



Mark Scheme

Specimen Papers Set 1

Pearson Edexcel GCSE (9 – 1)
In Statistics (1ST0)
Higher (Calculator) Paper 1H

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General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

- 1** All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

- 2** All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no 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.

Questions where working is not required: In general, the correct answer should be given full marks.

Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

- 3** **Crossed out work**

This should be marked **unless** the candidate has replaced it with an alternative response.

- 4** **Choice of method**

If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line then mark both methods **as far as they are identical** and award these marks.

- 5** **Incorrect method**

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

6 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, 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 or its context. (eg an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. 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 fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

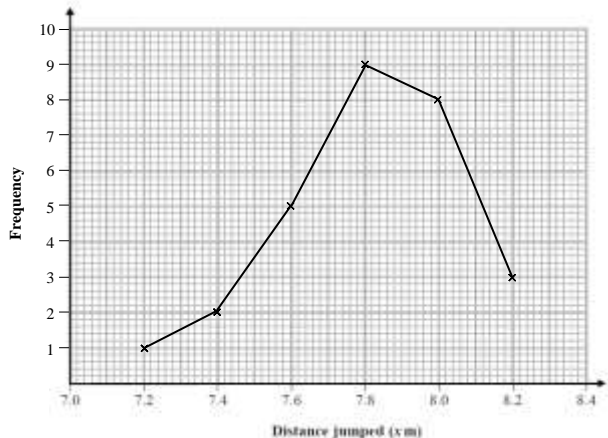
9 Range of answers

Unless otherwise stated, when an answer is given as a range (eg 3.5 – 4.2) then this is inclusive of the end points (eg 3.5, 4.2) and all numbers within the range.

Guidance on the use of abbreviations within this mark scheme

M	method mark awarded for a correct method or partial method
A	accuracy mark (awarded after a correct method; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Question	Answer	Additional guidance	Mark
1 (a)	B1 eg the number of films that were produced in the UK and made more than £40 million	B1 for a correct description which includes both events	(1)
(b)	B1 $\frac{5}{20}$	B1 allow equivalent fraction, decimal or percentage	(1)
(c)	M1 $\frac{\frac{3}{20}}{\frac{8}{20}}$ or for $\frac{k}{8}$ with $0 < k < 8$ A1 $\frac{3}{8}$	M1 for use of conditional probability $P(B A) = \frac{P(A \text{ and } B)}{P(A)}$ or for use of Venn diagram A1 allow equivalent fraction, decimal or percentage	(2)
(d)	M1 $\frac{5}{20} \neq \frac{3}{8}$ A1ft so they are not independent	M1 for a comparison of their part (b) and their part (c) A1 ft for correct conclusion based on their values (M1 must have been scored)	(2)
2 (a)	B1 Quota		(1)
(b)	B1 for eg <ul style="list-style-type: none"> • not random • not representative • biased • there are very different numbers of students from each nationality 	B1 for a correct statement explaining why the method of sampling is not appropriate	(1)
(c)	M1 $\frac{600 \times 979}{11727}$ A1 50	Accept a correct equivalent calculation	(2)
(d)	B1 The result is outside the range $-1 \leq r \leq 1$	B1 for correct interpretation of the correlation coefficient, allow the result is bigger than 1	(1)

Question	Answer	Additional guidance	Mark
(e)(i)	B1 Positive	B1 for correct statistical conclusion	(2)
(e)(ii)	B1 The students were in reasonable/good agreement oe	B1 for correct contextual interpretation of conclusion	
3	(a) B1 7.2, 7.4, 7.6, 7.8, 8.0, 8.2 M1 for $\Sigma fx = 7.2 \times 1 + 7.4 \times 2 + 7.6 \times 5 + \dots$ (218.8 \div 28) A1 7.8	B1 for midpoints correct. Condone one error. (Can be implied by 218.8 seen) M1 for sensible attempt at Σfx (x must be a consistent value within each class) A1 for awrt 7.8 not from wrong method	(3)
(b)	 <p>B1 Correct heights B1 Correct horizontal and joined B1 All correct including polygon, scale and label</p>	Different vertical scales are possible. $\frac{1}{2}$ square tolerance on plots. B1 for at least 5 points at correct height, consistently within intervals. (If no correct scale check relative heights: $k, 2k, 5k, 9k, 8k, 3k$) B1 for at least 5 correct horizontal plots <u>and</u> attempt at joining (ignore extra lines) B1 for fully correct frequency polygon with consistent numbered and labelled scale (For 3 rd B1 ignore lines joining first/last points to axis but not to each other)	(3)
(c)	B1 ft Negative (skew)	B1 for correct conclusion about the skewness B0 for negative correlation or negative trend	(1)

Question	Answer	Additional guidance	Mark
6 (a)	B1B1 for each appropriate comment from <ul style="list-style-type: none"> Data must be formatted/cleaned Data must be given in the same units/rounded to the nearest minute Data must be ordered 	B1B1 for each appropriate comment relating to the data	(2)
(b)(i)	B1 eg Not appropriate since the data is not bivariate	B1 for not appropriate with supporting reason about the data	(1)
(b)(ii)	B1 eg Appropriate since the data is continuous	B1 for appropriate with supporting reason	(1)
(b)(iii)	B1 eg Not appropriate since the data is all taken from one day	B1 for not appropriate with supporting reason about the data	(1)
7 (a)	B2 It represents a 3.6% increase in house prices (from 2013 to 2014)	B2 for a contextual response including increase and 3.6% (B1 for an incomplete response)	(2)
(b)(i)	M1 165000×1.15 A1 (£)189 750	M1 for any equivalent correct calculation	(2)
(b)(ii)	B1 These index numbers represent the average house price increase – individual house prices may have more variability	B1 for a correct assessment of the appropriateness of using an index number for a single house price	(1)
(c)	M1 $\sqrt[4]{103.6 \times 106.3 \times 101.5 \times 101.6}$ or $\sqrt[4]{103.0 \times 103.6 \times 102.8 \times 104.8}$ A1 103.2(3172...) A1 103.5(4707...) B1 ft The yearly average rate of increase for Scotland is 3.2% or The yearly average rate of increase for Wales is 3.5% B1 ft The yearly average rate of house price increase is greater in Wales than in Scotland	M1 for an attempt at either geometric mean A1 for one correct value (which must come from correct working) A1 for both correct values (allow awrt 3sf) B1 for a correct interpretation in context for either figure B1 for correct comparison in context	(5)

Question	Answer	Additional guidance	Mark
8	<p>B1B1B1 for each of 3 assessments</p> <p>Though stratified sampling is an appropriate method to</p> <ul style="list-style-type: none"> eg represent the population eg reduce bias <p>It is not appropriate here since</p> <ul style="list-style-type: none"> eg sample size is too small (some strata would have few members selected) eg you shouldn't stratify by the variable you are investigating (age) 	B1B1B1 for each of assessments of the appropriateness of the sampling method	(3)
9 (a)	<p>M1 for a bell shaped curve</p> <p>A1 for French centred on 78 with tails ending at 72 and 84</p> <p>A1 for German centred on 85 with tails ending at 77.5 and 92.5</p> <p>A1 height for French greater than height for German (must be labelled to score the final A mark)</p>		(4)
(b)	<p>B3 The test results in German are generally greater than those in French because German has the greater mean and the test scores in German are more spread out than those in French because German has the greater standard deviation</p>	<p>B3 for a complete comparison of means and standard deviations in context</p> <p>(B2 for a comparison of means and standard deviations with no interpretation/incomplete interpretation)</p> <p>(B1 for comparison of mean or standard deviation only)</p>	(3)
(c)	<p>M1 $\frac{76 - 78}{2} (= -1)$</p> <p>M1 $(0.68) \div 2 + 0.5$ or $1 - (1 - 0.68) \div 2$</p> <p>A1 0.84</p>	<p>M1 for working out 76 is 1s.d. below mean</p> <p>M1 for use of 0.68 or 68%</p> <p>A1 allow 84% or equivalent fraction</p>	(3)
(d)	<p>B2 eg The calculation is unlikely to be valid as it assumes that her score on the French test is independent of her score on the German test</p>	<p>B2 for a complete response including lack of independence or randomness and correct conclusion</p> <p>(B1 for an incomplete response)</p>	(2)

Question	Answer	Additional guidance	Mark
10 (a)	B1 eg Half of the chocolate bars would be unsellable (below 60 g in weight)	B1 for any suitable reason	(1)
(b)	B1 mean of population should be approximately equal to mean of sample / 62 g B1 standard deviation of population will be greater than standard deviation of sample means / 0.4 g	B1 for a correct deduction about the mean B1 for a correct deduction about the standard deviation	(2)
(c)	M1 warning lines are $\bar{x} \pm 2$ s.d. action lines are $\bar{x} \pm 3$ s.d. A1 61.2 and 62.8 and 60.8 and 63.2 A1 warning lines and action lines drawn on graph B1 sample 7 is outside warning lines B1 so another sample 8 should have been taken immediately B1 sample 8 is also outside action limits so the machine should be stopped and reset	M1 for attempting to find warning lines or action lines A1 for correctly calculating the warning lines A1 for correctly drawing warning and action lines B1 for identifying sample 7 outside warning line B1 for stating the appropriate action to take after sample 7 B1 for stating the appropriate action to take after sample 8	(6)

Question	Answer	Additional guidance	Mark
11 (a)	M1 $\sqrt{\frac{286.875}{50} - (2.29)^2}$ A1 0.7(0242...) which is 0.7 to 1 decimal place	M1 for a correct expression for the standard deviation (allow without square root) A1 for awrt 0.7 from correct working	(2)
(b)	M1 Median = $2 + \frac{9}{17} \times 0.5$ A1 2.26(47...) M1 Skew = $\frac{3(2.29 - 2.26)}{0.7}$ A1 answer in the range 0.10 to 0.13	M1 for using linear interpolation to find the median A1 awrt 2.26 Allow 2.28 from using $(n + 1)/2$ M1 for using $\frac{3(\text{mean} - \text{median})}{\text{standard deviation}}$ A1 for answer in the range 0.10 to 0.13 Allow answer in the range 0.04 to 0.05 coming from use of $(n + 1)/2$	(4)
(c)	B1 ft (Slight positive skew) so the weights above the median have a greater spread than the weights below the median/more piglets have a weight less than the mean	B1 ft for a correct contextualised interpretation of the skew Allow nearly symmetric	(1)
(d)	B1 Outlier limits are $[\text{mean} \pm 3 \text{ sd}]$ 0.2 and 4.4 B1 $[0.2 < 0.5]$ So there are no lower outliers B1 $[4.0 < 4.4 < 6.0]$ We don't know the exact weight of the piglet in the $4.0 \leq w < 6.0$ class, so cannot determine if it is an outlier	B1 for using $\text{mean} \pm 3 \text{ sd}$ to obtain awrt 0.2 and awrt 4.4 B1 for no lower outliers B1 for not possible to determine if there is an upper outlier	(3)