



F02-test Correlation and Causation (Foundation): Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 For each statement about correlation, write down True or False.

(i) Positive correlation means that as one variable increases, the other variable also tends to increase. (1)

(ii) Negative correlation means that both variables always decrease at exactly the same rate. (1)

(iii) If there is no correlation between two variables, the points on a scatter graph show no clear pattern. (1)

(Total for Question 1 is 3 marks)

2 State whether this pair of variables would most likely show positive correlation, negative correlation or no correlation.

The number of goals a football team scores in a season and the shirt number of their goalkeeper.

(Total for Question 2 is 1 mark)

3 For each description, write down whether it shows positive correlation, negative correlation or no correlation.

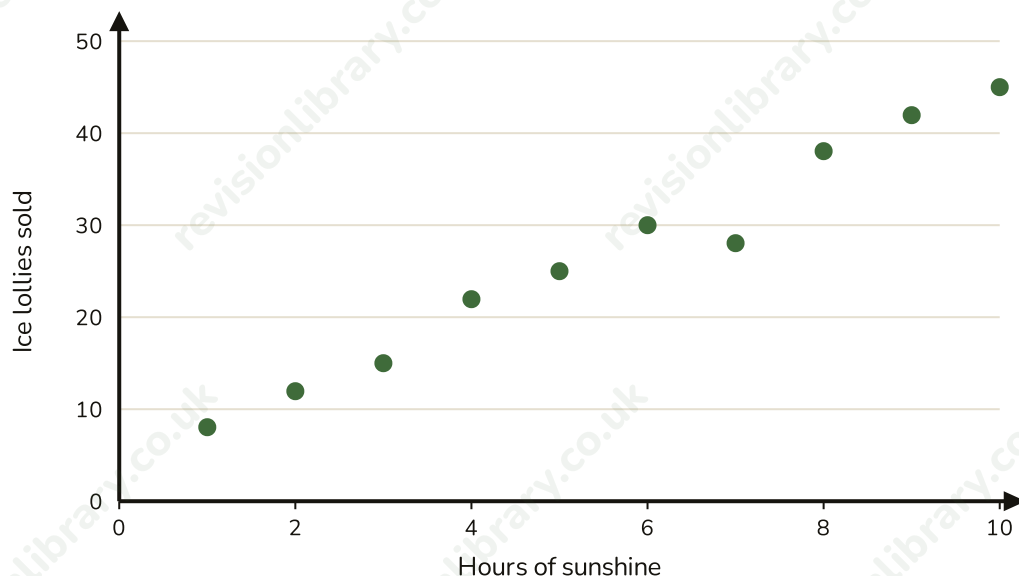
(a) As the age of a car increases, its value tends to decrease. (1)

(b) A pupil's shoe size compared with the last two digits of their home phone number. (1)

(c) As the midday temperature increases, the number of cold drinks sold at a shop tends to increase. (1)

(Total for Question 3 is 3 marks)

4 A market trader records the number of hours of sunshine and the number of ice lollies sold on 10 days. The scatter graph shows the results.



(a) Describe the correlation shown on the scatter graph. (2)

(b) Using the scatter graph, describe what this correlation shows about hours of sunshine and ice lolly sales. (1)

(Total for Question 4 is 3 marks)

5 Give the missing word.

Just because two variables are correlated, this does not mean that a change in one _____ a change in the other.

(Total for Question 5 is 2 marks)

6 A scientist plants 9 identical bean seeds and records the amount of water given each week, in ml, and the height of each plant after one month, in cm. The line of best fit is $h = 0.6w + 2$, valid for values of w between 20 and 100. (a) Use the line of best fit to estimate the height of a plant given 60 ml of water per week. (b) Explain why using this line to estimate the height for a plant given 250 ml of water per week would not be reliable.

(Total for Question 6 is 3 marks)

7 A researcher collects data from 10 towns and finds a strong positive correlation between the number of coffee shops in a town and the number of dentists in the town. A blogger claims: 'Opening more coffee shops causes more dentists to set up business.' Explain why the blogger's claim is not a valid conclusion, suggesting a more likely explanation for the correlation.

(Total for Question 7 is 3 marks)

8 A council collects data from 12 streets and finds a strong positive correlation between the number of streetlights on a street and the number of evening dog walkers seen there. It also finds a strong positive correlation between the number of evening dog walkers and the number of houses with a dog. Comment on whether this second correlation is more likely to reflect a genuine direct relationship than the first, giving a reason.

(Total for Question 8 is 4 marks)

Mark scheme · F02-test Correlation and Causation (Foundation): Test Pack

Question 1

- (i) **B1** True cao
- (i) **Answer: True**
- (ii) **B1** False cao
- (ii) **Answer: False**
- (iii) **B1** True cao
- (iii) **Answer: True**

Question 2

- **B1** no correlation cao
- **Answer: No correlation**

Question 3

- (a) **B1** Negative correlation cao
- (a) **Answer: Negative correlation**
- (b) **B1** No correlation cao
- (b) **Answer: No correlation**
- (c) **B1** Positive correlation cao
- (c) **Answer: Positive correlation**

Question 4

- (a) **B1** positive correlation
- (a) **B1** strong (correlation)
- (a) **Answer: Strong positive correlation**
- (b) **B1** as the number of hours of sunshine increases, the number of ice lollies sold tends to increase, oe (stated in context)
- (b) **Answer: As the hours of sunshine increase, more ice lollies tend to be sold.**

Question 5

- **M1** identifies the sentence is stating the correlation/causation rule oe
- **A1** causes oe (e.g. causing)
- **Answer: causes**

Question 6

- **M1** $0.6(60) + 2$ oe
- **A1** 38 cao
- **B1** 250 ml is well outside the range of data collected (20 to 100 ml), so this would be extrapolation and is unreliable oe
- **Answer: Estimated height at 60 ml = 38 cm; using the line at 250 ml would not be reliable because 250 ml is far outside the range of data collected (extrapolation).**

Question 7

- **B1** correlation does not prove causation
- **B1** identifies population/town size as a plausible confounding variable oe
- **B1** explains that a larger town supports more of both types of business, rather than one causing the other oe
- **Answer: The correlation does not prove causation. A likely confounding variable is the size of the town's population: a larger town can support more coffee shops and more dentists simply because it has more customers for both, rather than coffee shops causing dentists to open.**

Question 8

- **B1** recognises the streetlights/dog walkers correlation is likely explained by a confounding variable, e.g. safer/busier streets attract both more streetlights and more walkers oe
- **B1** recognises the dog walkers/houses with a dog correlation is more likely to reflect a genuine direct relationship oe
- **B1** gives a reason, e.g. a household needing to walk its dog directly explains an evening dog walker being seen there oe
- **B1** notes that neither correlation on its own proves causation without further investigation oe
- **Answer: The second correlation (dog walkers and houses with a dog) is more likely to reflect a genuine direct relationship, since owning a dog is a direct reason someone would be seen walking it; the streetlights/dog walkers link is more likely explained by a confounding variable such as how safe or busy a street feels. Neither correlation alone proves causation without further investigation.**