

AP Statistics - Least-Squares Regression and Residuals - Test

Common Core AP STAT 2.6, AP STAT 2.7, AP STAT 2.8, AP STAT 2.9, HSS-ID.B.6, HSS-ID.C.7 · maths-pdf.fr/en/

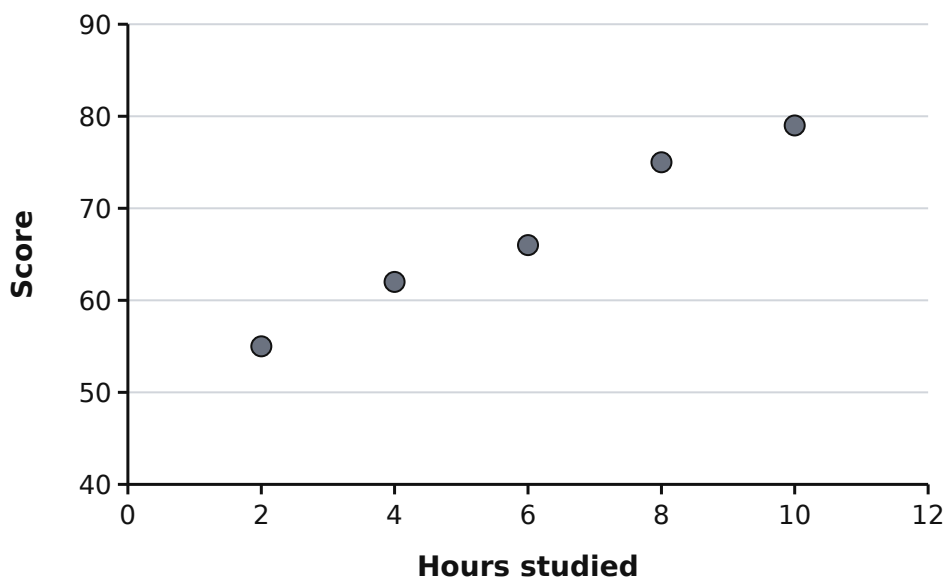
Name: _____ Class: _____ Date: ____/____/____

This 45-minute test covers least-squares lines, residuals, residual plots, r squared, and the cautions about extrapolation and influential points. Show your substitutions and interpret every number in context.

About this test

- Grade: AP Statistics
- Chapter: Least-Squares Regression and Residuals
- Standards: AP STAT 2.6, AP STAT 2.7, AP STAT 2.8, AP STAT 2.9, HSS-ID.B.6, HSS-ID.C.7
- Time: 45 minutes
- Total: 20 points

Question 1 - Regression line [3 pts]



Hours studied and score.

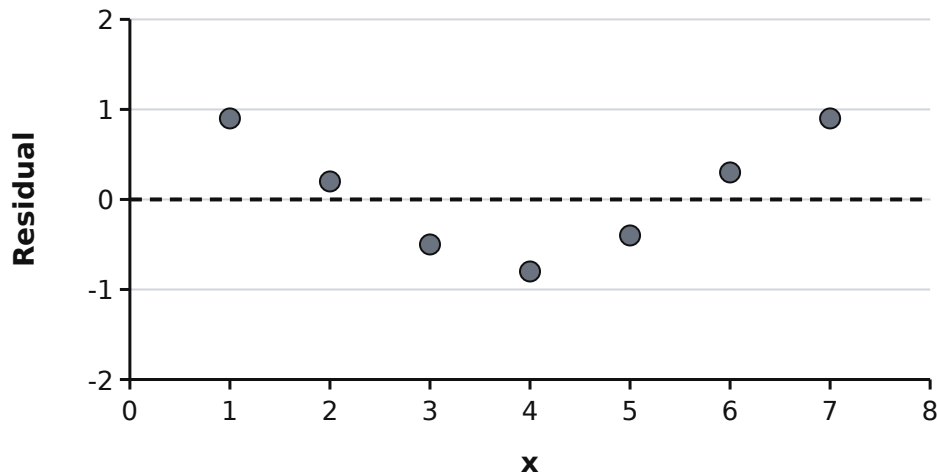
The least-squares line for hours studied (x) and score (y) is $\hat{y} = 49.1 + 3.05x$. (a) Predict the

score for 7 hours. (1 point) (b) Interpret the slope. (1 point) (c) Find the residual for the point (6, 66). (1 point)

Question 2 - Interpret r squared and s [2 pts]

A regression of tip amount on bill total has $r^2 = 0.88$ and $s = \$1.20$. Interpret both in context.

Question 3 - Residual plot [3 pts]



A residual plot.

(a) Describe the pattern in the residual plot. (1 point) (b) Is a linear model appropriate? (1 point) (c) What does a negative residual mean? (1 point)

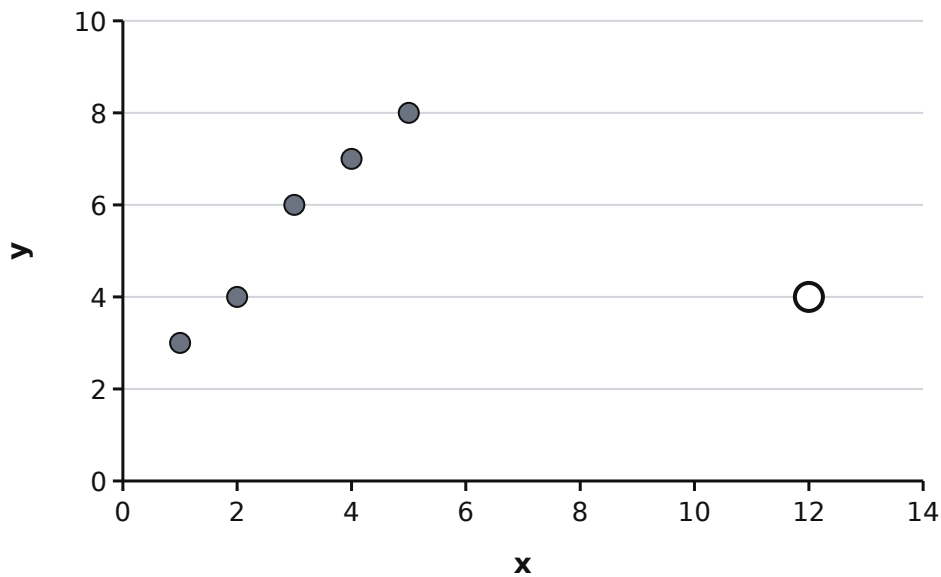
Question 4 - Slope from summary [3 pts]

For fuel use (y) against weight (x), $r = 0.8$, $\bar{x} = 3,000$, $s_x = 400$, $\bar{y} = 22$, $s_y = 4$. Find the slope and intercept of the regression line. (3 points)

Question 5 - Extrapolation [2 pts]

A line predicts the height of a child from age using data for ages 2 to 12: $\hat{y} = 32 + 2.4x$. Predict the height at age 40 and comment.

Question 6 - Influential point [2 pts]



A point far from the others.

Explain why the point at (12, 4) is likely to be influential.

Question 7 - Interpret the intercept [3 pts]

A line for a gym predicts calories burned from minutes: $\hat{y} = -12 + 9.5x$. (a) Predict the calories for 30 minutes. (1 point) (b) Interpret the slope. (1 point) (c) The intercept is negative. Explain why it should not be interpreted literally. (1 point)

Question 8 - Compute r [2 pts]

A regression has $r^2 = 0.49$ and negative slope. Find r and describe the association.