Mark Scheme

Specimen Papers Set 1

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

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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).

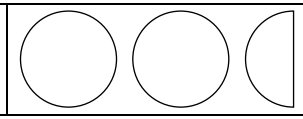
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Range of answers

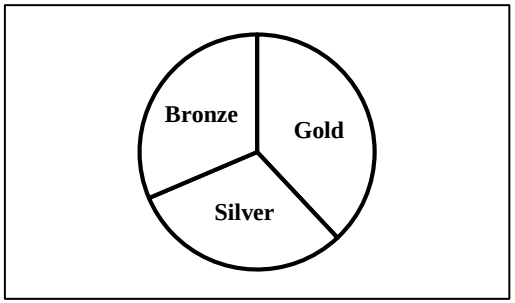
Unless otherwise stated, when an answer is given as a range (eg 3.5 – 4.2) then this is inclusive of the end points (eg 3.5, 4.2) and all numbers within the range.

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 tortoise 		(1)
	(b)	M1 $9 - 2$ or $3\frac{1}{2} \times 2$ A1 7		(2)
	(c)	B1 $10 + 9 + 2 + 5$ [= 26] or $10\frac{1}{2} \times 2$ or "13" × 2 B1 for conclusion in context	B1 for calculating statistic B1 for conclusion in context based on correct statistical reasoning	(2)
2	(a)	B1 for 150		(1)
	(b)	B1 for Canada		(1)
	(c)	B2 for yes AND correct reason eg 2924 ÷ 4 = 731 and 709 is reasonably close to 731 eg 709 ÷ 2924 = 0.242 and 0.242 is close to 0.25 OR if B2 not scored then B1 for an incomplete answer eg giving reasons but no conclusion eg yes AND 2924 ÷ 4 = 731		(2)

<table>
<tr><th colspan="2">Question</th><th>Answer</th><th>Additional guidance</th><th>Mark</th></tr>
<tr><td>3</td><td>(a)</td><td>B1 2014</td><td></td><td>(1)</td></tr>
<tr><td></td><td>(b)</td><td>B1 2008 and 2009</td><td></td><td>(1)</td></tr>
<tr><td></td><td>(c)</td><td>B1 for upwards</td><td>B1 for correct statement interpreting the trend</td><td>(1)</td></tr>
<tr><td></td><td>(d)</td><td>M1 for 81 – 8 or 61 – 13
A1 73 and 48
B1 for eg the difference in percentage of market share is greater in 2009 than in 2011</td><td>M1 implied by 73 or 48 correct
A1 for correct interpretation of data
B1 for correct comparison</td><td>(3)</td></tr>
<tr><td>4</td><td>(a)</td><td>B1 B1
<table><tr><th>Number of lollies in packet</th><th>Tally</th><th>Frequency</th></tr><tr><td>11</td><td>|</td><td>1</td></tr><tr><td>12</td><td>𝍸 ||</td><td>7</td></tr><tr><td>13</td><td>||||</td><td>4</td></tr><tr><td>14</td><td>|||</td><td>3</td></tr><tr><td>15</td><td>|||</td><td>3</td></tr></table></td><td>B1 any one row or one column correct
B1 all correct</td><td>(2)</td></tr>
<tr><td></td><td>(b)</td><td>B1 ft the mode is 12
B1 ft Katy is correct because 4 + 3 + 3 = 10</td><td>B1 for correct interpretation of data to find mode
B1for correct conclusion and explanation
ft allow not correct if their (4 + 3 + 3) ≠ 10</td><td>(2)</td></tr>
</table>

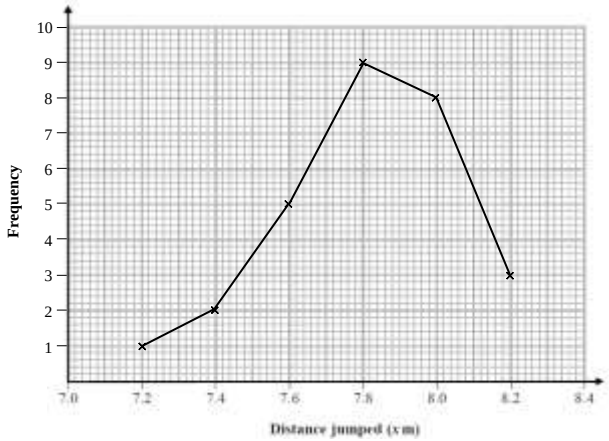
Question	Answer	Additional guidance	Mark
(c)	B1 ft $\frac{17}{18}$	B1 for $\frac{17}{18}$ oe	**(1)**
(d)	B1 ft for eg • Only 1 packet from Katy's sample has fewer than 12 lollies • The modal number of packets is 12 • $\frac{17}{18}$ is close to 1 (the probability of lollies >11)	B1 for a correct statement explaining the appropriateness of the packaging label	**(1)**
(e)(i)	B1 for eg • It might be quicker/easier to take the sample from the same machine • Katy may have only wanted to check the quality of one of the machines	B1 for a correct statement explaining the appropriateness of the data collection method (of sampling from one machine)	**(2)**
(e)(ii)	B1 for eg • One of the machines might be faulty and you might not find out if you only sampled from one machine	B1 for a correct statement explaining the inappropriateness of the data collection method (of sampling from one machine)	

Question	Answer	Additional guidance	Mark
5 (a)	B1 99		**(1)**
(b)	B1 Great Britain won (8) more gold medals than Russia	B1 for a correct comparison	**(1)**
(c)	B1 for eg the newspaper might use a pictogram to make it more visually appealing to the target audience	B1 for a correct statement assessing the appropriateness of pictograms considering the target audience	**(1)**
(d)	M1 $\frac{46}{121} \times 360$ or $\frac{37}{121} \times 360$ or $\frac{38}{121} \times 360$ Al for angles 137, 110 and 113 correctly drawn B1 for labels or key  	M1 for one correct angle calculation (implied by one sector drawn in tolerance 137, 110 or 113 seen) A1 all sectors correctly drawn B1 for labelling a 3-sector pie chart with gold, silver and bronze, or a correct key	**(3)**
(e)	M1 $\frac{46}{121}$ or $\frac{27}{67}$ A1 for 0.38 and 0.4 **and** conclusion Sanjit is not correct or 137° and 145° **and** conclusion Sanjit is not correct	M1 for correct interpretation of the data: $\frac{46}{121}$ (× 100) or $\frac{27}{67}$ (× 100) A1 for two figures in comparable form, allow percentages or equivalent fractions or both pie chart angles and the correct comparison and conclusion that the UK had a higher proportion	**(2)**

Question	Answer	Additional guidance	Mark
6 (a)	B1 for eg • A pilot study is a small scale version of the overall study used to evaluate and improve the design of the overall study B1 for eg • makes sure questionnaire gets relevant answers • makes sure questions are understood • to check response rate/likely responses • identifies ambiguity • improvements can be made to questionnaire • checks how long it will take	B1 for an explanation of a pilot study B1 for any sensible reason for doing a pilot study Do not allow: Checks spelling/proofread Checks for bias/leading questions Checks not offensive	**(2)**
(b)	B1 for eg • Easy and quick to answer • Response choice can clarify the question meaning • Improves consistency of responses • Easy to compare with other respondents or questionnaires • Easier, quick, and less costly to analyse	B1 for a correct statement assessing the appropriateness of closed questions	**(1)**
(c)	B1 for eg the spreadsheet does not add up non-numeric data/gives the wrong total	B1 for a correct statement assessing the reliability of the conclusion	**(1)**
(d)	M1 $\frac{17.2+17.2+18.6+26.6}{4}$ A1 19.9		**(2)**

Question	Answer	Additional guidance	Mark
7 (a)	B1 for eg • Boys at the school do more exercise than girls • There is no difference between the amount of exercise boys and girls at the school do	B1 any sensible hypothesis about boys and girls and exercise (B0 for a question)	**(1)**
(b)	B1 primary data is data you collect yourself B1 secondary data is data collected by someone else		**(2)**
(c)	B1B1 Qualitative Continuous Discrete	B1 for 1 correct B1 for all correct	**(2)**
(d)	B1 $60 \leq t < 80$		**(1)**
(e)	B1 for eg there are fewer classes means collecting/processing the data is easier	B1 for a correct statement explaining why table B is more appropriate	**(1)**
(f)	B1 for eg when data is grouped the mean is an estimate **or** for raw data the mean is exact B1 comparisons may not be as accurate if the means are calculated differently	B1 for correct explanation about effect on mean using raw or grouped data B1 for correct statement about the appropriateness of the comparison	**(2)**
8 (a)	M1 36 – 23 A1 13	M1 for attempt at IQR with at least one quartile (36 or 23) correct	**(2)**
(b)(i)	B1 The interquartile range is lower for phone B	B1 for correct comparison ft from *their* 13	**(1)**
(b)(ii)	M1 36 + 8 A1 44		**(2)**

Question		Answer	Additional guidance	Mark
9	**(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 $\mathrm{P}(B \mid A) = \frac{\mathrm{P}(A \text{ and } B)}{\mathrm{P}(A)}$ 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) A1ft for correct conclusion based on their values (M1 must have been scored)	**(2)**
10	**(a)**	B1 Quota		**(1)**
	(b)	B1 for eg • 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)**

Question	Answer	Additional guidance	Mark
(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)**
(e)(i) **(e)(ii)**	B1 Positive B1 The students were in reasonable/good agreement oe	B1 for correct statistical conclusion B1 for correct contextual interpretation of conclusion	**(2)**
11 (a)	B1 7.2, 7.4, 7.6, 7.8, 8.0, 8.2 M1 for $\Sigma fx = 7.2 \times 1 + 7.4 \times 2 + 7.6 \times 5 + \ldots$ (218.8 ÷ 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)	 B1 Correct heights B1 Correct horizontal and joined B1 All correct including polygon, scale and label	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 and attempt at joining (ignore extra lines) B1 for fully correct frequency polygon with consistent numbered and labelled scale (For 3rd B1 ignore lines joining first/last points to axis but not to each other)	**(3)**

Question	Answer	Additional guidance	Mark
(c)	B1 ft Negative (skew)	B1 for correct conclusion about the skewness B0 for negative correlation or negative trend	**(1)**
12	B1 for each of five correct comments eg • the hypothesis should be a statement not a question • time intervals are not exhaustive (eg there is no option for 0 or 7+) • time intervals need to be longer as many students are likely to spend more than 6 hours a week • a scatter graph is not appropriate (as horizontal axis is not numerical data) • it might be difficult for students to know the times as they might go on social media multiple times a day for short periods • it is not necessary to know the name of the student • he has not planned to collect the relevant information for a time series graph • calculating estimates of the means is sensible • finding the gender of the student is relevant	B1 for each correct comment on the appropriateness of the hypothesis or plans for collecting, processing and presenting the data	**(5)**
13 **(a)**	M1 $\frac{1}{20}$ or $\frac{2}{50}$ M1 $\frac{1}{20} \div \frac{2}{50}$ A1 1.25	M1 for $\frac{1}{20}$ oe or $\frac{2}{50}$ oe A1 for 1.25 oe	**(3)**
(b)	B1 ft for relative risk > 1 **and** Carla is correct	B1 for correct conclusion ft For *their* relative risk ≤ 1 **and** Carla is incorrect	**(1)**