

Name _____

Date _____

AP Statistics

Period _____

Residual HW

- 1) One of the points in a set of points is $(4, 8)$. What is the residual for this point if the equation of the regression line for these points is $\hat{y} = 3.6 + 1.7x$?

A. -1.8
B. -2.4
C. -2.8
D. -3.2
E. -3.6

- 2) A least squares regression line was fitted to the weights (in pounds) *versus* age (in months) of a group of many young children. The equation of the line is

$$\hat{y} = 16.6 + 0.65t,$$

where \hat{y} is the predicted weight and t is the age of the child. A 20-month-old child in this group has an actual weight of 25 pounds. Which of the following is the residual weight, in pounds, for this child?

(A) -7.85
(B) -4.60
(C) 4.60
(D) 5.00
(E) 7.85

- 3) Which of the following statements about residuals are true?

I. The mean of the residuals is always zero.
II. The regression line for a residual plot is a horizontal line.
III. A definite pattern in the residual plot is an indication that a nonlinear model will show a better fit to the data than the straight regression line.

(A) I and II
(B) I and III
(C) II and III
(D) I, II, and III
(E) None of the above gives the complete set of true responses.

4) Which of the following statements are true?

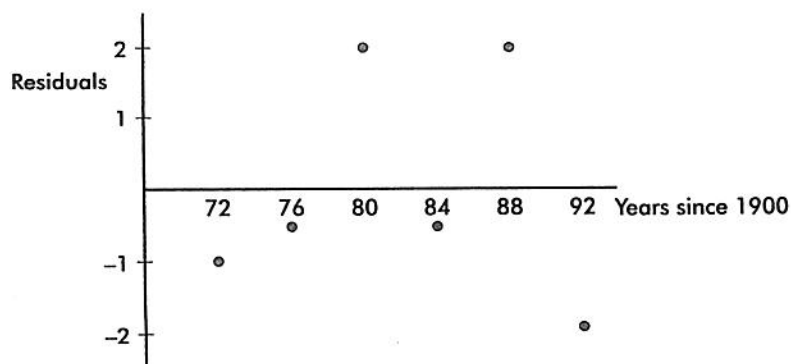
- I. A residual plot with no pattern indicates that a linear model is appropriate.
 - II. A residual plot with no pattern indicates that the correlation between the variables is 0 or close to 0.
 - III. Nonlinear variable relationships result in nonlinear residual plots.
- A. I and II
 - B. I and III
 - C. II and III
 - D. I, II, and III
 - E. None of the above are true.

Free Response

- 1) Data show a trend in winning long jump distances for an international competition over the years 1972–92. With jumps recorded in inches and dates in years since 1900, a least squares regression line is fit to the data. The computer output and a graph of the residuals are as follows:

R squared = 92.1%

Variable	Coefficient	SE of Coeff	t-ratio	Prob
Constant	256.576	11.59	22.1	0.0001
Year	0.95893	0.141	6.81	0.0024



- (a) Does a line appear to be an appropriate model? Explain.
- (b) What is the slope of the least squares line? Give an interpretation of the slope.
- (c) What is the correlation?
- (d) What is the predicted winning distance for the 1980 competition?
- (e) What was the actual winning distance in 1980?

2) The least-squares regression equation for the given data is $\hat{y} = 3 + x$. Calculate the sum of the squared residuals for the LSRL.

x	7	8	11	12	15
y	10	11	14	15	18