Correlation Coefficient

Choose one answer per question. Circle A, B, C, or D.

1. A classroom data set pairs the thickness of a book with its mass. The sample has Pearson’s r = 0.74. What direction does r describe?
   A. Positive
   B. Negative
   C. Exactly zero
   D. Undefined

2. A student copies four results from a calculator. Which value cannot be a Pearson correlation coefficient?
   A. 0
   B. −0.88
   C. 1.13
   D. 1

3. Which reported value describes the strongest linear association in its own sample?
   A. 0.78
   B. −0.93
   C. −0.62
   D. 0.49

4. A mock survey of shops gives r = −0.66 between delivery fee and number of orders. What does the negative sign indicate?
   A. Order counts must all be negative
   B. Higher fees tend to occur with more orders
   C. Every fee matches the same order count
   D. Higher fees tend to occur with fewer orders

5. Every recorded pair lies exactly on a rising straight line. Both variables vary. What is Pearson’s r?
   A. 0.5
   B. 1
   C. 0
   D. −1

6. More visitors buy iced drinks on warmer days, and the two measurements have a positive r. What can r alone establish?

A. There is a positive linear association in the sample
B. The drink purchases caused the days to be warmer
C. Temperature caused every purchase
D. There is no other factor affecting purchases

7. The points (−2, 4), (−1, 1), (0, 0), (1, 1), and (2, 4) have Pearson’s r = 0. What explains this?

A. A zero r prevents a relationship of any kind
B. The variables are both constant
C. The data have a perfectly negative linear trend
D. The U-shaped pattern has no net linear trend

8. A report gives r = 0.63 for distance and travel time. Every distance is converted from kilometers to meters. What is the new r?

A. −0.63
B. 0.00063
C. 0.63
D. The new value cannot be computed

9. An analyst adds 5 to all y measurements to align two scales. The x measurements stay the same. What happens to r?

A. It stays the same
B. It increases by 5
C. It changes sign
D. It becomes zero

10. A least-squares line has slope −2.4 and both variables have positive standard deviations. What must be true of r?

A. It is exactly zero
B. It is equal to −2.4
C. It is positive
D. It is negative

11. Four tests all use exactly 12 volts but record different currents. What happens when you calculate Pearson’s r for voltage and current?

A. It is 1 because the voltage never changes
B. It is exactly zero because current varies
C. It is undefined because voltage has zero standard deviation
D. It is negative because current changes

12. The measured relationship between x and y has r = 0.71. A second analyst uses −2y everywhere in place of y and leaves x unchanged. What is the new coefficient?

A. 0.71
B. −0.71
C. −1.42
D. 0.355

13. A sample has r = −0.57 with all points and r = 0.88 after removing one distant observation. What is the strongest conclusion from those results?

A. The sample size alone determines the sign of r
B. The observation is proven to be a data-entry error
C. The remaining data prove that one variable causes the other
D. The reported r is sensitive to that observation

14. A four-pair sample has r = 0.66 and a 100-pair sample also has r = 0.66. If both samples meet the usual test assumptions, which statement is correct?

A. The larger sample can provide stronger evidence even though the sample coefficients match
B. The two samples must have the same significance result
C. The smaller sample necessarily has a stronger linear association in its sample
D. Sample size is irrelevant to testing the population correlation

15. The centered data pairs are (−2, −1), (−1, −2), (0, 0), (1, 2), and (2, 1). Their cross products sum to 8, and each variable’s squared values sum to 10. What is r?

A. 0.64
B. −0.80
C. 0.80
D. 1.25