Mark Scheme (Results)

November 2020

Pearson Edexcel GCSE
In Statistics (1STO)
Foundation Tier
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 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 13		**(1)**
(b)	B1 impossible/no chance	B1 for any equivalent statement (also condone 0 and $\frac{0}{20}$)	**(1)**
(c)	B1 population		**(1)**
(d)	B1 e.g. 'He cannot since the sample does not include any teachers'	B1 for 'No' and correct supporting reason .	**(1)**

Question number	Answer	Additional guidance	Mark
2(a)	B2 B1ft | Oat	||||	4
Almond	⊮ ||	7
Total		33		B2 all tallies and frequencies correct (B1 any two correct) B1 correct (ft) total based on their frequencies	**(3)**
(b)	B1ft soya	B1ft their tally chart	**(1)**
(c)	B1 Mode for Tuesday is 'almond' depB1ft ….so no, they do no not have the same mode.	B1 identifying correct mode for Tuesday depB1ft dependent upon previous B1 for correct conclusion	**(2)**

Question number	Answer	Additional guidance	Mark
3	B1 Not appropriate since…	B1 for not appropriate and some attempt at a supporting reason B1 for each supporting reason why the representation is not appropriate (maximum B2)	**(3)**
	B1B1 • No (vertical) scale • In 3D • No labels • No title	Acceptable answers include • Can't measure from the (vertical) scale • Countries not shown	

Question number	Answer	Additional guidance	Mark
4(a)	B1 7		**(1)**
(b)	B2	B2 all 5 values correct (B1 any 2 correct)	**(2)**
(c)(i)	B1ft lunch	B1ft allow ft on their two-way table	**(1)**
(ii)	B1 $\dfrac{35}{94}$	B1 allow awrt 0.37 or awrt 37%	**(1)**
(iii)	B1 $\dfrac{63}{94}$	B1 allow awrt 0.67 or awrt 67%	**(1)**
(iv)	B1 $\dfrac{13}{32}$	B1 allow awrt 0.41 or awrt 41%	**(1)**

Table for part (b):

	Breakfast	Lunch	Dinner	Total
Year 9	(13)	(7)	**12**	(32)
Year 10	(8)	**9**	**10**	**27**
Year 11	(10)	(7)	(18)	(35)
Total	**31**	(23)	(40)	(94)

Question number	Answer	Additional guidance	Mark
5(a)	B1 13 855		**(1)**
(b)	B1 2013, 2014, 2017	Given in any order	**(1)**
(c)	B1 2015 and 2016	Either order	**(1)**
(d)	B1 Unemployed		**(1)**
(e)	B1 Method 2 is more appropriate since it is……………. B1 • Quicker • Cheaper • More convenient/easier	B1 for Method 2 and some attempt at reason B1 for any **correct** supporting reason Accept converses SC: B1 Method 1 as there is likely to be fewer non-responses	**(2)**

Question number	Answer	Additional guidance	Mark
6(a)	B1 e.g. 'Taller people are paid more'	B1 for any suitable hypothesis including height and salary.	**(1)**
(b)	B1 primary		**(1)**
(c)	B1 e.g. 'Salary is confidential/personal'	B1 for any suitable constraint which may prevent data collection	**(1)**
(d)	B1 quantitative		**(1)**
(e)	B1 systematic		**(1)**
(f)	B1B1 e.g. '(mean) age as the other variables have extraneous symbols'	B1B1 for age and supporting reason (B1 for identifying data for height and salary needs to be cleaned)	**(2)**

Question number	Answer	Additional guidance	Mark
7(a)	B1 e.g. 'The sector for fish has the largest area'	B1 correct reason allow size/area/angle	**(1)**
(b)	M1 Angle for fish is 220° $(\dfrac{220}{360} \times 54$ or $54 - \dfrac{140}{360} \times 54)$ A1 awrt 33 (million)	M1 for finding the angle in the pie chart. A1 awrt 33 (million) SC B1 for 33.75 (million)	**(2)**
(c)	B1 3		**(1)**
(d)	B1 e.g. '(about) 25% of pet owners own more than 3 pets'	B1 correct interpretation of the upper quartile (allow ft of their answer to (c))	**(1)**
(e)	B2 e.g. 'Not valid as she only asked pet owners.'	B2 for not valid and correct supporting reason (B1 for not valid with incomplete reasoning)	**(2)**

Question number	Answer	Additional guidance	Mark
8(a)	B1 e.g. 'The trend is upwards' (after 2015)	B1 correct description 'Positive correlation' is B0 Quarter by quarter description is B0	(2)
	B1. e.g. 'The annual inflation rate is increasing over the years'	B1 correct interpretation Quarter by quarter description is B0	
(b)	B1 for Q1 2018, 2.5 correctly plotted B1 for Q2 2018, 2.2 correctly plotted		(2)
(c)	B1 $\dfrac{0.4+0.3+0.4+0.4}{4}$ (= 0.375)	B1 for correct calculation	(1)
(d)	B2 e.g. 'Not suitable because it does not include all of the data'	B2 for Not suitable and correct supporting reason (B1 for reference to only 2 years of data)	(2)

Question number	Answer	Additional guidance	Mark
9(a)	M1 1×10 + 2×5 + 3×4 + 4×1 (= 36) A1 mean = 1.8 B1 range = 3 B1ft The mean is higher in Monday **or** the range is higher on Monday B1 The mean is higher on Monday **and** the range is higher on Monday so Cindy's first claim is supported and her second claim is not supported.	M1 for correct expression for the total A1 for correct mean B1 for correct range B1 comparison of means or ranges B1 comparison of means and ranges and correct comments on Cindy's claims.	(5)
(b)	B1 e.g. '(appropriate) since conclusions are likely to be more reliable'	B1 for correct comment on the appropriateness of the method.	(1)

Question number	Answer	Additional guidance	Mark
10(a)	B1 ordinal		**(1)**
(b)	B1B1B1 • Number **all** the students (from e.g. 000 to 466) • Select students with corresponding number from random number list • Select 50 numbers ignoring any repeats / numbers out of range	B1 for numbering B1 for selecting students with the corresponding selected numbers B1 for 50 unique numbers in range	**(3)**

Question number	Answer	Additional guidance	Mark
11(a)	B1 4.1(%) to 9.3(%) (decrease)		**(1)**
(b)	B1 13		**(1)**
(c)	B1 e.g. (Although more areas had a decrease) we do not know the numbers (of officers), only percentages. OR e.g. The fewer areas with a percentage increase might have more officers than those with a percentage decrease.	B1 Allow equivalent answers showing an understanding that we have percentages not numbers. Do not accept reference to total population (of officers) of England and Wales.	**(1)**
(d)	B1 Choropleth (map)	B1 Condone misspelling if intention is clear. (eg chloropeth)	**(1)**

Question number	Answer	Additional guidance	Mark
12(a)	M1 720 – 575 A1 145	M1 for identifying 720 and c where $560 < c < 580$ A1 for an answer in the range 140 to 159 Accept 140 000 to 159 000	**(2)**
(b)	B1 e.g. 'exact values can't be read off graph'	B1 for any equivalent reason	**(1)**

(c)	B2
	
	   • Italy has more alternative oe
	   • Italy has more diesel oe
	   • UK has more petrol oe
		B2 for all three bullet points
		(B1 for any one bullet point)
		Ignore extraneous non-contradictory comments
		Ignore figures
			(2)

(d)	B1 e.g. 'only shows the data for the 1st quarter'	B1 for a suitable reason why the data is not valid to reach the given conclusion	**(1)**

Question number	Answer	Additional guidance	Mark
13(a)	B1 0.97 in correct position on 1st stage B1 0.03, 0.97, 0.03, 0.97 correctly on 2nd stage		**(2)**
(b)	B1 0.97×0.97 $(= 0.9409)$	B1 for correct product of probabilities from their tree. (Working may be seen with tree) Answer not required. Ignore 'incorrect' answer if B1 awarded.	**(1)**
	In part (c) allow follow through from their tree only if all are probabilities. Working may be seen with tree.		
(c)	M1 $0.03 \times 0.97 \ (= 0.0291)$	1st M1 for one correct product using their '0.97' (Can be implied by 0.0291)	**(3)**
	M1 '0.0291' $\times 2 \ (= 0.0582)$	2nd M1 for complete correct method using 0.03 and their '0.97'. (Answer not required for this mark.)	
		A1ft for 'correct' ft probability and conclusion based on their probability. (Dependent on **both** M1 marks)	
	A1ft $= 0.058(2) \ (< 0.06 \text{ so ...})$ Shreya is correct		
ALT 1	M1 M1 $1 - 0.03 \times 0.03 - 0.9409 (= 0.0582)$	1st M1 for subtraction from 1 using one correct product from their tree. 2nd M1 for complete correct method for their tree. (Answer not required.)	
	A1ft $= 0.058(2) \ (< 0.06 \text{ so ...})$ Shreya is correct	A1ft as above	
		Using probability of at least one fake	
ALT 2	M1M1 $1 - 0.9409 (= 0.0591)$ or $0.03 \times 0.97 + 0.03 \ (= 0.0591)$ A1ft $= 0.059(1) \ (< 0.06 \text{ so ...})$ Shreya is correct	1st M1 for subtraction from 1 using one correct product from their tree. 2nd M1 for complete correct method for their tree. (Answer not required.) A1ft as above	

Question number	Answer	Additional guidance	Mark
14(a)	B1 e.g. 'May be an outlier/extreme value'	B1 for correct reasoning as to why the highest value could be removed Accept e.g. significantly taller	**(1)**
(b)	M1A1 Paris median = 128 London median = 150 B1 London has a greater median M1A1 Paris IQR (= 165 – 111) = 53 to 55 London IQR = 40 B1 Paris has a greater IQR	M1 for either median A1 for both correct (allow 127 to 129 for Paris) B1 correct comparison of medians Do not accept 'average' M1 for either IQR A1 for both correct B1 correct comparison of spreads SC if M0 scored for IQR B1 for the range of London is 110	**(6)**