

Multiple-Choice Test

Chapter 06.05

Adequacy of Models for Regression

1. For a linear regression model to be considered adequate, the percentage of scaled residuals that need to be in the range $[-2,2]$ is greater than or equal to

- (A) 5%
- (B) 50%
- (C) 90%
- (D) 95%

2. Given y vs. x data of 20 pairs are regressed to a straight line. The straight line regression model is given by $y = 9 - 5x$ and the coefficient of determination is found to be 0.59. The correlation coefficient is

- (A) -0.7681
- (B) -0.3481
- (C) 0.7681
- (D) 0.3481

3. The following y vs. x data is regressed to a straight line.

x	5	6	7	8	9
y	0.3	0.4	0.57	0.6	1.77

The linear regression model is found to be $y = -1.4700 + 0.3140x$. The coefficient of determination is

- (A) 0.3046
- (B) 0.4319
- (C) 0.6956
- (D) 0.8339

4. Many times you may not know what regression model to use for given discrete data. In such cases, a suggestion may be to use a polynomial model. But the question remains – what order of polynomial to use? For example, if you are given 10 data points, you can regress the data to a polynomial order 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. Below is the question you are asked to answer.

If S_n is the sum of the squares of the residuals and p is the order of the polynomial, the criterion you would use to find the optimum order of the polynomial would be to find the minimum of $\frac{S_n}{m-p}$ for all possible polynomial orders. If you have 30 data points, then the value of m in the formula is

- (A) 10
- (B) 29
- (C) 30
- (D) 50

5. On regressing n data pairs $(x_1, y_1), \dots, (x_n, y_n)$ to a linear regression model $y = a_0 + a_1x$, a scientist finds the regression model to have zero slope. The regression model then is given by

(A) $y = \frac{\sum_{i=1}^n x_i}{n}$

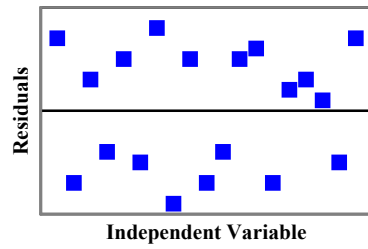
(B) $y = \frac{\sum_{i=1}^n y_i}{n}$

(C) $y = 0$

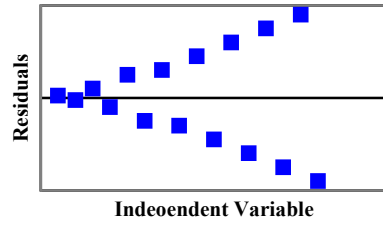
(D) $y = \sqrt{\frac{\sum_{i=1}^n (y_i - \bar{y})^2}{n-1}}$

6. Which of the following patterns of residuals is acceptable for a linear regression model?

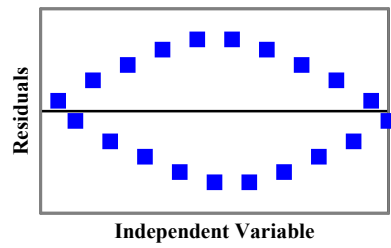
(A)



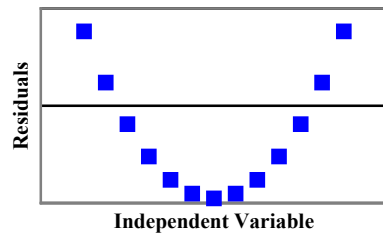
(B)



(C)



(D)



For a complete solution, refer to the links at the end of the book.