Question #1 of 11

Question ID: 1456690

The estimated slope coefficient in a simple linear regression is:

A) the predicted value of the dependent variable, given the actual value of the independent variable.

B) the change in the independent variable, given a one-unit change in the dependent variable.

C) the ratio of the covariance of the regression variables to the variance of the independent variable.

Explanation

The estimated slope coefficient in a simple linear regression is $\frac{\mathrm{Cov}_{\mathrm{X,Y}}}{\sigma^2_{\mathrm{X}}}$, where Y is the dependent variable and X is the independent variable. The estimated slope coefficient is interpreted as the change in the *dependent* variable, given a one-unit change in the *independent* variable. The predicted value of the dependent variable must consider the estimated intercept term along with the estimated slope coefficient.

(Module 7.1, LOS 7.b)

Question #2 of 11

Question ID: 1456696

Use the following *t*-table for this question:

Probability in Right Tail			
df	**5.0%**	**2.5%**	**1.0%**
196	1.653	1.972	2.346
197	1.653	1.972	2.345
198	1.653	1.972	2.345
199	1.653	1.972	2.345
200	1.653	1.972	2.345
201	1.652	1.972	2.345
202	1.652	1.972	2.345

A sample of 200 monthly observations is used for a simple linear regression of returns versus leverage. The resulting equation is:

$$\text{returns} = 0.04 + 0.894(\text{Leverage}) + \varepsilon$$

If the standard error of the estimated slope variable is 0.06, a test of the hypothesis that the slope coefficient is greater than or equal to 1.0 with a significance of 5% should:

A) be rejected because the test statistic of –1.77 is less than the critical value.

B) be rejected because the test statistic of –1.77 is greater than the critical value.

C) not be rejected because the test statistic of –1.58 is not less than the critical value.

Explanation

The test statistic is (0.894 – 1.0) / 0.06 = –1.77. The critical value with 200 – 2 = 198 degrees of freedom for 5% significance is –1.653. Because the test statistic of –1.77 is less than the lower critical value, we reject the hypothesis that b_1 is greater than or equal to 1.0.

(Module 7.2, LOS 7.f)

Question #3 of 11

Question ID: 1456692

The coefficient of determination for a linear regression is *best* described as the:

A) percentage of the variation in the dependent variable explained by the variation of the independent variable.

B) covariance of the independent and dependent variables.

C) percentage of the variation in the independent variable explained by the variation of the dependent variable.

Explanation

The coefficient of determination for a linear regression describes the percentage of the variation in the dependent variable explained by the variation of the independent variable.

(Module 7.2, LOS 7.d)

Question #4 of 11

Question ID: 1456698

When there is a linear relationship between an independent variable and the relative change in the dependent variable, the *most appropriate* model for a simple regression is:

A) the lin-log model.

B) the log-log model.

C) the log-lin model.

Explanation

A regression of the form $\ln Y = b_0 + b_1X$ is appropriate when the relative change in the dependent variable is a linear function of the independent variable.

(Module 7.3, LOS 7.h)

Question #5 of 11

Question ID: 1456694

Consider the following analysis of variance (ANOVA) table:

Source	Sum of squares	Degrees of freedom	Mean sum of squares
Regression	550	1	550.000
Error	750	38	19.737
Total	1,300	39	

The *F*-statistic for the test of the fit of the model is *closest* to:

A) 0.97.

B) 27.87.

C) 0.42.

Explanation

F = sum of squares regression / mean squared error = 550 / 19.737 = 27.867.

(Module 7.2, LOS 7.e)

Question #6 of 11

Question ID: 1456691

Which of the following is *least likely* an assumption of linear regression?

A) Values of the independent variable are not correlated with the error term.

B) The error terms from a regression are positively correlated.

C) The variance of the error terms each period remains the same.

Explanation

One assumption of linear regression is that the error terms are independently distributed. In this case, the correlations between error terms are expected to be zero. Constant variance of the error terms and no correlation between the independent variable and the error term are assumptions of linear regression.

(Module 7.1, LOS 7.c)

Question #7 of 11

Question ID: 1456695

Consider the following analysis of variance (ANOVA) table:

Source	Sum of squares	Degrees of freedom	Mean sum of squares
Regression	556	1	556
Error	679	50	13.5
Total	1,235	51	

The R^2 for this regression is *closest* to:

A) 0.55.

B) 0.45.

C) 0.82.

Explanation

R^2 = sum of squares regression / sum of squares total = 556 / 1,235 = 0.45.

(Module 7.2, LOS 7.e)

Question #8 of 11

Question ID: 1456689

In a simple regression model, the least squares criterion is to minimize the sum of squared differences between:

A) the estimated and actual slope coefficient.

B) the predicted and actual values of the dependent variable.

C) the intercept term and the residual term.

Explanation

The least squares criterion defines the best-fitting linear relationship as the one that minimizes the sum of squared errors, the squared vertical distances between the predicted and actual values of the dependent variable.

(Module 7.1, LOS 7.b)

Question #9 of 11

Question ID: 1456697

Given the relationship: Y = 2.83 + 1.5X

What is the predicted value of the dependent variable when the value of the independent variable equals 2?

A) –0.55.

B) 5.83.

C) 2.83.

Explanation

Y = 2.83 + (1.5)(2) = 2.83 + 3 = 5.83.

(Module 7.3, LOS 7.g)

Question #10 of 11

Question ID: 1456688

A simple linear regression is a model of the relationship between:

A) one or more dependent variables and one or more independent variables.

B) one dependent variable and one or more independent variables.

C) one dependent variable and one independent variable.

Explanation

A simple linear regression is a model of the relationship between one dependent variable and one independent variable. A multiple regression is a model of the relationship between one dependent variable and more than one independent variable.

(Module 7.1, LOS 7.a)

Question #11 of 11

Question ID: 1456693

A simple linear regression is performed to quantify the relationship between the return on the common stocks of medium-sized companies (mid-caps) and the return on the S&P 500 index, using the monthly return on mid-cap stocks as the dependent variable and the monthly return on the S&P 500 as the independent variable. The results of the regression are shown below:

	Coefficient	Standard Error of Coefficient	*t*-Value
Intercept	1.71	2.950	0.58
S&P 500	1.52	0.130	11.69
Coefficient of determination = 0.599			

The strength of the relationship, as measured by the correlation coefficient, between the return on mid-cap stocks and the return on the S&P 500 for the period under study was:

A) 0.774.

B) 0.599.

C) 0.130.

Explanation

We are given the coefficient of determination of 0.599 (R^2) and are asked to find the correlation coefficient (r), which is the square root of the coefficient of determination for a simple regression:

$$\sqrt{0.599} = 0.774$$

(Module 7.2, LOS 7.d)