



Mark Scheme

Specimen Papers Set 2

Pearson Edexcel GCSE (9 – 1)
In Statistics (1ST0)
Foundation (Calculator) Paper 2F

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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

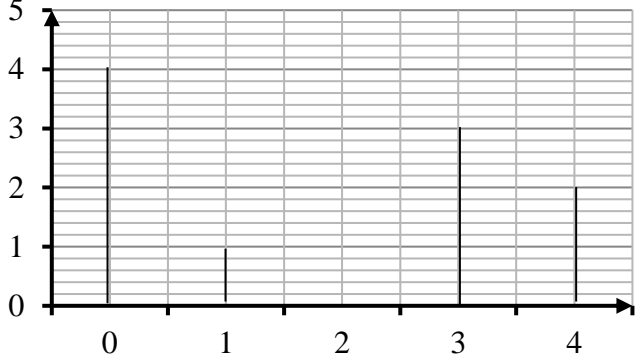
M	method mark awarded for a correct method or partial method
A	accuracy mark (awarded after a correct method; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
B	unconditional accuracy mark (no method needed)
oe	or equivalent
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 2015		(1)
(b)	M1 $5 + 7 + 2 + 6$ A1 20	M1 for identifying all 4 required values or for the addition of 4 numbers with at least 3 correct	(2)
(c)	B1 eg 'the data doesn't begin at year 0'	B1 for a suitable reason about the size of the graph or about the availability of the data	(1)

Question	Answer	Additional guidance	Mark
2 (a)	B2 continuous ordinal discrete	B2 for all 3 correct (B1 for any 1 correct)	(2)
(b)	B1 eg 'gender'	B1 for any relevant qualitative variable	(1)
(c)	B1 eg 'computer software/spreadsheet'	B1 for a suitable tool to help process data quickly	(1)

Question	Answer	Additional guidance	Mark
3 (a)	B1 C		(1)
(b)	B1 A and E		(1)
(c)	B1 $\frac{1}{2}$ oe	Allow equivalent decimal or percentage	(1)
(d)	B1 0		(1)
(e)	B1 ft 1	B1 ft 1 – their (d), provided that their (d) is a probability	(1)

Question	Answer	Additional guidance	Mark																				
4 (a)	B2 <table border="1"> <thead> <tr> <th>Age</th><th>male</th><th>female</th><th>Total</th></tr> </thead> <tbody> <tr> <td>18 to 22</td><td>(2)</td><td>(4)</td><td>6</td></tr> <tr> <td>23 to 29</td><td>(15)</td><td>18</td><td>33</td></tr> <tr> <td>30 to 36</td><td>13</td><td>8</td><td>(21)</td></tr> <tr> <td>Total</td><td>(30)</td><td>(30)</td><td>60</td></tr> </tbody> </table>	Age	male	female	Total	18 to 22	(2)	(4)	6	23 to 29	(15)	18	33	30 to 36	13	8	(21)	Total	(30)	(30)	60	B2 for all values correct (B1 for 3, 4 or 5 values correct)	(2)
Age	male	female	Total																				
18 to 22	(2)	(4)	6																				
23 to 29	(15)	18	33																				
30 to 36	13	8	(21)																				
Total	(30)	(30)	60																				
(b)	B1B1 ft Any two from <ul style="list-style-type: none"> There are more 18 to 22 year old (younger) females than males There are more 23 to 29 year old females than males There are more 30 to 36 year old (older) males than females 	B1 ft for one suitable comparison Allow each bullet point once. Ignore extraneous non-contradictory comments	(2)																				

Question	Answer	Additional guidance	Mark
5 (a)	<p>B2</p>  <p>B1 The mode number of pets for Year 7 is 1 B1 The mode number of pets for Year 8 is 0</p> <p>B1 ft The mode for Year 7 is greater than the mode for Year 8 B1 ft eg 'Year 7s have more pets on average than Year 8s'</p>	<p>B2 for all correct vertical lines (B1 for one or two errors)</p> <p>B1 ft for a correct ft comparison B1 ft for a correct ft conclusion</p>	(6)
(b)	B1 eg 'collect more data'	B1 for a suitable improvement	(1)
(c)	B1 eg 'use multiple bar charts'	B1 for a suitable suggestion that allows data to be compared easily	(1)
(d)	<p>B1 ft eg 'only valid for students in Year 7 and Year 8 at her school' 'not valid since the total number of pets is the same in both year groups' 'small samples may not be representative so conclusion may not be valid'</p>	B1 ft for a suitable assessment of the validity of the conclusion to Sadie's investigation	(1)

Question	Answer	Additional guidance	Mark
6 (a)	B1 the composite bar chart is shorter for (8-11 year olds) (37 < 47)	B1 for correct reason	(1)
(b)	B1 The time spent watching television for each group is the same, (14 hours)	B1 for correct comparison	(1)
(c)	B1 eg 'may not be reliable since children may not know exactly how much time they spend doing these activities'	B1 for a suitable comment on the reliability	(1)

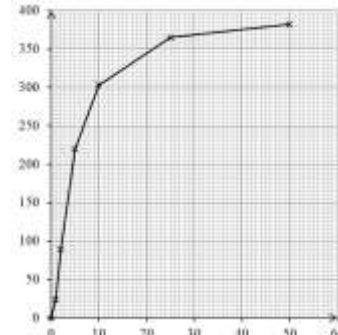
Question	Answer	Additional guidance	Mark
7 (a)	B1 eg 'convenient'	B1 for any suitable advantage of opportunity sampling	(1)
(b)	B1 eg 'not random'	B1 for any suitable disadvantage of cluster sampling	(1)
(c)	M1 $\frac{930}{6200} \times 150$ A1 22 or 23	M1 for an equivalent calculation (may be implied by a correct answer or by 22.5)	(2)
(d)	B2 eg 'Method 3 is most representative since it guarantees people from all ages are included in the sample'	B2 for Method 3 and correct supporting reason (B1 for Method 3 with incomplete reasoning)	(2)

Question	Answer	Additional guidance	Mark
8 (a)	B1 9.8		(1)
(b)	<p>B1B1 for considering the data eg</p> <ul style="list-style-type: none"> • ‘small data set’ • ‘data set may not be representative (of all adult cats)’ • ‘not a random sample’ <p>B2 for naming an appropriate average with a supporting reason eg</p> <ul style="list-style-type: none"> • ‘she should use the mean as it uses all the data’ • ‘she should use the median as it is less affected by extreme values’ <p>B1 for considering the effect of the outlier eg</p> <ul style="list-style-type: none"> • ‘outliers affect the mean’ • ‘outlier will have less of an effect the median’ • ‘including the outlier may lead to an overestimate’ • ‘it would be appropriate to include the outlier as it may be a real data value’ 	<p>B1 for each correct consideration of the data (up to B2)</p> <p>B2 for correct of average and supporting reason (B1 for naming an appropriate average and an attempt at a reason)</p> <p>B1 for an appropriate comment about the effect of the outlier</p>	(5)

Question	Answer	Additional guidance	Mark
9 (a)	B2 eg 'The median is greater than 5cm, so the students drew the line too long on average'	B2 for a complete answer which identifies the median and describes the accuracy (B1 for identifying a quartile from the box plot)	(2)
(b)	B1 positive		(1)
(c)	B1 eg 'There is a greater spread of length of lines drawn above the median than below the median'	B1 for a correct interpretation of skewness in context	(1)

Question	Answer	Additional guidance	Mark
10 (a)	B1 eg 'Histogram is suitable because the data is continuous/grouped'	B1 for assessing the suitability of using a histogram with correct supporting reason	(1)
(b)	B1 eg 'Not suitable since the data are skewed/not symmetric'	B1 for assessing the suitability of using the mean with correct supporting reason	(1)
(c)	B1 eg 'May not be appropriate as it is an estimate' or eg '50% of 117 is not a whole number'	B1 for a correct explanation	(1)

Question	Answer	Additional guidance	Mark
11 (a)	B1 6 (%)		(1)
(b)	B1 45 – 49		(1)
(c)	M1 $6.4 + 7.4 + 6 + 7$ A1 26.8(%) B1 Eric is correct	M1 for the addition of 4 numbers read off the population pyramid A1 for 26.8 A1 for Eric is correct	(3)
(d)	B1B1 for each comparison: eg <ul style="list-style-type: none"> The percentage of men is greater in 2017 The percentage of women is greater in 2017 There is an equal percentage of men and women in each year 	B1B1 for each comparison	(2)

Question	Answer	Additional guidance	Mark
12 (a)	B1 89, 220, 303, 365, 382	B1 for all correct cumulative frequencies	(1)
(b)	<p>B1 for correct horizontal plots B1 ft for correct vertical plots B1 ft for correct cumulative frequency graph allow with straight lines or curve</p> 	<p>B1 for correct horizontal plots B1 ft for correct vertical plots ($\frac{1}{2}$ square tolerance for plots)</p> <p>SC if B0 B0 then six correct points out of seven is B1</p> <p>B1 ft for correct cumulative frequency graph allow with straight lines or curve must be increasing curve for the ft</p>	(3)
(c)	B2 ft Hamish's conclusion is correct because the train median is higher than the median of the car which is 4.3	<p>B2 ft for correct conclusion from their graph with supporting figure for median</p> <p>Allow median in the range 4 to 5 or ft their graph providing their graph is increasing</p> <p>(B1 ft for median in range 4 to 5 or correct conclusion with incorrect supporting figure)</p>	(2)
(d)	B1 A cumulative frequency step polygon is more appropriate because data is discrete	B1 for any correct description why a cumulative frequency step polygon is more appropriate	(1)
(e)	<p>B1 Quota</p> <p>B1 Quota sampling is useful when</p> <ul style="list-style-type: none"> • time is limited • a sampling frame is not available • the research budget is tight • when detailed accuracy or randomness is not important 	<p>B1 for quota</p> <p>B1 for a correct explanation when it is appropriate to use quota sampling eg one of the bullet points</p>	(2)

Question	Answer	Additional guidance	Mark
13 (a)	B1 eg ‘allows two data sets to be compared easily’	B1 for a suitable reason	(1)
(b)	B1 $a = 53$ B1 $b = 43$ B1 $c = 62$	B1 for each correct value found	(3)
(c)	B1 eg ‘ $\frac{1}{2}$ as sample median is likely to be the same as the population median since it is a random sample’	B1 for $\frac{1}{2}$ and correct supporting reason (accept $\frac{12}{25}$ from the stem and leaf diagram)	(1)
(d)	B1 ft Canada IQR = 17 and UK IQR = 19 or Canada range = 43 and UK range = 44 B1 ft IQR/range in UK is greater than IQR/range in Canada B1 There is a greater spread of ages in the UK parliament	B1 for identifying both IQRs or ranges (allow ft from part (b)) B1 for a correct comparison of measure of spread (allow ft from part (b)) B1 for a correct conclusion in context	(3)
(e)	B1 Any one from • used to select sample • used to identify the population	B1 for a correct use of a sample frame	(1)
(f)	B2 eg ‘not a suitable sample frame since it does not include all members of the population’	B2 for assessing the suitability of the sampling frame with supporting reason (B1 for assessing the suitability of the sampling frame with incomplete reasoning)	(2)

Question	Answer	Additional guidance	Mark
14 (a)(i)	B1 $\frac{13}{40}$	B1 $\frac{13}{40}$ or equivalent or also allow 0.33 or 33%	(1)
(ii)	B1 $\frac{7}{40}$	B1 $\frac{7}{40}$ or equivalent or also allow 0.18 or 18%	(1)
(b)(i)	B1 $\frac{18}{40}$	B1 $\frac{18}{40}$ or equivalent	(1)
(ii)	B1 $\frac{9}{40}$	B1 $\frac{9}{40}$ or equivalent also allow 0.23 or 23%	(1)
(iii)	B1 ft $\frac{1}{2}$	B1 ft $\frac{1}{2}$ or ft their (ii)/their(i) provided they are both probabilities	(1)

