AQA

A Level

A Level Mathematics

Correlation (Answers)

Name:

M M E

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Total Marks:

L2- Correlation- Answers

AQA

1) **Frank says**

"there is no link between the dependent and independent variable as when we calculated the correlation coefficient it was $\mathbf{1.94 \times 10^{-6}}$***".***

i) Write the number $\mathbf{1.94 \times 10^{-6}}$ **in decimal form.**

[1 mark]

0.00000194

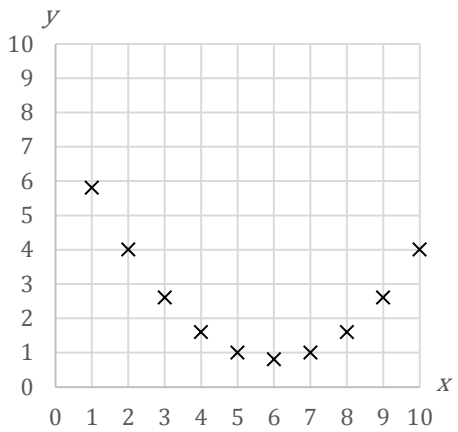
ii) Explain why Frank is incorrect, sketching a graph to support your argument.

[1 mark for linear]

[[1 mark for mention of relationship being of other form as shown by graph]

Correlation measures the linear relationship between pairs of observations. If the relationship isn't linear the correlation coefficient will be ~0. However, a relationship between variables could be of polynomial, exponential or logarithmic form (and therefore there is a link that could be modelled).

For example

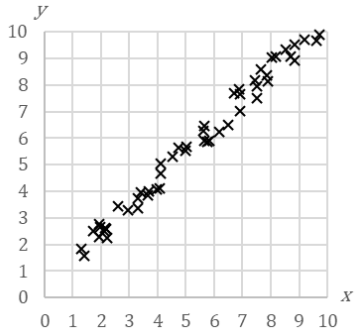


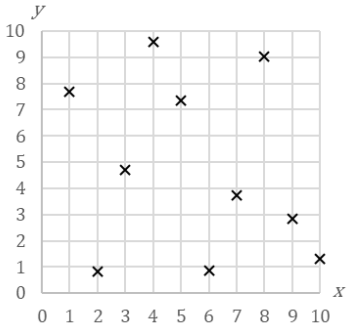
has no correlation but has a defined polynomial function.

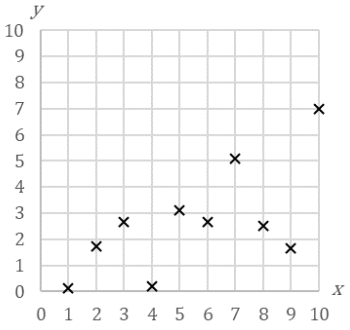
2) **The following six graphs represent randomly generated bivariate data. The Pearson Correlation has been calculated for each but not stated.**

i) Match each graph to one of the values.

[1 mark for each correctly match graph- 3 max]



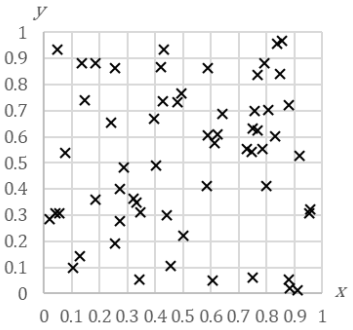


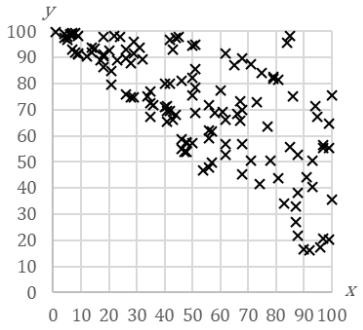


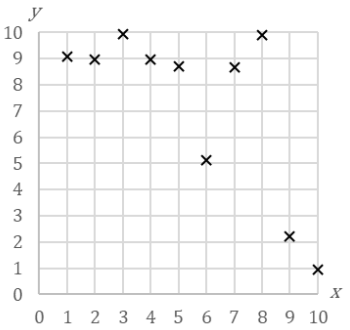
0.66 **-0.24** **0.87** **0.03** **0.99**

ii) For the remaining three, estimate the coefficient to 1 decimal place.

[1 mark for each correct answer in acceptable range- 3 max]







Has no observable correlation.

Acceptable range:

$$-0.1 \leq \rho \leq 0.1$$

Actual

$$\rho = -0.08$$

Has negative correlation, with some spread.

Acceptable range:

$$-0.8 \leq \rho \leq -0.6$$

Actual:

$$\rho = -0.71$$

Negative correlation, with spread, few observations.

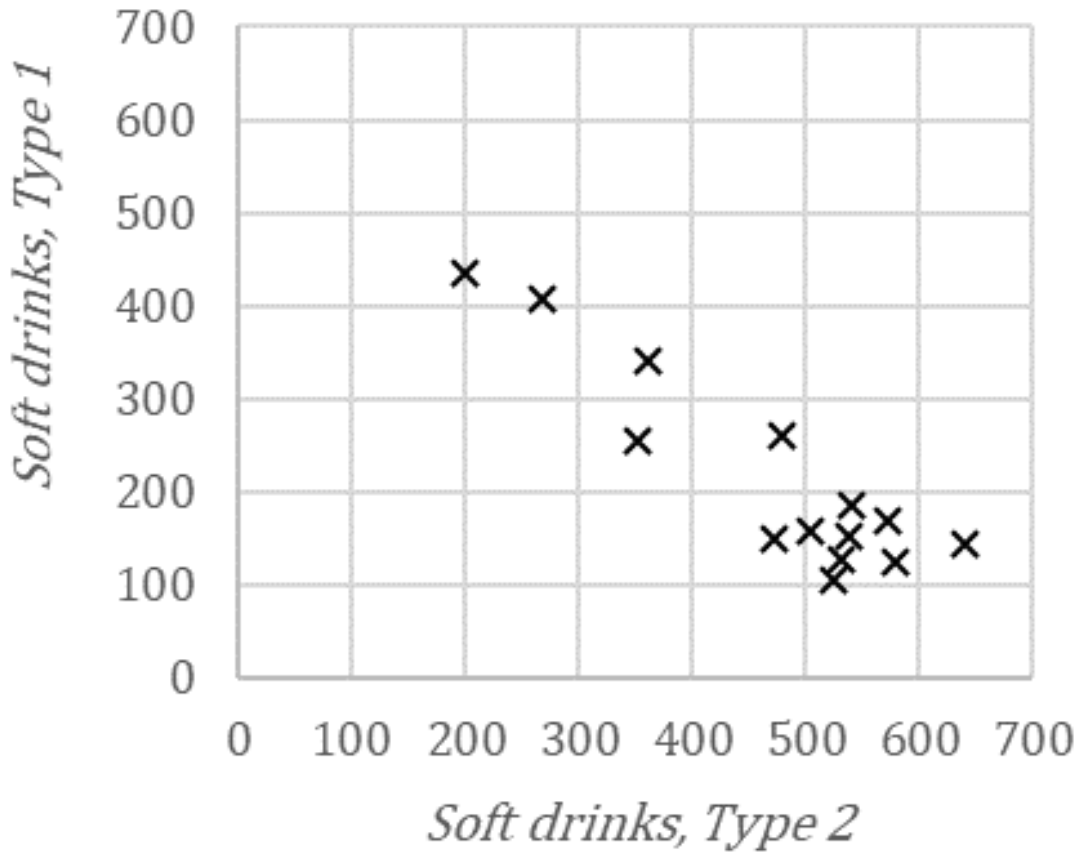
Acceptable range:

$$-0.75 \leq \rho \leq -0.55$$

Actual:

$$\rho = -0.69$$

3) **The large dataset[1] contains information on the consumption of soft drinks (*ml*). The graph of two types is shown below.**



i) Describe the relationship in words.

[1 mark for negative correlation]

[1 mark for what this means]

The graph shows strong negative correlation. As the consumption of Type 2 drinks increases the consumption of Type drinks decrease.

ii) Estimate the correlation.

[1 mark]

The actual correlation is -0.9. Any estimation <-0.8 would be acceptable.

iii) Suggest what the two types of drink are.

[1 mark]

The actual data is Type 1 (not low calorie) and Type 2 (low calorie). As people drink more of one they drink less of the other.

Any answer where one is a replacement of the other would be acceptable. Pepsi for Coca Cola, hot drinks for cold drinks, tea for coffee etc.