

Chapter 14: Introduction to Linear Regression and Correlation Analysis

Multiple Choice

This activity contains 10 questions.

1. The values in X below are hours spent studying, and the values in Y are grades on a test. Find the Pearson Product Moment Correlation Coefficient.

[Hint]

$X = \{3.2, 3.0, 1.0, 2.5, 1.9, 1.6, 3.1, 3.5, 4.2, 3.0\}$

$Y = \{90, 88, 57, 86, 79, 71, 84, 97, 90, 91\}$

- 0.706
- 0.737
- 0.803
- 0.889

2. Which of the following is not one of the assumptions required for the t test for determining whether the correlation is significant?

[Hint]

- The data are interval or ratio level.
- The variances are equal or $\sigma_1^2 = \sigma_2^2$
- The two variables are distributed as a bivariate normal distribution.
- All three are required assumptions.

3. Calculate the test statistic t for a correlation hypothesis test when the sample correlation coefficient is $r = 0.889$ and the sample size is $n =$

[Hint] 10.

- 5.337
- 5.491
- 5.519
- 5.664

4. The least squares method minimizes which of the following?

[Hint]

- sum of residuals
- sum of squared residuals
- sum of squares error
- total sum of squares

5. Compute the slope of the regression equation based on these sample data.

[Hint] $X = \{3.2, 3.0, 1.0, 2.5, 1.9, 1.6, 3.1, 3.5, 4.2, 3.0\}$
 $Y = \{90, 88, 57, 86, 79, 71, 84, 97, 90, 91\}$

- 9.638
- 10.144
- 10.835
- 11.169

6. Compute the y intercept of the regression equation based on these sample data.

[Hint] $X = \{3.2, 3.0, 1.0, 2.5, 1.9, 1.6, 3.1, 3.5, 4.2, 3.0\}$
 $Y = \{90, 88, 57, 86, 79, 71, 84, 97, 90, 91\}$

- 52.338
- 54.045
- 55.159
- 56.779

7. A company with 6 store locations wants to investigate the relationship between square footage of the store and monthly sales. The table below shows the square footage of each store (in hundreds) and average monthly sales (in thousands).

[Hint]

Store	Square Feet	Monthly Sales
1	4	8
2	6	7
3	7	12
4	8	9
5	10	10
6	12	14

Given the intercept of the regression equation is 14.63 and the slope is 0.69, what is the sum of squared residuals?

- 6.0
- 14.8
- 19.2
- 34.0

8. A company with 6 store locations wants to investigate the relationship between square footage of the store and monthly sales. The table below shows the square footage of each store (in hundreds) and average monthly sales (in thousands).

[Hint]

Store	Square Feet	Monthly Sales
1	4	8
2	6	7
3	7	12
4	8	9
5	10	10
6	12	14

Given the intercept of the regression equation is 14.63 and the slope is 0.69, along with the result from Question #7, what is the simple regression estimator for the standard deviation of the slope?

- 0.30
- 1.92
- 2.48
- 3.69

9. A company with 6 store locations wants to investigate the relationship between square footage of the store and monthly sales. The table below shows the square footage of each store (in hundreds) and average monthly sales (in thousands).

[Hint]

Store	Square Feet	Monthly Sales
1	4	8
2	6	7
3	7	12
4	8	9
5	10	10
6	12	14

Given the intercept of the regression equation is 14.63 and the slope is 0.69, along with the result from Question #8, what is the test statistic for the test of significance of the regression slope?

- 0.30
- 1.59
- 1.87
- 2.30

10. A company with 6 store locations wants to investigate the relationship between square footage of the store and monthly sales. The table below shows the square footage of each store (in hundreds) and average monthly sales (in thousands).

[Hint]

Store	Square Feet	Monthly Sales
1	4	8
2	6	7
3	7	12
4	8	9
5	10	10
6	12	14

Given the intercept of the regression equation is 14.63 and the slope is 0.69, along with the result from Question #9, which of the following statements are true? Use alpha equal to 0.05.

- Since the critical value equals 2.7765, we fail to reject the null hypothesis and conclude that there is no significant relationship between square footage and monthly sales.
- Since the critical value equals 2.7765, we reject the null hypothesis and conclude that there is a significant relationship between square footage and monthly sales.
- Since the critical value equals 2.4469, we fail to reject the null hypothesis and conclude that there is no significant relationship between square footage and monthly sales.
- Since the critical value equals 2.4469, we reject the null hypothesis and conclude that there is a significant relationship between square footage and monthly sales.

