



# Mark Scheme (Results)

November 2021

Pearson Edexcel GCSE  
In Statistics (1ST0) Foundation Tier  
Paper 2F

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- 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.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Additional guidance	Mark
1(a)	B1 for Evens		(1)
(b)	B1 for Certain		(1)
(c)(i)	B1 for B		(1)
(c)(ii)	B1 for F		(1)

Question number	Answer	Additional guidance	Mark																
2(a)	B3 for <table border="1" data-bbox="459 614 1265 989" style="margin-left: 40px;"> <thead> <tr> <th></th> <th>Day pass</th> <th>Weekend pass</th> <th>Total</th> </tr> </thead> <tbody> <tr> <th>Adult</th> <td>30</td> <td>37</td> <td>67</td> </tr> <tr> <th>Child</th> <td>32</td> <td>21</td> <td>53</td> </tr> <tr> <th>Total</th> <td>62</td> <td>58</td> <td>120</td> </tr> </tbody> </table>		Day pass	Weekend pass	Total	Adult	30	37	67	Child	32	21	53	Total	62	58	120	B1 for 53, 37 B1 for 32, 58 B1 for 62	(3)
	Day pass	Weekend pass	Total																
Adult	30	37	67																
Child	32	21	53																
Total	62	58	120																
(b)	B1 for $\frac{30}{67}$	Allow awrt 0.45	(1)																
(c)	B1ft B1ft for each of: an overall comparison e.g. <ul style="list-style-type: none"> <li>• overall there were more day passes than weekend passes sold</li> </ul> further comparisons e.g. <ul style="list-style-type: none"> <li>• more weekend passes for adult than day passes for adults</li> <li>• more day passes for children than weekend passes for children</li> <li>• more adults than children had weekend passes</li> </ul>	B1ft B1ft for two correct comparisons of sales of day passes and weekend passes  Follow through their (a).	(2)																

Question number	Answer	Additional guidance	Mark
<b>3(a)</b>	B1 e.g. <ul style="list-style-type: none"> <li>• not representative</li> <li>• only collecting data on one day/only Monday</li> <li>• the numbers for other days may be different</li> </ul>	B1 for identifying a problem with the method for data collection	<b>(1)</b>
<b>(b)</b>	B1 for discrete		<b>(1)</b>
<b>(c)</b>	B1 for each of two problems with the data e.g. <ul style="list-style-type: none"> <li>• Missing data / no data for 11:01-12:00</li> <li>• Data collected for a two hour period rather than a one hour period (13:01-15:00)/different time gaps</li> <li>• Inexact data – about 10</li> </ul>	B1 for each problem identified with the data  Do not allow timings are wrong on its own	<b>(2)</b>
<b>(d)</b>	B1 for a bar showing frequency 11 for photography	B1 for a correctly drawn bar for photography	<b>(1)</b>
<b>(e)</b>	B1 for sculpture		<b>(1)</b>

Question number	Answer	Additional guidance	Mark								
4(a)	B1 for primary	Allow features of primary data, for example reliable.	(1)								
(b)	B1B1 <table border="1" data-bbox="383 379 1151 536"> <thead> <tr> <th data-bbox="383 379 766 421">Type of house</th> <th data-bbox="766 379 1151 421">Tally</th> </tr> </thead> <tbody> <tr> <td data-bbox="383 421 766 459"></td> <td data-bbox="766 421 1151 459"></td> </tr> <tr> <td data-bbox="383 459 766 497"></td> <td data-bbox="766 459 1151 497"></td> </tr> <tr> <td data-bbox="383 497 766 536"></td> <td data-bbox="766 497 1151 536"></td> </tr> </tbody> </table>	Type of house	Tally							B1 for ‘type of house’ column or listing at least three options for type of house in a table B1 for separated space labelled tallies/frequencies/number/total  A question for a questionnaire is B0 even if there are types of house listed. A diagram (e.g. bar chart) is B0 even if there are types of house included on it.	(2)
Type of house	Tally										
(c)	B2 for median AND an appropriate reason e.g. <ul style="list-style-type: none"> <li>• Median is not affected by extreme values</li> <li>• Mean is affected by extreme values</li> </ul> B1 for an incomplete answer e.g. <ul style="list-style-type: none"> <li>• Median and an attempt at a reason</li> </ul> SCB1 for mean AND includes all of the data	B2 for a complete answer assessing the appropriateness of the technique  Or if B2 not earned... B1 for an incomplete answer assessing the appropriateness of the technique	(2)								
(d)	M1 5 – 2  A1 3 SC1 for 9		(2)								
(e)	B1ft e.g. the range is smaller in 2019 than it was 2014  B1ft e.g. the number of people living in the houses is less variable in 2019	B1ft for a correct comparison of the ranges B1ft for interpreting the comparison in context	(2)								

Question number	Answer	Additional guidance	Mark
5(a)	M1A1 Lines at 350, 380, 470 vertically and correct shading.	M1 for attempt at drawing a composite (i.e. stacked) chart, blocks in correct order (may be implied by at least 2 out of 3 lines correct) A1 fully correct composite bar chart	(2)
(b)	M1 for 320 – 280 A1 for 40	M1 for subtraction with at least one value correct A1 cao	(2)
(c)	B1ft e.g. (number of retirement cakes sold) decreased (over the three years)	B1ft for a correct conclusion relating to the sales of retirement cakes over the three years Follow through their composite bar chart.	(1)

Question number	Answer	Additional guidance	Mark
6(a)	B1 e.g. <ul style="list-style-type: none"> <li>• Reading and playing computer games is equally popular.</li> <li>• Watching TV was the least popular.</li> <li>• Playing outside was the most popular.</li> <li>• ¼ of primary students like reading the best.</li> </ul>	B1 for any correct conclusion based upon the primary school pie chart  Condone playing outside on its own	(1)
(b)	B1 for each of two conclusions comparing the primary and secondary students e.g. <ul style="list-style-type: none"> <li>• Greater proportion of primary students like playing outside.</li> <li>• Playing computer games is equally popular with both groups.</li> <li>• Greater proportion of primary students like reading best.</li> <li>• Greater proportion of secondary students like watching TV best.</li> <li>• Playing outside is the greatest for both</li> </ul>	B1 for each of two conclusions comparing the primary school pie chart to the secondary school pie chart  Condone 'more' for greater proportion	(2)

Question number	Answer	Additional guidance	Mark
7(a)	B1 Scotland and Italy	B1 for identifying both teams Allow in either order	(1)
(b)	B1 France and Italy	B1 for identifying both teams Allow in either order	(1)
(c)	B1 England	B1 cao	(1)
(d)	<p>B2 for Yes AND a reason which uses information from both tables e.g.</p> <ul style="list-style-type: none"> <li>Wales finished higher in the table than Scotland in both years</li> <li>Wales finished 2<sup>nd</sup> and Scotland finished 3<sup>rd</sup> in 2018, Wales finished 1<sup>st</sup> and Scotland finished 5<sup>th</sup> in 2019</li> </ul> <p>B1 for Yes AND a reason which uses information from one table e.g.</p> <ul style="list-style-type: none"> <li>Wales finished 2<sup>nd</sup> and Scotland finished 3<sup>rd</sup> in 2018</li> <li>Wales won more matches than Scotland in 2019</li> </ul>	<p>B2 for a complete answer assessing the appropriateness of the conclusion</p> <p>Or if B2 not earned... B1 for an incomplete answer assessing the appropriateness of the conclusion</p>	(2)
(e)	B1 for 28	B1 cao	(1)
(f)	<p>B2 for no AND a correct reason e.g. the data is all in the 20s so there would only be one row in the stem and leaf diagram</p> <p>OR if B2 not earned... B1 for an incomplete answer e.g. no with an attempt at a reason OR correct reason without a conclusion</p>	<p>B2 for a complete answer assessing the appropriateness of the choice of diagram Allow B2 for yes AND a description of how this could be done i.e. have a 20-24 stem and a 25-29 stem</p> <p>OR if B2 not earned... B1 for an incomplete answer assessing the appropriateness of the choice of diagram</p>	(2)



Question number	Answer	Additional guidance	Mark
8(a)	B1 Data collected by someone else	B1 for a correct explanation of secondary data	(1)
(b)(i)	<p>B1 (median = ) 5  M1 <math>7 - 4.5</math>  or <math>7 - 4.25</math></p> <p>A1 <math>=2.5</math> or <math>2.75</math>  B1ft Wolf pups median &gt; Fox pups median  B1ft Wolf pups IQR &gt; Fox pups IQR  B1ft e.g. there are on average more wolf pups in a den than fox pups in a den  OR e.g. there is a greater variation in the number of wolf pups in a den</p>	<p>B1 for median  M1 for attempt at calculating interquartile range  i.e. <math>7 - \textit{their} 4.5</math> or <math>\textit{their} 7 - 4.5</math>  (condone 3 on its own for M1)</p> <p>A1  B1ft for correct statistical comparison of medians  B1ft for correct statistical comparison of IQR  B1ft for interpreting one of the comparisons in context</p>	(6)
(b)(ii)	<p>B1 e.g.</p> <ul style="list-style-type: none"> <li>Reduces reliability as we do not know how data collected</li> <li>Reduces reliability as the two sets of data may have been collected differently</li> </ul>	B1 for identifying the impact of secondary data on the conclusions	(1)

Question number	Answer	Additional guidance	Mark
9(a)	B1 for 0.55 oe		(1)
(b)	B1ft for 1980	B1ft follow through their (a)	(1)
(c)	<p>M1M1  <math>0.4 \times 0.35 + 0.6 \times 0.55</math>  or <math>1 - (0.4 \times 0.65 + 0.6 \times 0.45)</math>  A1 0.47 oe</p>	<p>M1 for one correct product from the tree diagram  M1 for correct method to find probability that the book was borrowed in the last month  A1 for 0.47</p>	(3)

Question number	Answer	Additional guidance	Mark
<b>10(a)</b>	M1M1  $\frac{2.5 \times 7 + 7.5 \times 10 + 12.5 \times 9 + 17.5 \times 6 + 22.5 \times 3}{7 + 10 + 9 + 6 + 3}$ (= 10.78 ...)  A1 for 10.8	M1 for consistent use of $\sum fx$ with $x$ within interval (including ends)  M1 for correct use of $\sum fx$ with $x$ the mid-interval value (can be implied by 377.5)  A1 for awrt 10.8	<b>(3)</b>
<b>(b)</b>	B1B1 for each of two limitations of conclusion e.g. <ul style="list-style-type: none"> <li>• The data is just for Ben's office</li> <li>• Estimated mean in part (a) as we don't know the actual distances travelled/ have used midpoints</li> <li>• Don't know how the data for the newspaper article was collected/secondary data</li> <li>• Small sample size</li> <li>• Newspaper refers to 'average' – we don't <i>know</i> that this is the mean</li> <li>• We only know the average for 2001 and the year that Ben carried out his research.</li> </ul>	B1B1 for each of two limitations of conclusion          Do not accept Newspaper is out of date Source is unreliable	<b>(2)</b>

Question number	Answer	Additional guidance	Mark
<b>11(a)</b>	<p>B1 Suitable as does not require specialist knowledge to understand/easy to understand. e.g. suitable because you don't have to be a statistics lecturer to understand the diagram.</p> <p>OR</p> <p>B1 Not suitable as it is difficult to distinguish between the colours.</p>	<p>B1 for assessment of the appropriateness of using a choropleth map</p>	<b>(1)</b>
<b>(b)</b>	<p>B3 for yes/partially AND two correct statements, e.g.</p> <ul style="list-style-type: none"> <li>• as shows countries in the south have higher literacy rates (above 60%) as they have more darker areas.</li> <li>• whereas countries in the centre/north have lower literacy rates (below 60%) as they have more lighter areas.</li> <li>• However, a small number of countries in the very north have higher literacy rates (above 60%) too.</li> </ul> <p>OR if B3 not earned...</p> <p>B2 for yes/partially AND one correct statement making reference to percentages or colours</p> <p>OR for two correct statements with no conclusion</p> <p>OR if B2 not earned...</p> <p>B1 for yes/partially with an attempt at a reason and not making reference to percentages or colours</p> <p>OR for a correct statement without a conclusion</p>	<p>B3 for a complete answer assessing the appropriateness of the conclusion</p> <p>OR if B3 not earned...</p> <p>B2 for an incomplete answer assessing the appropriateness of the conclusion.</p> <p>OR if B2 not earned...</p> <p>B1 for an attempt at assessing the appropriateness of the conclusion</p>	<b>(3)</b>

Question number	Answer	Additional guidance	Mark
<b>12(a)</b>	B1 for negative (correlation)  B1 for correct interpretation of negative correlation e.g. as the engine size increases the number of miles per gallon decreases	B1 for correct identification of correlation B1 for correct interpretation of correlation	<b>(2)</b>
<b>(b)(i)</b>	B1 19.39 ...  B1ft for plotting (3.3, 19.4)	B1 for mean city fuel usage (implied by correctly plotting of the double mean point) B1ft for correct plotting of double mean point (3.3,'19.4')	<b>(2)</b>
<b>(b)(ii)</b>	B1ft for acceptable line of best fit through the double mean point	B1ft for acceptable line of best fit through the double mean point, should extend from 1.5 to 6 for engine size and pass through (3.3,'19.4') or their mean point ft their mean point SC if B0B0 scored in (b)(i) then B1 can be scored for an appropriate line of best fit	<b>(1)</b>
<b>(c)</b>	B1 for correct explanation of why this is not appropriate e.g. <ul style="list-style-type: none"> <li>• Extrapolation / trend may not continue</li> <li>• beyond the range of values</li> </ul>	B1 for correct explanation of why this is not appropriate	<b>(1)</b>

Question number	Answer	Additional guidance	Mark
13	<p>B1 for each of five correct comments eg</p> <ul style="list-style-type: none"> <li>• the hypothesis should be a statement not a question</li> <li>• pre-test a good idea as it can identify issues/problems with the reaction time test</li> <li>• people might do better on the caffeine test because they have done the test before – biased</li> <li>• need to give more detail on test protocol e.g. how much coffee to drink, how long to wait after drinking coffee before doing second test</li> <li>• need to plan to control extraneous variables e.g. what time of day</li> <li>• people may not record data in spreadsheet accurately / may lie about their time</li> <li>• median/interquartile range are suitable measures to compare (as data may be skewed/have outliers)/needed to draw a box plot</li> <li>• good idea to consider outliers/may not be appropriate to remove outliers as they could be genuine data</li> <li>• box plots are suitable to e.g. show the distribution of the times</li> <li>• need to draw comparative box plots and not just one for after the coffee has been drunk</li> </ul>	<p>B1 for each correct comment on the appropriateness of the hypothesis or plans for collecting, processing and presenting the data</p>	(5)

Question number	Answer	Additional guidance	Mark
14(a)	B1 for random start point (from 1 to 20) B1 for selecting every 20th item		(2)
(b)	B1 for e.g. <ul style="list-style-type: none"> <li>not random</li> <li>not representative</li> <li>interval may coincide with some pattern in the population</li> </ul>	B1 for identifying a disadvantage of systematic sampling	(1)
(c)(i)	B1 for $100 < c \leq 150$	B1 for identifying the class interval which contains the median	(1)
(c)(ii)	M1 $100 + \frac{7}{20} \times 50$ A1 for 117.50	M1 for fully correct method for linear interpolation Allow use of $n$ or $n+1$ e.g. $100 + \frac{7.5}{20} \times 50$  A1 allow 117.50 or 118.75	(2)

