised scores	B1 (1) **[5]**

Question	Scheme	Marks
8 (a)	**e.g.** people feel less (or more) safe in the evening, OR older people feel less (or more) safe than younger people.	B1 (1)
(b)	Any two from: 1) To check <u>questions are understood</u> / <u>can be answered</u> 2) To check the <u>questions work</u> / you <u>get the information needed</u> 3) To get an idea of <u>response rate</u> / <u>how many get returned</u> 4) To save on costs <u>if changes are needed</u>	B1 B1 (2)
***(c)**	Two points <u>stated</u> from: 1) Poor choice (of sampling frame) 2) Does not include whole population 3) Likely to be out of date	B2 (2) **[5]**
	Notes	
(a)	Many hypotheses are possible but must refer to idea of <u>safety</u> AND to <u>age</u> and/or <u>time of day</u>. (Allow equivalent wording if meaning is clear.) Condone prefixed with 'I believe that...' etc BUT **must be a statement NOT a question**. Allow 'more people feel safe in the a.m.' or 'more old people feel unsafe' etc	
(b)	Allow equivalent wording, but **must be one of the four bullet points**. May make two points in one statement. (Each bullet once only.) **For point 1**: condone to see how easy it is to carry out **For point 2**: condone to get an idea of answers given, BUT to <u>predict results</u> is B0 **For point 3**: accept to see if there is a good (or poor) response OR to see how long it takes **For point 4**: to save money/costs …**alone is B0** BUT: **do not allow <u>vague</u> answers <u>on their own</u>**, e.g. to check for problems/errors OR to make improvements OR to check it is suitable OR to check for bias OR to save money ...**on their own are all B0**	
(c)	B2 two points clearly stated from two different bullet points. (or B1 for one clear point. 'No' …on its own or with an incorrect reason is **B0,** BUT 'No' with a correct reason is B2) Allow equivalent wording, but **must be from the three bullet points**. **Do not accept <u>contradictory comments</u> on any bullet point** (e.g 'yes' and 'no') **For point 1**: accept bad / biased (sampling frame). **For point 2**: accept e.g. some people are not in the phone book / don't have a phone / only have a mobile OR may be more than one person for each number. **For point 3**: accept e.g. it may be an old phone book. BUT: might know each other / have similar opinions / don't like to answer on phone / only parents will answer ... **are all B0**	

Question	Scheme	Marks
9 (a)	73 – 67 = 6 (%) **accept (5~6)**	M1 A1 (2)
***(b)**	H1: Correct / USA spending (on housing) > UK spending, **because**… • Larger section of bar for USA, OR • USA 34(%) AND UK 19(%), OR • USA is 15(%) more OR UK 15(%) less H2: Incorrect / UK spending (on entertainment) > USA spending, **because**… • Smaller section of bar for USA, OR • USA 6(%) AND UK 13(%), OR • UK is 7(%) more OR USA 7(%) less	B2 B2 (4)
(c)	We only know percentages, not actual amounts spent	B1 (1) **[7]**
	Notes	
(a)	Values may be seen labelled on the chart. For answer in range 5~6 inclusive award M1A1 Otherwise : 73 **and** 67 seen (and no extra figures for USA) OR subtraction seen with figures (72~74) and (66~68) ... are M1	
(b)	**For each of H1 & H2**: (condone use of the word 'proves' in this question) B2 for correct conclusion AND reason from bar chart (otherwise B1 for an incomplete answer, e.g. correct reason with no conclusion / incorrect conclusion, OR correct conclusion supported by reason with one correct figure in range.) Reason must EITHER: • compare correctly a feature of the bar chart (ie 'section' oe), OR • state both correct figures from the bar chart. (Condone missing '%'. Allow **±1 on figures**), OR • state the percentage difference between USA / UK (Condone missing '%'. Allow **±2 on differences**) **e.g. for Hypothesis 1**: • Hypothesis is correct …**on its own is B0** (must have a reason) • Hypothesis is correct… with an incorrect reason …**is B0** • USA 34, UK 19 …on its own is B1 (no conclusion) • 34 is greater than 19 …on its own is B1 (comparison but no conclusion) • USA 34, UK 19, so hypothesis is correct …is just sufficient for B2 (**BUT:** 34, 19, so hypothesis is correct …is B1 only) Note, condone 'USA about double UK' for a correct reason.	
(c)	Reason referring to or implying data being percentages/proportions e.g. we don't know the overall (family) spending (in each) … is B1 BUT e.g. there are more people in the USA **… is B0**	

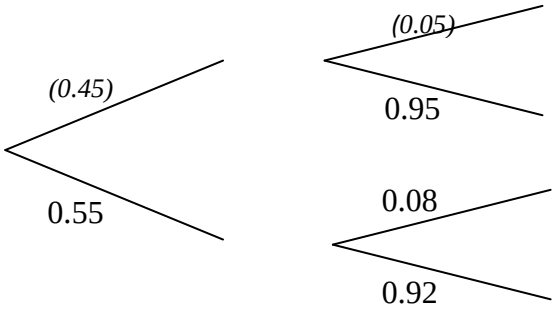
Question	Scheme	Marks
10 (a)	30, $(39 \leq M < 40)$, $(49 < UQ \leq 50)$	B2 (2)
(b)		M1 A1ft (2)
(c)	1) UK have lower **median** OR USA have higher **median**	B1ft
	2) **IQR** is similar / the same for both (or UK slightly lower **IQR**), OR **range** almost the same for both (or UK slightly lower **range**)	B1ft
	3) USA **symmetrical/no skew** **AND** UK **symmetrical** (or slight positive **skew**)	B1ft
	4) Teachers in UK are younger OR Head Teacher is correct	B1ft (4) **[8]**
	Notes	
(a)	B2 All three correct (or B1 for at least one correct) Median/UQ in given ranges. Do **not** accept 40 or 49	
(b)	M1 box with two whiskers and two correct (ft) values from five. (condone missing median for this mark) A1ft all correct with 22, 62 and their median+quartiles from (a) (±½ line tolerance)	
(c)	Max one mark from each bullet point. Must be comparisons, not just listing values. **COMMENTS MUST BE CONSISTENT WITH THEIR BOX PLOT**, (if no box plot, ft from table, otherwise cao) Words in bold must be used in comparisons for each of first three marks. (Condone poor spelling, but not 'medium'.) **For point 1**: allow smaller/bigger for lower/higher. (condone younger/older) NB: allow medians stated without an explicit comparison ONLY IF they have a correct conclusion – i.e. if they also score for point 4 **For point 2**: do not accept 'wider'/'narrower' for larger/smaller range or IQR **For point 3**: in description of UK allow skew / slight skew / positive skew if correct ft. (Could be 'negative skew' on ft) **For point 4**: Accept 'yes' if clearly meant as an answer to the stated question. Note, do NOT accept direct comparison of individual max, min, LQ, UQ values	

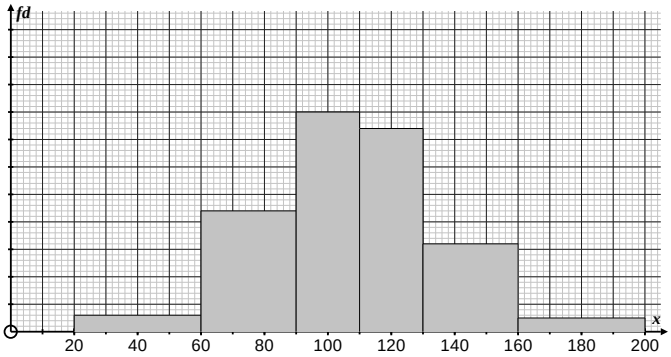
Question	Scheme	Marks
11 (a)	Yes / Rupert is correct.	B1
	Reason: • Strong/positive correlation	B1 (2)
(b)	Point plotted at (21.5, 11.0)	B1 (1)
(c)(i)	Point is an anomaly OR does not fit pattern/trend	B1ft
(ii)	Sales of Daily Mirror <u>changed</u>/<u>fell</u> by <u>more</u> than the other papers **cao**	B2 (3) **[6]**
	Notes	
(a)	**1st B1 for correct conclusion**. Can be implied by, e.g.: • sales have <u>changed</u> in a similar way for all papers • papers with highest/lowest sales in 2002 still have highest/lowest sales in 2012 **2nd B1 for statistical reason** <u>from graph</u>. Accept strong correlation OR points are <u>close to</u> a (straight) line OR positive correlation BUT data/points are close together ... **on its own is B0**	
(b)	$\pm \frac{1}{2}$ square tolerance	
(c) (i)	Condone 'outlier' for anomaly. Accept (point) out of line OR not close to <u>line/trend</u> OR does not follow same relationship ...all B1 BUT: **do not allow on their own ...** below the line OR lower than most OR not close to <u>other points</u> ... **all B0 alone** **Allow ft for <u>this</u> mark**: e.g. if (b) is plotted at (2.2, 1.1) then accept: fits with the trend/line OR (seems to) follow the same relationship.	
(ii)	B2 for correct interpretation. **cao** Accept Daily Mirror fell by lots compared with the others ... for B2 (or B1 for an incomplete answer) e.g.: 'Daily Mirror also fell' OR 'Daily Mirror fell but still higher than most' OR <u>compares</u> with just one other paper OR lists changes (without comparison) for Daily Mirror and <u>at least two others</u> ...**all B1** BUT: Daily Mirror sales fell ...**on its own is B0** (need the 'also' for a comparison)	

Question	Scheme	Marks
12 (a)	$20 \div 4 \times 30$ $= 150$ cao	M1 A1 (2)
(b)	Any two from: • No fish were born/died/arrived/left the canal. (i.e. population unchanged / proportion of marked fish unchanged) • Marked fish mixed in between samples OR all fish have same chance of being caught / samples are random. (i.e. idea of randomness) • Markings remain in place / unchanged.	B1 B1 (2) **[4]**
	Notes	
(a)	M1 for attempt correct full method accept any of: $\frac{4}{20} = \frac{30}{N}$ (o.e.) OR $4:20 = 30:N$ (allow '?' for N) OR 30 fish is $\frac{1}{5}$ (or 20%) OR 20 fish is $\frac{4}{30}$ (or 13%) **NB: do not ISW here** - e.g. if they go on to add 30 then M0A0	
(b)	**Allow each bullet point once only**. Condone same proportion / 20%, of (all) the fish have marks on them (each time)	

Question	Scheme	Marks
13 (a)	$(200+300+220) \div 3$ $= 240$ (**230~250**)	M1 A1 (2)
(b)	Trend line value + their (a) $(375 + 240) = 615$ (600~630)	M1 A1 (2) **[4]**
	Notes	
(a)	For answer in range 230~250 award M1A1 Otherwise: M1 for clear attempt at <u>three</u> <u>Q2 variations</u> from graph being averaged (allow ±20 for each of the 200, 300, 220 above for this mark)	
(b)	M1A1 for answer-only in range 600~630 **<u>only if at least M1 scored in (a)</u>** **Otherwise working must be shown** here: allow: trend line value in range (360~380) + their (a) OR: for their (a) shown 'added' to trend line <u>at 2012 Q2 on graph</u>	

Question	Scheme	Marks
14 (a)	There would be <u>nothing left</u> (to sell) OR <u>all</u> (the fireworks) are <u>used/tested/destroyed</u>.	 B1 (1)
***(b)(i)**	Sample **every 100th** (firework from production line/list) Use a **random start**ing point (between 1~100)	B1 B1
(b)(ii)	Disadvantage: Not random / not representative Period may coincide with same machine/worker	 B1 B1 (4) **[5]**
	Notes	
(a)	e.g. <u>all</u> are used up / <u>all</u> are set off / <u>none</u> are left …are B1 BUT: cannot sell after testing … **on its own is B0** (no reference to <u>all</u> used) Also: 'more expensive' or 'takes too long' ...**on their own are B0** If they are clearly just <u>defining</u> a census ...**then B0**	
(b)(i)	**1st B1** for correct period clearly expressed or implied (e.g. by 8, 108, 208...) BUT: 1 in every 100 …**on its own is B0** (regular gap not implied) **2nd B1** for random start (Note: independent of 1st B1) *QWC: words in bold must be used or clearly implied for each of first two marks.	
(b)(ii)	Accept: biased / not fair …for not random. 1st B1 And e.g. affected by some pattern (in the population), OR every 100th may be faulty … are 2nd B1 BUT: Infrequent sampling / small sample / time consuming / expensive / not accurate, etc … **are all B0**	

Question	Scheme	Marks
15 (a)		M1 A1 (2)
(b)	0.45×0.05 + 'their 0.55' × 'their 0.08'	M1 M1
	= **0.0665** or 6.65% or $\frac{133}{2000}$	A1 (3)
(c)	$\frac{0.45\times0.05}{\text{'their } 0.0665'}$	M1
	= awrt **0.338** or $\frac{45}{133}$	A1 (2) **[7]**
	Notes	
	Accept correct equivalent fractions or percentages to same accuracy throughout this question.	
(a)	M1 for two correct probabilities, in correct positions. A1 for fully correct tree	
(b)	**1st M1** for either product (from their tree - implied by 'their 0.0225' or 'their 0.044' seen – may be with tree) **2nd M1** for sum of two <u>correct</u> products (ft from their tree) **A1** allow 0.067 or 6.7% (Condone 0.066 or 6.6%). Correct answer scores M1M1A1 **BUT Do not follow through their tree for M1 marks in part (b) if no working is given**.	
(c)	Must be <u>conditional</u> probability (with correct numerator) for M1 e.g. $\frac{0.0225}{\text{'their } 0.0665'}$ ...is M1 A1 accept 0.34 or 34% (Condone 0.33 or 33%). NB: A common <u>incorrect</u> answer is $\frac{5}{13}$, M0A0	

Question		Scheme	Marks
16	**(a)**	6÷40, etc	
		Frequency densities: (may see multiples of...) 0.15, 1.1, 2.0, 1.85, 0.8, 0.125	M1
			A1 A1 B1 (4)
	(b)	$\sqrt{\frac{1794625}{145}-\left(\frac{15535}{145}\right)^2}$	M1
		= **29.9**(6978...) or awrt **30.0**	A1 (2)
	(c)(i)	2 × s.d.	M1
		107 ±2×30	M1
		⇒ **47** and **167** (kg) awrt	A1 (3)
	(c)(ii)	(There is evidence that) the Zoologist is <u>correct</u> as most of histogram (or data) in this range / within 2SD of mean **cao**	B1 (1) **[10]**

	Notes
(a)	**If all bars correct (±½ square tolerance) award M1A1A1 - OVERLAY** Otherwise: **M1** for attempt at least one f ÷ c/w (implied by <u>one</u> correct fd, or by <u>any</u> histogram bar) **A1** if three of their <u>bars</u> correct height **A1** for all bars fully correct **B1** for labels 'frequency density' and 'weight (kg)' (allow fd and *x* as minimum) (Figures on vertical axis are not required.)
(b)	**M1** for full attempt at s.d. including √ (award M1 if $\sqrt{\text{awrt } 898}$ is seen) **A1** for <u>29.9</u> or better or awrt <u>30.0</u> (NB: **correct working must be seen**) Condone 30 as final answer only **if clearly not rounded** from an incorrect intermediate answer. Condone missing √ sign **if** clear working for variance and answer is <u>29.9</u> or better
(c)(i)	**1st M1** for 2 × s.d. **2nd M1** for 2 × 30 applied to mean. M1M1 can be implied by awrt (47 or 167) seen **A1** for awrt 47 and awrt 167 (either order)
(ii)	Require correct conclusion <u>AND</u> a sensible reason <u>from graph/data</u>: Accept: (about) 95% in range / within 2SD of mean / within these values Condone: nearly all (or 99.8%) within 3SD of mean / between 17 and 197 Condone: bell-shaped / symmetrical for B1, **BUT:** most values in middle **is B0**

Question		Scheme	Marks
17	**(a)**	0.6 or $\frac{3}{5}$ o.e.	B1 (1)
	(b)	0.4^5 = 0.01(024) or $\frac{32}{3125}$ o.e.	M1 A1 (2)
	(c)	$10 \times 0.6^2 \times 0.4^3$ = 0.23(04) or $\frac{144}{625}$ o.e.	M1 A1 (2)
	(d)	P(0 or 1) OR 1 - P(2, 3, 4 or 5) $5 \times 0.6 \times 0.4^4$, + their (b) = 0.087(04) or $\frac{272}{3125}$ o.e.	M1, M1 A1 (3) **[8]**
		Notes	
		Accept correct equivalent fractions or percentages to same accuracy throughout this question.	
	(b)	M1 for **<u>using</u>** p^5 or q^5 with 0.4, (or condone use of their 0.6)	
	(c)	M1 for <u>selecting</u> (or using) <u>either of</u> $10p^2q^3$ or $10p^3q^2$ (can be implied by 0.3456 o.e. seen) A1 accept 0.23 BUT: 0.**0**23(04) ...**is M0**	
	(d)	**1st M1** for correct <u>numerical attempt</u> at any <u>other</u> individual probability (see below). Can be implied by sight of 0.912(96) or $\frac{2853}{3125}$. **2nd M1** for fully correct expression (ft their 0.01024 from (b)) **A1** accept 0.087	

These values (for 5, 4, 3 or 1) seen can imply correct attempts for 1st M1 in (d):

Available taxis	5	4	3	*(2)*	1	*(0)*
Probability	0.6^5	$5\times0.6^4\times0.4$	$10\times0.6^3\times0.4^2$	*$(10\times0.6^2\times0.4^3)$*	$5\times0.6\times0.4^4$	*(0.4^5)*
	0.07776	0.2592	0.3456	*(0.2304)*	0.0768	*(0.01024)*
	$\frac{243}{3125}$	$\frac{162}{625}$	$\frac{216}{625}$	$\left(\frac{144}{625}\right)$	$\frac{48}{625}$	$\left(\frac{32}{3125}\right)$

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: 5ST1H_01			
Question		**Modification**	**Notes**
Q01		Made 2D or model provided as well as diagram	Standard mark scheme.
Q03		Diagram enlarged, lines drawn across to join both pyramids. 'Men' and 'Women' moved up above grid.	Standard mark scheme.
Q05		Table split onto 2 pages	Standard mark scheme.
Q06		MLP frequency column widened to allow for working.	Standard mark scheme.
Q09		Proportions altered in the bar charts: USA UK Food 0 - 15% 0 – 10% Housing 15 – 45% 10 - 30% Clothing SECTION REMOVED Transport 45 - 65% 30 - 50% Entertainment 65 - 75% 50 - 65% Other 75 - 100% 65 - 100%	(a) 75 – 65 = 10 (%) Accept answer in range (9~10) for M1A1 Otherwise 75 and 65 seen, or subtraction seen with (74~76) and (64~66) score M1 (b) Apply original mark scheme with the same tolerances (±1 on figures, ±2 on differences) but with these figures if seen: H1: USA 30, UK 20, or difference 10 H2: USA 10, UK 15, or difference 5

PAPER: 5ST1H_01			
Question		**Modification**	**Notes**
Q10	(a)	Graph finishes at (60, 100) Table – Highest changed to 60 Box plot 2cm squares. UK lowest put in USA LQ35 M45 UQ50 highest 65 (extra column put at the end of grid – labelled '70')	(a) No change to mark scheme. (b) M1 box with two whiskers <u>and two correct (ft) values from four</u> (minimum point is given). (condone missing median for this mark) A1ft all correct with 60 and their median+quartiles from (a)(5mm tolerance) (c) Apply the scheme as it is **ft**. Changed 'correct' answers are: 1) & 4) are no change from original scheme. 2) USA has lower **IQR**, or UK has lower **range**, oe 3) USA **negative skew <u>AND</u>** UK **symmetrical** (or slight positive **skew**)
Q11		Grid 1.5 cm Parts (b) & (c) 'Daily Mirror' changed to 'Daily News' because sales figures have been changed to: 2002 – 2 250 000 and 2012 – 1 000 000	(a) No change to mark scheme. (b) Point plotted at (22.5, 10) (± 1 small square tolerance) (c) No change to mark scheme, except they will refer to Daily News not Daily Mirror.
Q13		Quarter 2 figures changed on the graph to: 650, 700 and 600 Data source 'adapted from' inserted	(a) Accept answer in range (**220~250**) for M1A1 Otherwise apply mark scheme and tolerances (±20) but with these figures: (210+290+200)÷3 (b) Apply original scheme except final answer range is (580~630)

PAPER: 5ST1H_01			
Question		**Modification**	**Notes**
Q16		Histogram: 1½cm grid, because of this answer will only be very approximate for remaining bars	(a) Frequency densities unchanged. Apply scheme with tolerance ±1small square (b)&(c) No change to mark scheme.

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