25. A real estate analyst uses regression analysis to determine the relationship between interest rates and house sales. She collects the following data and obtains the results below.

|  |  |
| --- | --- |
| **Interest Rates % (X)** | **Number of Houses Sold (Y)** |
|   7 | 64 |
|   8 | 52 |
|   9 | 42 |
| 10 | 34 |
| 11 | 32 |
| 12 | 31 |
| 13 | 30 |
| 14 | 29 |
| 15 | 19 |
|  |  |

Y-hat = 87.6 - 4.6X, where X is the interest rate expressed as a percent and Y = number of houses sold. ΣX = 99, ΣY = 333, ΣXY = 3,387, ΣX2 = 1,149, ΣY2 = 13,807.Refer to Exhibit 11-1. Compute the sample correlation coefficient r.

Based on the formula, 

**R=(9\*3387-99\*333)/sqrt((9\*1149-99^2)\*(9\*13807-333^2))=-0.9243**

Answer

.9243

.8544

-.9243

-.8544

.6543

26. A study is being made of the relationship between family annual income (X), and annual expenditures on food (Y) in a native American community. Both variables are in $1,000s. Below is the summary of the data.

|  |  |  |
| --- | --- | --- |
| SSx = 791.5 | SSy = 14 | SCPxy = 100 |
| n = 8 |  = 19.75 |  = 3.5 |
|  |  |  |

Refer to Exhibit 11-2. What is the critical value of the test statistic (absolute value) for testing at a .05 level whether the slope is significantly different from zero.

Df=8-2=6,

The critical t value is TINV(0.05,6)=2.447 (TINV is a function in excel).

Answer

1.860

2.306

3.707

1.943

2.447

27. Using the following statistics, a least squares line was derived.

|  |  |  |
| --- | --- | --- |
| Σx = 137 | Σy = 253 | n = 25 |
| Σxy = 1,609 | Σx2 = 895 | Σy2 = 2,943 |
|  |  |  |

Refer to Exhibit 11-5. What is the slope of this line?

Slope = (∑XY – N x Xbar x Ybar)/(∑X2 – N x Xbar2)

Slope=(1609-25\*137/25\*253/25)/(895-25\*(137/25)^2)=1.543≈1.54

Answer

2.11

1.54

3.01

1.66

2.83

28. Using the following statistics, a least squares line was derived.

|  |  |  |
| --- | --- | --- |
| Σx = 137 | Σy = 253 | n = 25 |
| Σxy = 1,609 | Σx2 = 895 | Σy2 = 2,943 |
|  |  |  |

Refer to Exhibit 11-5. What is the intercept of this line?

Intercept=mean of y-slope\*mean of x=253/25-1.543\*137/25=1.66

Answer

2.11

1.54

3.01

1.66

2.83

29. **Exhibit 12-1**A realtor used the regression model Y = β0 + β1X1 + β2X2 + e to predict selling prices of homes (in the thousands of $). The variable X1 represents home size (square feet) and X2 represents number of bedrooms. The following information is available:

|  |  |  |
| --- | --- | --- |
| **Predictor** | **Coefficients** | **Standard Error** |
| Constant | 26.28 | 22.88 |
| Size | .12352 | .02435 |
| Bedrooms | 20.183 | 6.697 |
|  |  |  |
| **ANOVA** |   |   |   |
| **Source** | **DF** | **SS** | **F** |
| Regression |   |   | 293.29 |
| Residual |   | 219.6 |   |
| Total | 10 |   |   |
|  |  |  |  |

Refer to Exhibit 12-1. Testing, at the .01 level of significance, if the model is useful for the prediction of the selling prices of homes, the null hypotheses will be rejected if the value of the test statistic is:

Df for regression is 2, df for residual is 10-2=8.

Critical F value FINV(0.05,2,8)=4.459.

Answer:

>8.65

>8.02

>3.11

**>4.46**

none of the above

30. **Exhibit 12-1**A realtor used the regression model Y = β0 + β1X1 + β2X2 + e to predict selling prices of homes (in the thousands of $). The variable X1 represents home size (square feet) and X2 represents number of bedrooms. The following information is available:

|  |  |  |
| --- | --- | --- |
| **Predictor** | **Coefficients** | **Standard Error** |
| Constant | 26.28 | 22.88 |
| Size | .12352 | .02435 |
| Bedrooms | 20.183 | 6.697 |
|  |  |  |
| **ANOVA** |   |   |   |
| **Source** | **DF** | **SS** | **F** |
| Regression |   |   | 293.29 |
| Residual |   | 219.6 |   |
| Total | 10 |   |   |
|  |  |  |  |

Refer to Exhibit 12-1. What is the value of SSR?

SSR/2/(219.6/8)=293.29

SSR=16101.621

Answer

8,970.5

12,751.2

5,928.9

**16,101.6**

none of the above

31. A carpet manufacturer is interested in determining which factors customers consider as measures of the quality of carpet. In a survey of 30 customers, information was collected on quality (Y), texture (X1), durability (X2), and price (X3). The market analyst uses multiple regression to formulate the following equation:  = 34.56 + 5.21X1 + 3.25X2 + 2.15X3. The coefficient of determination is .86, and the variance of the error terms s2 = 4.67.Refer to Exhibit 12-3. What is the test statistic for testing the overall usefulness of the model?

R^2=SSR/SST=0.86. SSR/SSE=0.86/0.14

F=(SSR/3)/(SSE/(30-3))=0.86/0.14\*(27/3)=55.2.

Answer

1.97

2.04

8.94

**53.24**

3.31

32. **Exhibit 12-4**The following results of a regression analysis are available:

|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **DF** | **SS** | **MS** |
| Regression |   5 | 6,578.6 |   |
| Residual | 24 | 3,943.2 |   |
| Total | 29 | 10,521.8   |   |
|  |  |  |  |
| **Predictor** | **Coefficients** | **Standard Error** |
| Intercept | -230.56 | 78.71 |
| X1 |    15.62 |   1.27 |
| X2 |     -5.96 |   2.67 |
| X1X2 |      3.46 |   1.34 |
| X12 |      1.56 |   0.23 |
| X22 |      5.46 |   3.18 |
|  |  |  |

Refer to Exhibit 12-4. What is the coefficient of determination?

Coefficient of determination=SSRegression/SST=6578.6/10521.8=0.625

Answer

.249

.375

.457

.563

.625