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Mark Scheme (Results)

November 2020

Pearson Edexcel GCSE
In Statistics (1ST0)
Foundation 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 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 number	Answer	Additional guidance	Mark
1(a)	B1 D B1 E B1 Correct description of an event with the probability $\frac{1}{6}$ e.g. (rolling) the number 1 B1 F	B1 for each correct Allow $\frac{1}{2}$ for D Allow $\frac{4}{6}$ oe for E Allow $\frac{5}{6}$ oe forF	**(4)**
(b)	B1 Certain		**(1)**

Question number	Answer	Additional guidance	Mark
2(a)	B1 Dec(ember)		**(1)**
(b)	B1 Continuous		**(1)**
(c)	B2 There were 7 wet months (and 7 > 6)/listing all 7 months from June onwards as wet months/ only 5 dry month, so more than half were wet months.	B2 for correct conclusion and supporting figure (B1 for incomplete answer which includes 7 wet months)	**(2)**

Question number	Answer	Additional guidance	Mark
3(a)	B1 5.8	B1 Allow 5.8%	**(1)**
(b)	B1 50 – 54	B1 Allow 50 to 54	**(1)**
(c)	B1 10 – 14	B1 Allow 10 to 14	**(1)**
(d)	B1 The percentages are the same.	B1 for a correct explanation Ignore incorrect figures if they have stated that the percentages are the same. Allow they are both 12.7%	**(1)**
(e)	B1 e.g. The figures have been rounded	B1 for a correct explanation	**(1)**

Question number	Answer	Additional guidance	Mark
4(a)	B1 e.g. Richard did not collect the information himself/collected by someone else	B1 for a correct reason Allow collected it from the internet/bbc Do not allow it has a source on its own	**(1)**
(b)	B1 5		**(1)**
(c)	B2 Not the best diagram/yes because… • it is difficult to accurately represent the fractions/percentages of cars • a pie chart would be better to show proportions • the key only shows what a full car represents	B2 for decision of not the best diagram with correct supporting reason (B1 for not the best diagram with attempt at reason) Do not allow difficult to read/hard to understand on its own	**(2)**
(d)	B2 Not expected as • black is the most popular car colour • other colours have higher percentages than blue • blue has the second lowest percentage.	B2 for not expected and correct supporting reason (B1 for an incomplete response identifying blue is not the mode in table 1.)	**(2)**
(e)	B1 e.g. • Because car colour is non-numerical • It is not possible to find the other averages	B1 for correct explanation why the mode is the most appropriate average to us Do not allow easier to find or not affected by extreme values	**(1)**
(f)	M1 for 0.10×60 or $8 \div 60$ A1 6 or 13.3% B1 There were more silver cars in the car park (Table 2) than the expected frequency (Table 1). ($8 > 6$ or 13.3%>10%)	M1 for 0.10×60 oe may be implied by 6 A1 correct number or correct percentage B1 correct comparison	**(3)**

Question number	Answer	Additional guidance	Mark
5(a)	B1 36		**(1)**
(b)	B1 median for Puzzle X > median for Puzzle Y B1 Puzzle Y is completed faster than Puzzle X	B1 for correct comparison B1 for correct contextual interpretation of the median	**(2)**
(c)	B1 22		**(1)**
(d)	B1 Puzzle X because it has the lowest range	B1ft for correct conclusion, ft their answer to (c) if less than 10	**(1)**
(e)	B1 The stem and leaf diagram is not ordered B1 The correct median is 37 (minutes)	B1 for explanation as to mistake in Hannah's method B1 for correct median	**(2)**

Question number	Answer	Additional guidance	Mark
6	M1 $\frac{943\,200 \times 1000}{52\,400\,000}$ A1 18 M1 $12 = \frac{\text{number of births} \times 1000}{66\,022\,273}$ A1 792 267	M1 a correct calculation for 1960 A1 18 cao M1 a correct calculation for the number of births in 2010 (may be implied by 792 267.2(76) A1 Integer value only (also allow 792000 792300 or 792270)	**(4)**

Question number	Answer	Additional guidance	Mark
7(a)	B1 e.g. • the population is very large • a sample will be easier/quicker to take • a sample would be cheaper • not practical (possible) to ask every child in the UK/less data to handle	B1 for a correct explanation why a sample is preferable to a census Allow converse statements if they include the word census.	**(1)**
(b)	B1 for a correct explanation e.g. • Not all students will do chores • There may be some outliers • They may not give the answers in the same units • They might not know how long they do chores for • Not all may agree on what a chore is B1 for a suggestion to overcome the problem e.g. • Before giving out the pieces of paper she could ask if they do chores • Ask them face to face • Give an incentive to complete the survey • She could plan to remove outliers • She should tell them to collect the information to the nearest hour • Give them options of timescales for how long they do chores • She could give them a defined list of chores.	B1 for any explanation of what problems she may encounter with regards to non-response or unexpected outcomes Do not allow the student could lie B1 for a suggestion of how to overcome the problem	**(2)**

Question number	Answer	Additional guidance	Mark
8(a)	B1 A **list** of **all** the students at his school	B1 for a suitable sampling frame Must have list or suitable alternative e.g. register/database and include the whole population Allow a list of students who have school meals	**(1)**
(b)	B1 Quota (sampling)		**(1)**
(c)	B1 B1 B1 B1 B1 for any 5 comments from A. Sampling method: • 70 students is a good sample size/appropriate sampling from every year group • The sampling method may generate more of one gender than another/take equal number of boys and girls from each year group • Sampling method is not random/year groups may be different sizes • Doesn't state how he will take his sample • B. Question: • Year group will not necessarily give the age • Favourite meal is not relevant to either hypothesis • Most of the questions are closed which will be easier to analyse/Question 3 is an open question • Question 4 is a leading question • Question 5 is not exhaustive/there is no option for 0 • Question 5 does not have a time frame C. Presenting data: • There may not be any vegetarians in the sample so a graph could not be drawn/ he hasn't asked if the students are vegetarian to draw a pictogram of the results • A pictogram is appropriate • He can't plot age on the axis as he only has year group	B1 for each correct comment (maximum 5) on the appropriateness of the plans. With at least one comment from each of sections A, B and C (with a maximum of 3 marks for comments from any one section).	**(5)**

(d)	B1 Advantage e.g. there are less groups to work with so data easier to handle/it's quicker to handle the data B1 Disadvantage e.g. less accurate	B1 for a suitable advantage of larger class intervals B1 for a suitable disadvantage of larger class intervals	**(2)**

Question number	Answer	Additional guidance	Mark
9(a)	M1 $(219792 + 221670 + 224554 + 225572) \div 4$ A1 (£)222 897	M1 implied by 891588/4	**(2)**
(b)	B1 1. It is not a valid conclusion as it is not possible to make a comment about **all** months you can only make a comment about the other 8 months on average or in total B1 2. It is not a valid comment because we only know about the first 6 months of 2018/don't know mean for the whole of 2018	B1 note even if their answer to (a) is lower than £221 244 it would still not be possible to say one fact about **all** of the months	**(2)**
(c)	B2 It represents a 32% increase in house prices (from 2011 to 2018)	B2 for a contextual response including increase and 32% (B1 for an incomplete response e.g. house price has increased) Do not allow the index number has increased on its own	**(2)**
(d)	B1 260 000 × 1.32		**(1)**
(e)	B1 e.g. not suitable because the change in price of flats may be completely different from that of detached houses/price of detached houses is different to flats/don't have index number for flats	B1 for a correct comment on the suitability using an index number for a house instead of flat	**(1)**

Question number	Answer	Additional guidance	Mark
10(a)	B1 Annual profit is the response variable because... • It depends on the distance to the car park • It is plotted on the *y*-axis	B1 for a correct reason. Allow equivalent wording. Condone 'vertical' axis.	**(1)**
(b)	B2 Mike is correct as the scatter graph shows negative correlation	B2 for a correct conclusion and mention of negative correlation. Allow a description of negative correlation provided it is does not simply restate the question (B1 for correct conclusion with attempt at reason)	**(2)**
(c)(i)	B1 Straight line with intercept 40 000 B1 Straight line through (325, 27 000)		**(2)**
(c)(ii)	B1 (£40000 is) the profit when the distance (from the car park) is 0 (metres)	B1 for correct interpretation of intercept 40 000 in context	**(1)**
(d)	B2 Restaurant A/250m estimate is more reliable because… • involves interpolation • 250 is inside the range of data	B2 for conclusion that A is more reliable (or B less reliable) with correct reasoning. (B1 for correct conclusion with attempt at reason)	**(2)**
(e)	B1 Conclusion is not valid because correlation does not imply causation	B1 for correct conclusion of not valid with a correct supporting reason	**(1)**
(f)	B1 64(%)	Allow awrt 64% Do not all – 64%	**(1)**

Question number	Answer	Additional guidance	Mark
11(a)	M1 for correct labelling of a scale A1 for 8 and 2	M1 implied by 8 or 2	**(2)**
(b)	M1 for correctly plotting one bar using their scale A1 for both bars correct on histogram (25 and 10)		**(2)**
(c)	B1 for positive (skew) B1 either correct interpretation • (the heights of trees) above the median have a greater spread the mean (tree height) is greater than the median (tree height)	B1 for correct identification of skew Do not allow positive correlation B1 for a correct interpretation of skew	**(2)**
(d)	M1M1 $\frac{1 \times 40 + 4 \times 120 + 32 \times 200 + 13 \times 280}{50} (= 211.2)$ A1 for David is incorrect with 211.2 B1 for identification of limitation of conclusion e.g. • Difference may not be the same at other locations • Both means are in the same class interval so we cannot be sure • We don't know the original data only the class intervals	M1 for consistent use of fx with x within interval M1 for correct use of fx with x the mid-interval value with division by 50 A1 for correct mean and conclusion that David is incorrect/No B1 for identification of limitation of conclusion For the final bullet point do not accept 'these are just estimates' on its own.	**(4)**

Question number	Answer	Additional guidance	Mark
12(a)	M1 $\frac{35}{400}$ or $\frac{245}{350}$ M1 $\frac{35}{400} \div \frac{245}{350}$ A1 0.125	M1 for $\frac{35}{400}$ oe or $\frac{245}{350}$ oe (0.0875 or 0.7) M1 complete attempt at relative risk A1 for 0.125 oe	**(3)**
(b)	B1 e.g. The risk of getting sunburnt when wearing sunblock is (87.5%) lower than the risk of getting sunburnt when not wearing sunblock. (8 times as likely)	B1 ft for correct interpretation of their relative risk value Must have a relative risk given in part (a)	**(1)**
(c)	B1 e.g. The risk of getting a stomach bug is not affected by whether or not the people drink tap water/ the risk of getting a stomach bug when drinking tap water or not drinking tap water is equal.	B1 for correct interpretation of relative risk value of 1	**(1)**

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