LESSON MAKER PRO

Correlation Checkpoint

Compute r and read the pattern.

HIGH SCHOOL · MA.912.DP.2.7

MA.912.DP.2.7 "Compute the correlation coefficient of a linear model using technology. Interpret the strength and direction of the correlation coefficient."

NAME _____ DATE _____

COMPUTE AND INTERPRET R

Use a spreadsheet or graphing calculator to compute Pearson correlation from paired numerical values. Keep each x with its matching y. The sign gives direction; |r| nearer 1 indicates stronger linear association. Correlation does not establish causation. A value near zero does not rule out a nonlinear relationship.

WORKED EXAMPLE

Use a spreadsheet to find r for (11,20),(13,25),(15,30).

1. Enter x in A2:A4 and its paired y in B2:B4.
2. Enter =CORREL(A2:A4,B2:B4) in another cell.
3. The result is 1; the points lie on an increasing straight line.

Answer: r=1, perfect positive linear correlation.

PRACTICE 6 problems

1 A correlation tool reports r=0.82 for weekly volunteer hours and number of community-service events attended. State the strength and direction of the correlation.

ANSWER _____

2 A correlation tool reports r=-0.18 for days absent and test score. State the strength and direction of the correlation.

ANSWER _____

3 A data set has r=-1. State the strength and direction of the correlation.

ANSWER _____

4 For the pairs (1,6), (2,8), and (3,7), compute r using a spreadsheet or graphing calculator. Record the function/command and interpret the result.

ANSWER _____

5 For the pairs (4,2), (5,0), and (6,1), compute r using a spreadsheet or graphing calculator. Record the function/command and interpret the result.

ANSWER _____

_____

6 A student reports a correlation coefficient of r=1.06. Is this possible? Explain.

ANSWER _____

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APPLY IT Show your work

1 Four students track the number of short videos they watch after school, x, and their homework scores, y. The pairs are (2,74), (4,76), (6,76), and (8,74). Use technology to compute r, record the function/command, then describe the strength and direction of the linear correlation.

2 Students record social-media minutes during the hour before bed, x, and hours of sleep, y. The pairs are (12,10), (24,9), (36,8), and (48,7). Use technology to compute r, record the function/command, then describe the strength and direction of the linear correlation.

CHALLENGE One step up

A spreadsheet reports r=-0.58 between daily social-media minutes, x, and sleep hours, y. A researcher creates a new variable s=12-y, where s is the number of hours below a 12-hour sleep target. What is the correlation coefficient between x and s? Explain your reasoning.

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A correlation tool reports r=0.82 for weekly volunteer hours and number of community-service events attended. State the strength and direction of the correlation.	**Strong positive linear correlation.**
2	A correlation tool reports r=-0.18 for days absent and test score. State the strength and direction of the correlation.	**Weak negative linear correlation.**
3	A data set has r=-1. State the strength and direction of the correlation.	**Perfect negative linear correlation.**
4	For the pairs (1,6), (2,8), and (3,7), compute r using a spreadsheet or graphing calculator. Record the function/command and interpret the result.	**r=1/2, so the data have a moderate positive linear correlation.**
5	For the pairs (4,2), (5,0), and (6,1), compute r using a spreadsheet or graphing calculator. Record the function/command and interpret the result.	**r=-1/2, so the data have a moderate negative linear correlation.**
6	A student reports a correlation coefficient of r=1.06. Is this possible? Explain.	**No. A correlation coefficient must be from -1 to 1.**

PART 2 · APPLY IT

1. **r=0, so there is no linear correlation.** The x deviations from the mean are -3, -1, 1, and 3, and the y deviations are -1, 1, 1, and -1. The products of the deviations add to 0, so r=0.
2. **r=-1, so there is a perfect negative linear correlation.** Every increase of 12 social-media minutes matches a decrease of 1 sleep hour. The points follow one decreasing line exactly, so r=-1.

CHALLENGE

r=0.58. The new variable s is found by multiplying y by -1 and adding 12, so the direction flips while the strength stays the same.

Accept 1/2 or 0.5, and accept equivalent wording for correlation strength and direction. For r=0, accept "no linear correlation" rather than "no relationship," because a nonlinear relationship may still exist. Provide spreadsheet or graphing-calculator access. Require the paired-data entry/range or command and output, then interpretation. Formula calculation may be an optional check, not a substitute for the specified technology use. Strength labels are contextual, not universal cutoffs.