

Disclaimer

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Chapter 10 Homework



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1. A scatterplot is used to show the relationship between _____ quantitative variables.
2. Fill in the blank. The _____ is a value that represents the strength and direction of the linear relationship between two quantitative variables.
3. True or False. Linear correlation analysis is also known as bivariate analysis.
4. Fill in the blank. The predictor variable is also known as the _____ variable or independent variable.
5. Fill in the blank. The outcome variable is also known as the _____ variable or dependent variable.
6. A researcher would like to use age to predict a patient's blood pressure. Identify the explanatory variable and the response variable.
7. A researcher would like to use years of education to predict a person's annual salary. Identify the explanatory variable and the response variable.
8. True or False. The predictor variable is used to measure the outcome variable.
9. Fill in the blank. A _____ relationship is a relationship that exists between x and y in which the value of x increases as the value of y tends to increase.
10. Fill in the blank. A _____ relationship is a relationship that exists between x and y in which the value of x increases as the value of y tends to decrease.
11. True or False. The correlation coefficient, r , is referred to as the Pearson product moment correlation coefficient.
12. Fill in the blank. The correlation coefficient, r , measures only _____ relationships.
13. True or False. Values of the correlation coefficient, r , can be greater than 1.
14. True or False. Values of the correlation coefficient range from -1 to 1 , inclusive.



15. Which of the following are valid values of the correlation coefficient, r : 0.71, -0.35 , 0.99, 2.31, -6.2 , 1?
16. Given the following data, compute the correlation coefficient.

x	75	88	101	99	92
y	80	90	100	90	90

17. Given the following data, compute the correlation coefficient.

x	21	17	16	11	9
y	10	17	14	9	3

18. True or False. If the value of r is close to 0, the variables have no linear relationship.
19. True or False. Correlation analysis can be used to make causal statements with 100% certainty.
20. Define lurking variable.
21. Given the following data, test $H_0: \rho = 0$, $H_A: \rho \neq 0$ at the 5% level of significance and state the decision.

x	100	150	200	200	150
y	150	200	150	250	200

22. Define regression analysis.
23. Define least-squares regression line.
24. Define residual.
25. True or False. The mean of the residuals of a least-squares regression line is equal to 0.



26. Determine the equation of the least-squares regression line given the following statistics:

Mean of $x = 1531.4$

Mean of $y = 1750.6$

Standard deviation of $x = 622.5$

Standard deviation of $y = 631.85$

$r = 0.98$

27. Determine the equation of the least-squares regression line given the following statistics:

Mean of $x = 14.2$

Mean of $y = 7$

Standard deviation of $x = 2.59$

Standard deviation of $y = 1.58$

$r = -0.92$

28. The equation of a least-squares regression line is the following: $\hat{y} = 16.9x + 0.44$. What is the slope?
29. The equation of a least-squares regression line is the following: $\hat{y} = -72x + 1021$. What is the slope?
30. If $\hat{y} = 143 - 11x$, determine the predicted y -value given $x = 201$.
31. If $\hat{y} = 0.11 - 0.99x$, determine the predicted y -value given $x = -2.3$.
32. Define extrapolation.
33. Given $r = -0.21$, what would be the value of the coefficient of determination?
34. Given $r = 0.65$, what would be the value of the coefficient of determination?
35. Define standard error of estimate.



Answers

1. Two
2. Correlation coefficient
3. True
4. Explanatory
5. Response
6. Explanatory variable: age
Response variable: blood pressure
7. Explanatory variable: years of education
Response variable: annual salary
8. True
9. Positive
10. Negative
11. True
12. Linear
13. False
14. True
15. 0.71, -0.35, 0.99, 1
16. 0.89
17. 0.63
18. True
19. False
20. Lurking Variable: an extraneous variable (a variable not included in the experiment) that adversely affects the relationship between the explanatory variable and response variable.
21. $H_0: \rho = 0$, $H_A: \rho \neq 0$. $t = 0.82$. Do not reject the null hypothesis.
22. Regression Analysis: a process used to develop an equation based on the relationship between quantitative variables.
23. Least-Squares Regression Line: a line for which the sum of the squared residuals is as small as possible.
24. Residual: the difference between the observed y-value and predicted y-value.
25. True
26. $\hat{y} = 227.32 + 0.9947x$



27. $\hat{y} = 14.97 - 0.5612x$
28. 16.9
29. -72
30. -2068
31. 2.387
32. Extrapolation: a practice in which one uses x-values that are beyond the range of the observed x-values of the data set to make predictions.
33. 0.0441
34. 0.4225
35. Standard Error of Estimate: the standard deviation of the observed y-values about the predicted y-value for a specific x-value.

