



**Pearson
Edexcel**

Mark Scheme (Results)

Summer 2018

**Pearson Edexcel GCSE
In Statistics (2ST01)
Higher Paper 1H**

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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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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	Scheme	Marks
1(a)	Quota (sampling)	B1 (1)
(b)	Advantage: ensures both genders / a variety of ages are represented	B1
	Disadvantage: Not random / is open to interviewer bias in selection	B1
		(2)
		[3]
Notes		
(b)	<p>Allow equivalent wording for advantage and disadvantage if meaning is clear.</p> <p>Advantage: B1 for an answer indicating inclusion of more than one gender or age group. They must refer to gender and/or age</p> <p>B0 Do not accept (on their own), e.g. fair, gets enough data, equal numbers in each section, includes a variety of people, reliable/accurate representation, easy/quick/cheap.</p> <p>Disadvantage: B1 for stating method is not random / could be biased, or may not reflect the (proportions in the) population. e.g. 'may not be a fair representation' Accept: expensive / time consuming, or age range is incomplete (e.g. no U18)</p> <p>B0 Do not accept (on their own), e.g. less accurate, <u>those selected</u> may be biased, won't have correct proportions (too vague), not enough data</p>	

Question	Scheme	Marks
<p>2. *(a)</p> <p>* (b)</p> <p>(c)</p> $ \begin{array}{c cccccc} 2 & 1 & 3 & & & \\ 3 & 1 & 2 & 3 & 5 & 7 \\ 4 & 0 & 1 & 5 & 7 & \\ 5 & 0 & 1 & 3 & 3 & 5 & 8 \\ 6 & 0 & 3 & 4 & & & \end{array} $ <p>Key: 2 1 represents 21 (minutes)</p> <p>(d) 46</p> <p>(e) 11</p> <p>(f) $64.5 - 20.5 = 44$</p>	<p>• Data is continuous (Otherwise B1 for ‘quantitative’/‘numerical’ o.e.)</p> <p>• Data is secondary (allow not primary) so reliability is unknown.</p>	<p>B2 (2)</p> <p>B2 (2)</p> <p>B2</p> <p>B1 (3)</p> <p>B1ft (1)</p> <p>B1ft (1)</p> <p>M1 A1ft (2)</p> <p>[11]</p>
Notes		
<p>* (a)</p> <p>* (b)</p> <p>(c)</p> <p>(d)&(e)</p> <p>(f)</p>	<p>B2 for describing continuous nature of the data. Must use ‘continuous’ to score both marks. Otherwise allow B1 for description of data being numerical/numbers if no ‘continuous’. Ignore extra non-contradictory comments. e.g. ‘secondary continuous’ is B2, ‘quantitative discrete’ is B1, ‘qualitative continuous’ is B0, ‘discrete’ is B0 SC If B0 allow B1 for ‘primary’</p> <p>B2 for recognising that the data is secondary and hence its reliability is unknown. Must use ‘secondary’ (or ‘not primary’) to score both marks. Note: accept comments implying unreliable but do not allow ‘inaccurate’. Otherwise allow B1 for an incomplete answer; e.g. ‘secondary’ with no mention of reliability, or recognising it may not be reliable but no ‘secondary’. But ‘data may be biased’ alone is B0 Ignore extra non-contradictory comments.</p> <p>B2 for fully correct stem and leaves (Accept ‘upside down’ i.e. 6 at top) Otherwise B1 for correct stem with three correct lines, or all leaves correct but unordered. (Condone stem as 20, 30, ... for B1) Final B1 for a usable key (‘minutes’ not required)</p> <p>Allow ft from their attempt at <u>ordered</u> stem and leaf (or ordered list). e.g. if they have 19 values only then ft median must be 10th</p> <p>M1 for at least one of 64.5 or 20.5 seen. (Allow ft from their attempt at an <u>ordered</u> stem and leaf, or from an ordered list). A1 44 ft (must have used upper/lower bounds correctly)</p>	

Question	Scheme	Marks
<p>3(a)</p> <p>(b)</p> <p>(c)</p> <p>ALT. $\frac{25}{100}$ (= 0.25) o.e. This is lower than / not the same as expected. o.e.</p>	<p>0.4 × 0.4 or 1 – (0.24 + 0.24 + 0.36) (= 0.16)</p> <p>(0.24 + 0.24 =) 0.48 or (0.5 – 0.48 =) 0.02 This is close to 0.5 (so nearly evens)</p> <p>He would expect (about) 36 times (for double tails) So (25 is) fewer than / not the same as expected. o.e.</p>	<p>B1 (1)</p> <p>B2 (2)</p> <p>M1 A1 (2)</p> <p>M1 A1</p> <p>[5]</p>
Notes		
Accept equivalent fractions or percentages for probability.		
<p>(a)</p> <p>(b)</p> <p>(c)</p>	<p>B1 for a correct equivalent calculation (that would lead to answer 0.16). Condone poor notation and words (e.g. ‘timesed by..’). Note: product may be shown on tree. Answer 0.16 not required.</p> <p>B2 for complete reasoning which mentions 0.48 or 0.02 and recognises evens = 0.5 e.g. ‘0.02 off (evens)’ scores B2, BUT ‘0.48 is nearly evens’ alone is B1 Accept ‘0.48 and 0.52 are close’ for B2</p> <p>Otherwise allow B1 for a partial answer which recognises there are two ways to get one head and one tail. e.g. HT & TH, OR 0.24 (+) 0.24 (note 0.24 may be seen as 0.4×0.6), OR 0.48 or 0.02 seen without a comparison</p> <p>M1 for 0.36 × 100, or 25 ÷ 100, or 36 or 11 or 0.25 seen A1 for clear working with a correct comparison. (e.g. 0.36 ≠ 0.25)</p>	

Question	Scheme	Marks
<p>4(a)</p> <p>(b)</p> <p>(c)</p>	<p>(The proportion of losses is) greater for England, o.e. OR $\frac{100}{360} > \frac{80}{360}$</p> <p>$48 \times \frac{210}{360}$ o.e.</p> <p style="text-align: center;">= 28 cao</p> <p>The angle/proportion for draws is smaller in the England pie chart (o.e.), so England have played more matches.</p>	<p>B1 (1)</p> <p>M1 A1 (2)</p> <p>B1 depB1 (2) [5]</p>
Notes		
	<p>(a) Allow any correct comparison of proportion. (Accept e.g. sector/angle/area for 'proportion'.) e.g. The proportion is greater than $\frac{1}{4}$ for England and less than $\frac{1}{4}$ for Switzerland. For numerical comparison: accept 95~105 compared with 75~85 or percentages 26~29 compared with 21~24 Condone: England had more losses, o.e.</p> <p>(b) M1 for any correct equivalent calculation e.g. $\frac{48}{360} \times 210$, $48 \div (360 / 210)$ Calculation may be seen in stages for M1 Final answer 28 scores M1A1</p> <p>(c) 1st B1 for comparing angles for draws in the pie charts. Accept e.g. sizes/ sectors/areas for angles. Note they could find angle per match: England 7.5°, Switzerland awrt 9° 2nd B1 dependent on 1st B1, for England have played more matches. e.g. 'England, as the same number takes up a smaller portion' scores B1B1 or 'England, as they (also) had more wins and losses' scores B1B1</p>	

Question	Scheme	Marks
5(a)	807	B1 (1)
(b)	46025 – 6922 = 39103	M1 A1 (2)
(c)	$\frac{5590}{44723} \times 100$ (= 12.4991...) = 12.5 (%)	M1 A1 (2)
(d)	1. total for holiday is greatest OR more on holiday for all types of travel 2. all visits by air is greatest OR air most popular for all reasons for visit	B1 B1 (2) [7]
Notes		
(b)	M1 for identifying both 46025 and 6922 (subtraction not needed for this mark) Condone one slip, e.g. 46052 for 46025, or 6992 for 6922 A1 for 39103 reached. Condone later rounding or division by 1000	
(c)	M1 for identifying both 5590 and 44723 (calculation not needed for this mark) Condone one slip, e.g. 5990 for 5590 A1 accept 12.5 or better	
(d)	1 st B1: Accept equivalent reason for holiday most popular – must imply for all types of travel. e.g. ‘38 519 is highest total / more than half (of 60 082)’ They should refer to: holiday AND total, or holiday AND all types of travel. e.g. accept for B1 ‘holiday is always the highest number’ 2 nd B1: Accept equivalent comment about air most popular – must imply for all reasons for visit. e.g. ‘48 337 is highest total / more than half (of 60 082)’ (Note condone use of ‘total’ here if clear they mean ‘all visits’) They should refer to: all visits AND air, or all reasons for visit AND air For both marks condone minor slips in any figures used if clear what they mean. Condone answers for 1 and 2 swapped. Reference to the wrong year is B0 but condone reference to ‘all years’.	

Question	Scheme	Marks
<p>6(a)</p> <p>(b)</p> <p>(c)(i)</p> <p>(ii)</p> <p>(d)</p> <p>*(e)</p>	$\left(\sum ft\right) = 1 \times 53 + 8 \times 55 + 22 \times 57 + 29 \times 59 + 18 \times 61 \quad (= 4556)$ $\frac{4556}{78} \quad (= 58.41025\dots)$ $= 58.4(1)$ <p>True values were used OR [in (a)] true values are not known / data is grouped / mid-points were used</p> <p>Negative (skew)</p> <p>Mean ('58.4...') is less than median (58.8)</p> <p>(Freestyle IQR = 60 – 56.6 =) 3.4 (Butterfly IQR = 66 – 61.4 =) 4.6</p> <p>Butterfly IQR is (1.2) more than Freestyle IQR o.e. So: Freestyle <u>times</u> more consistent OR butterfly <u>times</u> vary more</p> <p>Time > 61.2 indicates butterfly Time < 57.4 indicates freestyle Otherwise (time in range 57.4~61.2 means) it could be either</p>	<p>M1</p> <p>M1</p> <p>A1</p> <p>(3)</p> <p>B1</p> <p>(1)</p> <p>B1</p> <p>B1</p> <p>(2)</p> <p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p> <p>(4)</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>(3)</p> <p>[13]</p>
Notes		
<p>(a)</p> <p>(b)</p> <p>(c)(ii)</p> <p>(d)</p> <p>*(e)</p>	<p>1st M1: any one correct product using correct midpoint (may be in table) (can be implied by 4556)</p> <p>2nd M1: attempt $\Sigma ft \div 78$ using their Σft (or for a figure (4400~4700) $\div 78$)</p> <p>A1: for 58.4 or better</p> <p>Accept equivalent explanation, but reference to rounding or '(a) was an estimate' alone is B0. Do not accept 'medians' for 'midpoints'.</p> <p>Accept comparison of true mean with median in words or figures Condone 'mean is to left of median (on the diagram)'</p> <p>Evidence for first two marks may be on box plot. M1 (implied by one correct IQR found) for one subtraction with correct Q₃ and sensible attempt at Q₁ (i.e. 56.n or 61.n) A1 for both IQR values correct</p> <p>1st B1: Butterfly IQR > Freestyle IQR o.e. (Accept '4.6' > '3.4' if M1 scored)</p> <p>2nd B1 for correct equivalent interpretation of variation in <u>times</u>. (Condone 'results' or 'scores' for 'times' but 'data' is B0)</p> <p>B1×3 for clear explanation of each possibility with correct reference to key times. SC: If B0 scored then allow B1 for one example of a time (or range of times) with a correct corresponding decision. (If no figures used they may refer to 'minimum time for butterfly' and/or 'maximum time for freestyle')</p>	

Question	Scheme	Marks
<p>7(a)(i)</p> <p>(ii)</p> <p>(iii)</p> <p>(b)</p> <p>(c)</p>	<p>15</p> <p>$16 - 12 = 4$</p> <p>17</p> <p>20 cao</p> <p>$48 - 37$ or $9 + 1 + 1 = 11$</p>	<p>B1</p> <p>M1 A1</p> <p>B1</p> <p>B1</p> <p>M1 A1</p> <p>(4)</p> <p>(1)</p> <p>(2)</p> <p>[7]</p>
Notes		
<p>(a)(ii)</p> <p>(b)</p> <p>(c)</p>	<p>M1 for attempt at $Q_3 - Q_1$ with at least one correct value. (Note subtraction can be implied by candidate's answer. e.g. 12, 17 followed by answer 5)</p> <p>Accept 20 on its own only. e.g. 20 – 22 is B0</p> <p>M1 for 37 seen</p> <p>OR for 9 and 1 and 1 seen (with no other figures – addition not required for this mark)</p>	

Question	Scheme	Marks				
8(a)	Time series (graph/diagram)	B1 (1)				
(b)	$(8 - 6.5 =) 1.5$ (million)	B1 (1)				
(c)	Not suitable, with a reason It involves extrapolation / trend may not continue / data is out of date	B1 B1 (2)				
(d)	<table border="1"> <thead> <tr> <th>EITHER</th> <th>OR</th> </tr> </thead> <tbody> <tr> <td> Conduct a survey/ collect (primary) data Any one problem from: <ul style="list-style-type: none"> • Expensive • Time consuming • Difficult (to get enough data for a reliable estimate) • Some people may refuse to give information </td> <td> Obtain more recent (secondary) data Any one problem from: <ul style="list-style-type: none"> • May be difficult to access • May cost to access • May not find a reliable source / not know reliability of data o.e. ('May still be out of date' is B0) </td> </tr> </tbody> </table>	EITHER	OR	Conduct a survey/ collect (primary) data Any one problem from: <ul style="list-style-type: none"> • Expensive • Time consuming • Difficult (to get enough data for a reliable estimate) • Some people may refuse to give information 	Obtain more recent (secondary) data Any one problem from: <ul style="list-style-type: none"> • May be difficult to access • May cost to access • May not find a reliable source / not know reliability of data o.e. ('May still be out of date' is B0)	B1 depB1 (2) [6]
EITHER	OR					
Conduct a survey/ collect (primary) data Any one problem from: <ul style="list-style-type: none"> • Expensive • Time consuming • Difficult (to get enough data for a reliable estimate) • Some people may refuse to give information 	Obtain more recent (secondary) data Any one problem from: <ul style="list-style-type: none"> • May be difficult to access • May cost to access • May not find a reliable source / not know reliability of data o.e. ('May still be out of date' is B0)					
Notes						
(a)	Also accept for B1: composite or comparative or multiple or dual ... bar chart/graph/diagram But 'bar chart' alone is B0 Any other type of graph (e.g. line graph) is B0					
(b)	Mark final answer. Must be evaluated (so e.g. $6.5 - 8.0$ is B0) Accept -1.5 Condone (\pm) 1 500 000					
(c)	1 st B1: Accept 'no' with any attempt at a reason Note 'not suitable' without attempt at reason scores B0 2 nd B1: Allow equivalent reason based on data being out of date. e.g. 'no data after 2002' Condone 'data is secondary so may be unreliable'. (Do not accept 'accuracy' for 'reliability'.) But e.g. 'there is no trend' or 'there is no data for 2018' are B0					
(d)	1 st B1 Accept equivalent description of either option 2 nd B1 Dependent on 1 st B1, for a correct corresponding problem					

Question	Scheme	Marks
<p>9(a)</p> <p>(b)</p>	<p>Positive (correlation) Regions with more projects have more millionaire winners, o.e.</p> $1 - \frac{6 \times 96}{11 \times (11^2 - 1)} \quad (= 0.5636\dots)$ $= 0.56$ <p>Greater than zero / closer to 1 / positive (correlation)</p>	<p>B1 B1 (2)</p> <p>M1 A1 A1ft (3) [5]</p>
Notes		
<p>(a)</p> <p>(b)</p>	<p>1st B1: ignore excess words e.g. ‘weak’ 2nd B1: Accept equivalent contextual interpretation</p> <p>M1 for full working including ‘1 – ...’ and ‘6 × ...’ 1st A1: accept awrt 0.56 2nd A1ft: accept equivalent wording. Allow ft for their value (if in range -1 to 1), and allow ft for their (a)</p>	

Question	Scheme	Marks
10(a)	e.g. Newer books are borrowed for longer than older books.	B1 (1)
(b)	Age of book, and length of loan (o.e.)	B1 (1)
(c)(i)	All books in the library	B1
(ii)	Library database / list of (all) books (in the library)	B1 (2)
(d)(i)	e.g. type of book may affect length of loan OR so each book type is fairly represented	B1
(ii)	$\frac{8000}{43000} \times 60 \quad (= 11.16\dots)$	M1
	= 11 cao	A1 (3)
*(e)	Use random numbers (ignoring any repeats/out of range)	B1
	Select corresponding book (from numbered sampling frame)	B1
	Repeat sampling for each stratum	B1 (3)
[10]		
Notes		
(a)	Allow equivalent or converse statements regarding age and length of loan, but must not be a question.	
(b)	Accept equivalent descriptions for the correct pair of variables (both needed) Condone ‘age’ for age of book, but units or ‘time’ alone for either variable is B0	
(c)(i)	Require reference to ALL books , but accept ‘all books that are borrowed’ Condone omission of ‘all’ here only if B1 scored in (ii) includes ‘all’. Note, ‘the number of books in the library’ is B0	
(ii)	Any equivalent list/register/database o.e.	
	e.g. (i) the books in the library AND (ii) database of all the books, scores B1B1	
(d)(i)	Accept equivalent reasons that recognise either:	
	<ul style="list-style-type: none"> • that loan length may vary with book type/section, OR • the different numbers ... of each type / in each section 	
(ii)	cao Final answer must be an integer.	
*(e)	1 st B1 for any mention of ‘random’, eg RAN# on calculator, random sample, etc	
	2 nd B1: clear matching of number to book	
	3 rd B1: for indicating that a separate sample is needed for each book type/stratum (e.g. by describing a number to select from each stratum)	
	Note use of ‘hats’ can score max B0B0B1. Sampling people can score max B1B0B0.	
	Description of simple random or selective sampling scores max 2/3	
	SC: If no marks scored award B1 for ...	
	numbering books OR ignoring repeats OR ignoring numbers out of range.	

Question	Scheme	Marks
<p>11(a)</p> <p>(b)</p> <p>*(c)</p>	<p>(Yes it is as) e.g. numbers are in same proportion as past orders / percentages OR two numbers for vegetarian is 20% etc</p> <p>OR $\frac{5}{10} = 50\%$ etc</p> <p>OR 5:3:2 = 50:30:20</p> <p>Frequencies: 39, 26, 15</p> <p>A comment which includes two features from:</p> <ul style="list-style-type: none"> • results will vary / results will be different each time o.e. • can find the maximum (or average) for each dish • can compare the results / see patterns • to test reliability of results (e.g. see if repeatable). Condone make prediction/results more reliable (do not accept 'accurate' for 'reliable') • to find out how many of each dish is likely to be needed /ordered • to spot anomalous results (condone eliminate outliers) • can find the range for each dish <p>Do not accept</p> <ul style="list-style-type: none"> • results don't match the percentages • may have more than 80 customers • vague answers, e.g. 'to make it fair' or 'remove bias' 	<p>B1</p> <p>(1)</p> <p>M1A1</p> <p>(2)</p> <p>B2</p> <p>(2)</p> <p>[5]</p>
Notes		
<p>(a)</p> <p>(b)</p> <p>*(c)</p>	<p>Clear explanation or calculation linking choice of numbers to the percentages Accept e.g. 'the numbers represent the percentages'. B0 if they answer no / not sensible</p> <p>M1 for any one frequency or tally correct A1 for all frequencies correct</p> <p>B2 for an answer recognising two features from the list. (Accept each bullet once only)</p> <p>Otherwise: B1 for an incomplete answer including at least one appropriate feature.</p>	

Question	Scheme	Marks
<p>12(a)</p> <p>(b)</p> <p>(c)</p>	<p>$190 \div 5 (= 38)$</p> <p>Frequency densities: (38, 20,) 28, 25, 18, 11 All correct bar heights Class boundaries: 25, 45, 65, 100 Axes numbered and labelled age/frequency density</p> <p>$\frac{360}{4} + 385$ or $5 \times '18' + 385$ $= 475$ (hence 4 750 000)</p>	<p>B1 (1)</p> <p>M1 A1 B1 B1 (4)</p> <p>M1 A1 (2) [7]</p>
Notes		
<p>(a)</p> <p>(b)</p> <p>(c)</p>	<p>Accept equivalent calculation/verification but must use class width 5</p> <p>M1 for at least two of last four bar heights or frequency densities correct (check table)</p> <p>A1 for all bar heights correct. (½ square tolerance)</p> <p>1st B1 for correct horizontal placement of all bars. (½ square tolerance)</p> <p>2nd B1 accept minimum labels of f.d. and age/years ('class width' is B0) AND minimum two correct figures on each axis</p> <p>For M1 accept shading of correct region on their histogram A1 for final answer of 475 or 4 750 000</p>	

Question	Scheme	Marks
<p>13*(a)</p> <p>(b)</p> <p>(c)</p>	<p>(Total costs = £80 000)</p> $\frac{52\,000}{80\,000} (\times 100) = 65(\%), \frac{8\,000}{80\,000} (\times 100) = 10(\%), \frac{20\,000}{80\,000} (\times 100) = 25(\%)$ <p>OR <u>all</u> weightings = costs ÷ 800 OR costs and weightings are in same ratio (13:2:5 o.e.)</p> $52000 \times \frac{107.2}{100} \text{ o.e.}$ $= (\pounds) 55744$ $(107.2 \times 65 + 114.6 \times 10 + 112 \times 25) \div (65 + 10 + 25)$ $= \mathbf{109(.14)}$ <p>So 9(.14)% rise, OR 9(.14) < 10 OR 109(.14) < 110 (condone % here) (... hence manager is correct)</p> <p>ALT. for M1: $\frac{52000 \times \frac{107.2}{100} + 8000 \times \frac{114.6}{100} + 20000 \times \frac{112}{100}}{52000 + 8000 + 20000} \times 100 \quad \left(= \frac{87312}{80000} \times 100 \right)$</p> <p>Then A1A1 as above</p>	<p>M1, A1</p> <p>(2)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>(3)</p> <p>[7]</p>
Notes		
<p>*(a)</p> <p>(b)</p> <p>(c)</p>	<p>M1 for correct equivalent calculation or explanation for one category, e.g. 52000 is 65% (of total)</p> <p>OR comparison of ratio for any two categories, OR simplifying one triple ratio</p> <p>For M1 condone use of their £80 000 if clearly attempt at total costs.</p> <p>A1 for complete answer with all three categories included</p> <p>e.g. $\frac{65}{52000} = \frac{10}{8000} = \frac{25}{20000}$ or 52000=65%, 8000=10%, 20000=25%</p> <p>... score both marks</p> <p>M1 for complete equivalent calculation (or 55744 seen) A1: final answer, accept 55700 or better</p> <p>M1 for complete attempt at weighted index number (may be done in stages) 1st A1: accept 109 or better for M1A1 (but £109 or 109% scores A0 here) 2nd A1 for correct conclusion / comparison with figures as shown</p> <p>ALT: For M1 the $52000 \times \frac{107.2}{100}$ may be seen as 55744 (but accept figure in range 55000~56000)</p> <p>SC If M1 not scored then B1 if they reach 9(.14) and compare correctly with 10 (or reach 1.09 and compare with 1.1) without finding weighted index.</p>	

Question	Scheme	Marks
<p>14(i)</p>	<p>Normal (distribution) or C Time taken is a continuous variable</p>	<p>B1 B1 (2)</p>
<p>(ii)</p>	<p>Discrete uniform (distribution) or A Each digit is equally likely</p>	<p>B1 B1 (2) [4]</p>
Notes		
<p>(i)</p>	<p>2nd B1: Must have reference to continuous</p>	
<p>(ii)</p>	<p>1st B1: Condone 'discrete' or 'uniform' on their own 2nd B1: Must have reference to equally likely, o.e.</p>	

Question	Scheme	Marks
<p>15(a)</p> <p>(b)</p> <p>ALT.</p>	$\frac{2}{9} \times \frac{1}{8}$ $= \frac{2}{72} \text{ o.e. (e.g. 0.02\dot{7})}$ <p>P(RR' or WW' or BB') =</p> $\frac{2}{9} \times \frac{3+4}{8} + \frac{3}{9} \times \frac{2+4}{8} + \frac{4}{9} \times \frac{2+3}{8} \quad \left(= \frac{6+8}{72} + \frac{6+12}{72} + \frac{8+12}{72} \right)$ $= \frac{52}{72} \text{ o.e. e.g. } \frac{13}{18}, 0.72, 72\%$ <p>1 – P(RR or WW or BB) =</p> $1 - \left(\left(\frac{2}{9} \times \frac{1}{8} \right) \text{ or their (a) } + \frac{3}{9} \times \frac{2}{8} + \frac{4}{9} \times \frac{3}{8} \right)$ $= \frac{52}{72} \text{ o.e.}$	<p>M1</p> <p>A1</p> <p>(2)</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>(3)</p> <p>M1</p> <p>M1</p> <p>A1ft</p> <p>[5]</p>
Notes		
<p>(a)</p> <p>(b)</p> <p>ALT.</p>	<p>M1: condone $\frac{2}{9} \times \frac{2}{9}$ or $\frac{a}{b} \times \frac{a-1}{b-1}$ if $a < b$</p> <p>A1: accept equivalent fraction, decimal or percentage, accept 0.028 or better</p> <p>1st M1: identify outcomes RR', WW' and BB' or equivalent 6 combinations of R/W/B (e.g. on a tree) (Implied by correct sum of products)</p> <p>2nd M1: at least one correct product seen (e.g. $\frac{2}{9} \times \frac{3}{8}$)</p> <p>A1: accept equivalent fraction, decimal or percentage to 2 significant figures. e.g. 0.72... or better</p> <p>Note sampling with replacement: final answer $\frac{52}{81}$ (o.e.) or awrt 0.642 implies M1M0A0</p> <p>1st M1: identify RR, WW and BB (e.g. on a tree) AND subtraction from 1</p> <p>2nd M1: at least one <u>correct</u> product used AND subtraction from 1</p> <p>A1ft: dependent on <u>both</u> M1 but allow ft from their (a) for RR.</p>	

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

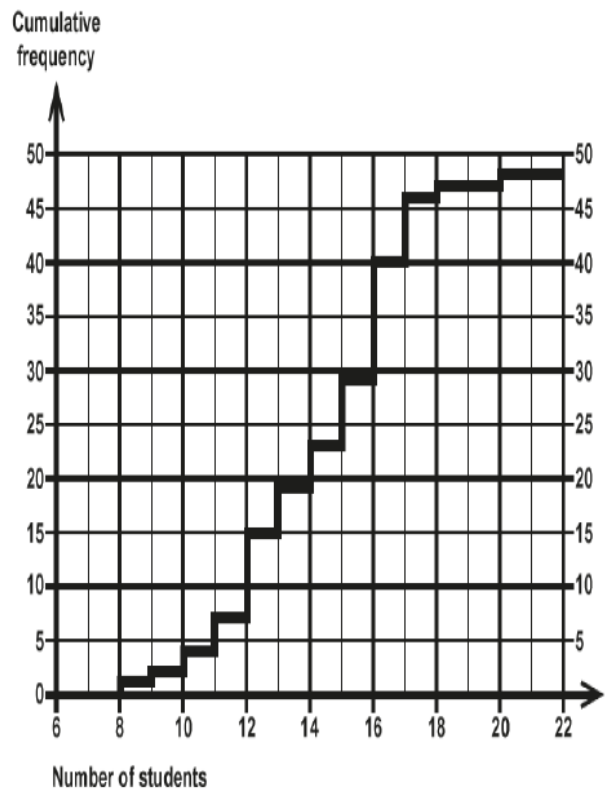
Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

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

Angles: $\pm 5^\circ$

Measurements of length: ± 5 mm

Paper: 5ST1H/01		
Question	Modification	Mark scheme notes
Q01	Table has been turned to vertical format.	
Q02	Diagram enlarged. Horizontal line has been added to the bottom of the stem and leaf diagram.	
Q03	Diagram enlarged.	
Q04	Diagram enlarged. Key has been moved to the left of the diagram. Shading has been changed.	
Q05	2010 column has been removed. Wording added 'adapted from' after 'Source:'	
Q06	Diagram enlarged. Shading removed. Points on the box plot have moved to: Free style: 54, 57, 59, 60, 61. Butterfly: 57, 61, 64, 66, 68. Horizontal axis has been extended to 70 and label has been moved to the left of the axis. Wording added 'adapted from' after 'Source:'	(d) Freestyle IQR = $60 - 57 = 3$ Butterfly IQR = $66 - 61 = 5$ These values may be used for 1 st 3 marks (e) time > 61 indicates butterfly time < 57 indicates freestyle otherwise (time 57~61) could be either

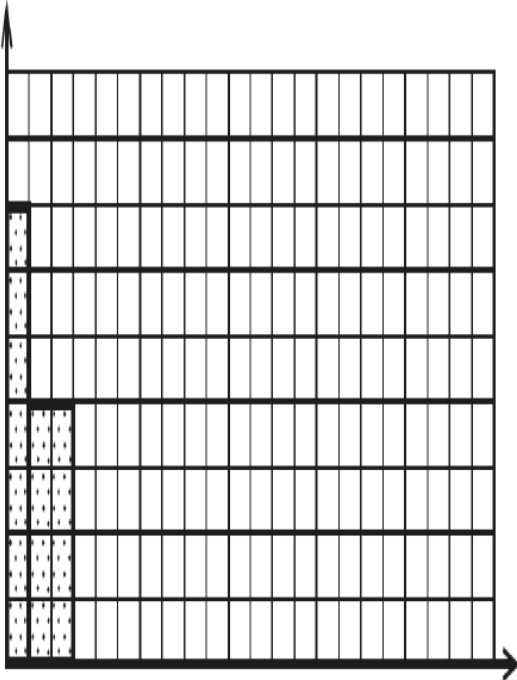
Question	Modification	Mark scheme notes																																
Q07	<p>Diagram enlarged. Axes labels have been moved to the left of the horizontal axis and above the vertical axis. Points on the diagram have moved. See screenshot. Right axis has been labelled. [Leeway will be needed].</p>  <table border="1" data-bbox="560 462 1164 1260"> <caption>Data points for the cumulative frequency graph</caption> <thead> <tr> <th>Number of students</th> <th>Cumulative frequency</th> </tr> </thead> <tbody> <tr><td>8</td><td>1</td></tr> <tr><td>9</td><td>2</td></tr> <tr><td>10</td><td>4</td></tr> <tr><td>11</td><td>7</td></tr> <tr><td>12</td><td>15</td></tr> <tr><td>13</td><td>19</td></tr> <tr><td>14</td><td>23</td></tr> <tr><td>15</td><td>29</td></tr> <tr><td>16</td><td>40</td></tr> <tr><td>17</td><td>46</td></tr> <tr><td>18</td><td>47</td></tr> <tr><td>19</td><td>48</td></tr> <tr><td>20</td><td>49</td></tr> <tr><td>21</td><td>50</td></tr> <tr><td>22</td><td>50</td></tr> </tbody> </table>	Number of students	Cumulative frequency	8	1	9	2	10	4	11	7	12	15	13	19	14	23	15	29	16	40	17	46	18	47	19	48	20	49	21	50	22	50	<p>(a)(iii) Mode = 16</p> <p>(c) $48 - 40 = 8$ OR $6+1+1 = 8$ (M1A1)</p> <p>M1 for 40 seen OR (6 and 1 and 1) seen</p>
Number of students	Cumulative frequency																																	
8	1																																	
9	2																																	
10	4																																	
11	7																																	
12	15																																	
13	19																																	
14	23																																	
15	29																																	
16	40																																	
17	46																																	
18	47																																	
19	48																																	
20	49																																	
21	50																																	
22	50																																	

Paper: 5ST1H/01

Question		Modification	Mark scheme notes
Q08		Table has been turned to vertical format.	
Q09		Diagram enlarged. Axes labels have been moved to the left of the horizontal axis and above the vertical axis. Right axis has been labelled. Crosses have been changed to solid dots.	
Q10		Table has been turned to vertical format.	
Q11		The first two tables have been turned to vertical format.	
Q 11	(b)	Braille only: will label the answer spaces (i) to (iii) from top to bottom.	

Paper: 5ST1H/01

Question		Modification	Mark scheme notes
Q12		Numbers in the table have been changed to: Age Frequency $0 \leq x < 5$ 175 $5 \leq x < 15$ 200 $15 \leq x < 25$ 250 $25 \leq x < 45$ 500 $45 \leq x < 65$ 300 $65 \leq x < 100$ 350	
Q12	(a)	The number 38 has changed to 35.	$175 \div 5 (=35)$
	(b)	Diagram enlarged. 0-5 bar on the histogram has been moved down to the main grid line to match the change of numbers in the table.	Frequency densities: (35, 20,) 25, 25, 15, 10 For bar heights accept tolerance ± 1 on frequency density values, and similar for horizontal placement

Question	Modification	Mark scheme notes
12 (cont)	(b) _____ _____ _____  _____	(c) M1: $300/4 + 350$ OR $5 \times '15' + 350$ A1: $\quad = 425$ (Hence 4 250 000)
Q13	All tables have been turned to vertical format.	

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