



Mark Scheme

Specimen Papers Set 2

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 B1 for any two appropriate comments eg <ul style="list-style-type: none"> • Percentage axis does not start from zero • 3D effect (distorts the data) • Difficult to read heights/scale • Source is not properly acknowledged • Unclear what the percentage is of 	B1 for each of two comments explaining why the graph is not appropriate. Allow equivalent wording if meaning is clear.	(2)
(b)	B1 The bars for women are higher than the bars for men (for all years) oe	B1 for an equivalent comment (eg converse) explaining the statistical reasoning from the graph.	(1)

Question	Answer	Additional guidance	Mark
2 (a)	B2 Pictogram complete with 2 symbols for 1 bedroom homes and 3 symbols for 3 bedroom homes B1 eg  represents 2 homes	B2 for correctly completed pictogram for 1 bedroom homes and for 3 bedroom homes. Condone poor size/spacing. Otherwise B1 for 1 row correct. B1 for key completed to define one symbol	(3)
(b)	B1 ft 2		(1)
(c)	M1 $62 \div 25$ A1 $= 2.48$	M1 for correct calculation A1 cao	(2)
(d)	M1 Ashby: $6 + 5 = 11$, Knaresborough: $4 + 5 + 6 = 15$ OR difference is 4 A1 Knaresborough (has most available)	M1 for sufficient statistical reasoning to make a comparison A1 for correct conclusion	(2)

Question	Answer	Additional guidance	Mark
3	<p>M1 2 or fewer occupied = $(0 +) 2 + 4$, OR 3 or 4 occupied = $11 + 3$</p> <p>A1 Adrian is correct / there are 6 to choose from</p>	<p>M1 for attempt to find out how many have either ≤ 2 or ≥ 3</p> <p>A1 for correct conclusion. Working must be seen (may be on diagram)</p>	(2)

Question	Answer	Additional guidance	Mark
4 (a)	<p>B1 Not a good question, because...</p> <p>B1 ...it is an open question / no answer options / answers will be difficult to handle, OR ...it is personal / customers may not wish to answer</p>	<p>B1 for correct conclusion that question is poor</p> <p>B1 for a correct reason. Accept equivalent wording recognising that the question is open (and hence can lead to answers which are difficult to analyse), or that it could be a sensitive question.</p>	(2)
(b)	<p>B1 eg How much do you spend on books per month?</p> <p>B1 eg <input type="checkbox"/> £0 <input type="checkbox"/> £0.01 to £10 <input type="checkbox"/> £10.01 to £20 <input type="checkbox"/> over £20 </p>	<p>1st B1 for an unbiased question about amount spent on books</p> <p>2nd B1 for at least three options with a time frame (may be in question) with no overlaps or omissions</p>	(2)
(c)	<p>B1 Questionnaire eg can answer in own time / give more considered answers / feel less pressured / many can do at once / cheaper</p> <p>B1 Face to face eg can explain questions / get immediate answers / avoid non-response to questions</p>	<p>1st B1 for any advantage of using a questionnaire</p> <p>2nd B1 for any advantage of a face to face interview</p>	(2)

Question	Answer	Additional guidance	Mark
5 (a)	B1 (\$) 373 700 (thousand)	B1 accept 373 700 000	(1)
(b)	B1 Argo	B1 cao but condone misspelling if choice is clear	(1)
(c)	B1 4		(1)
(d)	<p>M1 Slumdog Millionaire (has highest USA Box Office takings, but...)</p> <p>A1 ... rating (8.0) is not highest OR $8.0 < 8.1$</p> <p>Alternative:</p> <p>M1 Highest ratings for Spotlight, 12 Years a Slave and No Country for Old Men</p> <p>A1 ...but highest takings were for Slumdog Millionaire</p>	<p>M1 for identifying Slumdog Millionaire</p> <p>A1 for correct conclusion (accept numeric comparison)</p> <p>Alt.</p> <p>M1 for identifying the three films with highest rating</p> <p>A1 for stating these films did not have the highest takings</p>	(2)
(e)	B1 Maximum runtime is 134 (minutes) (or 2h 14min) OR all runtimes are <u>< 150</u> (minutes).	B1 for statistical reasoning: identifying maximum runtime as 134 (oe) OR comparison of all with 150	(1)
(f)	<p>M1 $134 - 100$</p> <p>A1 $= 34$ (minutes)</p>	<p>M1 for correctly identifying maximum and minimum values OR subtraction with at least one value correct</p> <p>A1 cao</p>	(2)
(g)	B1 eg Longer films have higher box office takings / make more money	B1 for any appropriate hypothesis relating box office takings to film runtime.	(1)
(h)	<p>B1 B1 B1 for any three appropriate comments</p> <p>eg</p> <ul style="list-style-type: none"> • Not suitable/not valid • Sample very small • Sample not random • Includes Oscar winners only/other films are excluded • Not representative (of all films) • Source is likely to be reliable OR secondary data so may be unreliable • Data not up to date • Data does include his two variables (so may be suitable) • Will be quicker than finding his own data (so may be suitable) 	<p>B1 for each of three comments assessing the appropriateness of the plan.</p> <p>Accept each bullet point once only.</p> <p>Allow equivalent wording if meaning is clear.</p> <p>NB: Do not award marks for the last two bullets if contradicting a conclusion that using the data is not suitable/valid.</p>	(3)

Question	Answer	Additional guidance	Mark
6 (a)	B1 unlikely		(1)
(b)	B2 One tally added to each of Blue & Yellow AND frequencies 3, 9, 8 in table	B2 for a fully complete table with tallies and frequencies Otherwise... B1 for tallies correct OR frequencies correct OR one row correct	(2)
(c)	B1 $\frac{3}{20}$	B1 for $\frac{3}{20}$ or 0.15 or 15%	(1)
(d)	M1 20×0.1 or 20×0.6 or 20×0.3 A1 Expected frequencies Red = 2, Blue = 12, Yellow = 6	M1 for any one correct product (or one correct answer) A1 all correct	(2)
(e)(i)	B2 ft eg Spinner appears equally likely to land on each side + supporting reason: eg Blue most for both; red fewest for both; blue > yellow > red for both; results are similar; etc OR eg Spinner is not equally likely to land on each side + supporting reason: eg too few blue; too many yellow; etc	B2 ft for a conclusion (allow for or against equally likely) with a corresponding supporting argument. (Accept not biased / biased or fair / not fair) Otherwise B1 for an incomplete answer. eg correct reasoning but no conclusion NB: allow conclusions which follow through from their two tables	(2)
(ii)	B1 eg carry out more spins / get more results	B1 for explaining how to improve reliability in the method, recognising that relative frequency tends towards probability with a greater number of results	(1)

Question	Answer	Additional guidance	Mark
7 (a)	B1 eg sales increase (as time goes on)	B1 for a description of trend. Accept rising/upward trend (Condone 'positive' but 'positive correlation' is B0)	(1)
(b)(i)	B1 eg sales are higher in each quarter 3, OR lower in each quarter 1	B1 for correctly identifying a seasonal variation	(1)
(ii)	B1 eg it is warmer / it is summer / there is more demand for drinks, OR it is colder / it is winter / there is less demand for drinks	B1 for a sensible corresponding suggestion why sales are higher in quarter 3 OR why lower in quarter 1	(1)
(c)(i)	M1 $(180 + 260 + 300 + 240) \div 4$ A1 $\left(= \frac{980}{4} \right) = 245$	M1 for selecting the last 4 values from the graph (at least 2 correct) and division by 4 A1 cao	(2)
(ii)	B1 ft Their '245' plotted midway between Q2 & Q3, 2017	B1ft for correct horizontal positioning of their moving average	(1)

Question	Answer	Additional guidance	Mark
8 (a)	B1 eg Data is bivariate/paired OR so she can see if there is correlation (between her variables)	B1 for justifying appropriateness of a scatter diagram.	(1)
(b)	B2 Line of best fit drawn through (25.2, 72), Otherwise B1 For plotting (25.2, 72) OR a sensible line of best fit which does not go through double mean point.	B2 for an appropriate line which recognises that it should be drawn through the double mean point. B1 only for a partially correct answer	(2)
(c)	B1 Correct comment related to the graph (points 1 to 4) B1 Correct comment related to sample (points 5 to 8) B1 B1 B1 for any three further correct comments, eg 1. Points are close to a line (so strong correlation) OR some points not close to a line (so correlation not strong) 2. Line has positive gradient / points increasing left to right (so positive correlation) 3. Life expectancy is higher when age of mother is higher 4. Life expectancy increases by just over 2 years (eg 2.3) as age of mother increases by 1 year 5. Small sample of data / only valid for these 12 countries 6. Sample is not random / may not be representative 7. Source given is likely to be reliable OR secondary data may not be reliable 8. Data may be out of date 9. Statement A is (OR is not) appropriate* 10. Statement B is not appropriate * 11. Correlation does not imply causation	To gain all 5 marks at least one correct comment must be made interpreting the graph (equivalent to points 1 to 4) AND assessing the validity of conclusions based on the sample (equivalent to points 5 to 8) Accept equivalent comments for each example (1 to 11) 1. Assessing <i>strength</i> of correlation 2. Justifies <i>positive</i> correlation 3. <i>Interpreting</i> positive correlation 4. Interpreting gradient (accept 1sf from their line) 5. Assessing validity based on small sample 6. Recognising the sample may not be valid as not random 7. Considering the reliability of the source 8. Recognising that secondary data may not be up to date 9. Assessing the appropriateness of statement A (*dependent upon a correct supporting reason) 10. Concluding that statement B is not valid (*dependent upon a correct supporting reason) 11. Recognising that causation is not implied by correlation Ignore excess comments if not contradictory	(5)

Question	Answer	Additional guidance	Mark
9 (a)	B2 Fully correct frequency polygon	B2 for all five points correctly plotted and joined with straight lines. Condone lines joining to 'x'-axis but not joining start to end. Otherwise: B1 for five points plotted correctly (not joined), OR for at least three points correct and joined with straight lines	(2)
(b)	<p>B1 Correct comparison of average eg Wilbur Farm has larger litters on average, OR Wilbur mode (10) > Napoleon mode (8)</p> <p>B1 Correct comparison of dispersion eg Napoleon Farm has a greater spread of litter size, OR Napoleon range (6) > Wilbur range (4)</p>	<p>1st B1 for a correct comparison of average. Must see a word implying average. (eg 'Wilbur Farm has larger litters' alone is B0)</p> <p>2nd B1 for a correct comparison of dispersion. May refer to spread/range/variation. For each mark, listing alone (eg mode/range) without comparison scores B0</p>	(2)

Question	Answer	Additional guidance	Mark
10 (a)	B1 Each (student) has the same chance of selection, oe	B1 for a correct equivalent explanation of randomness	(1)
(b)	B1 All the students at her school	B1 for an answer indicating all the students, BUT an answer indicating population size (850) alone scores B0	(1)
(c)	<p>B1 One number (940) is out of range (so cannot be used)</p> <p>B1 One number (310) is repeated (so needs replacing)</p>	<p>1st B1 for a statement recognising that only numbers on the sampling frame can be used</p> <p>2nd B1 for recognising the repeated number has to be rejected.</p>	(2)
(d)	B2 Terri's method is not appropriate as the large population would make it impracticable	<p>B2 for a complete answer rejecting Terri's idea with an appropriate reason. eg it would take too long.</p> <p>OR</p> <p>B1 for an incomplete answer, eg correct reasoning without a conclusion, OR correct conclusion with an attempt at reasoning.</p>	(2)

Question	Answer	Additional guidance	Mark
11 (a)	M1 $\frac{890}{781} \times 100$ A1 114	M1 for correct calculation for index number A1 for an answer in the range 113.9 to 114.0	(2)
(b)	B1 ft eg both prices have increased OR male price has gone up by a greater percentage B1 ft eg male price has gone up by 14%	B1 ft for a statement implying that both prices have increased B1 ft for giving correct percentage for at least one index number Note: male prices have gone up by 1% more than female prices scores B2	(2)

Question	Answer	Additional guidance	Mark
12 (a)	B1 for 0.7, 0.4 and 0.8 in correct positions		(1)
(b)	M1 0.3×0.6 or “0.7” \times “0.8” M1 $0.3 \times 0.6 +$ “0.7” \times “0.8” A1 ft 0.74	1 st M1 for a correct product of (their) probabilities 2 nd M1 for complete method using their probabilities Allow ft provided probabilities are between 0 and 1	(3)
(c)	M1 $\frac{0.3 \times 0.6}{0.3 \times 0.6 + \text{“0.7”} \times \text{“0.8”}}$ A1 0.243...	M1 for correct method for conditional probability Allow ft provided probabilities are between 0 and 1 A1 for awrt 0.24	(2)

Question	Answer	Additional guidance	Mark
13 (a)	B2 Birth rate (per 1000 people) fell in both countries, but fell more in Germany	B2 for a complete answer that includes fall for both and greater fall for Germany OR B1 for an incomplete answer that includes a comparison eg Germany had greatest change, OR both fell	(2)
(b)(i)	M1 $12 = \frac{n \times 1000}{360000}$ or 12×360 A1 = 4320	M1 for correct use of crude birth rate with given population A1 cao	(2)
(ii)	B2 (May be) not valid as Coventry may have a different birth rate to the UK average	B2 for a complete answer recognising the poor validity of the estimate due to not knowing the birth rate for Coventry OR B1 for an incomplete answer, eg correct reasoning without a conclusion, OR correct conclusion with an attempt at reasoning. SC: Allow B1 for 'answer is valid as Coventry is in UK (or as all figures are for same year)'	(2)

