

 A dependent variable is also known as a(n) a. explanatory variable 		
b. control variable		
c. predictor variable		
d. response variable		
ANSWER:	d	
RATIONALE:	FEEDBACK: A dependent variable is known as a response variable.	
POINTS:	1	
DIFFICULTY:	Easy	
NATIONAL STANDARDS:	United States - BUSPROG: Analytic	
TOPICS:	Definition of the Simple Regression Model	
KEYWORDS:	Bloom's: Knowledge	
2. If a change in variable x causes a change in variable y, variable x is called thea. dependent variable		
b. explained variable		
c. explanatory variable		
d. response variable		
ANSWER:	c	
RATIONALE:	FEEDBACK: If a change in variable x causes a change in variable y , variable x is called the independent variable or the explanatory variable.	
POINTS:	1	
DIFFICULTY:	Easy	
NATIONAL STANDARDS:	United States - BUSPROG: Analytic	
TOPICS:	Definition of the Simple Regression Model	
KEYWORDS:	Bloom's: Comprehension	
3. In the equation $\gamma = \beta_0$	+ $\beta_1 x + u$, $\beta_{0 \text{ is the }}$.	
a. dependent variable		
b. independent variable		
1		
c. slope parameter		
d. intercept parameter		
ANSWER:	d	
RATIONALE:	FEEDBACK: In the equation $y = \beta_0 + \beta_1 x + u$, $\beta_{0 \text{ is the intercept parameter.}}$	
POINTS:	1	
DIFFICULTY:	Easy	
NATIONAL STANDARDS:	United States - BUSPROG: Analytic	
TOPICS:	Definition of the Simple Regression Model	
KEYWORDS:	Bloom's: Knowledge	
4. In the equation $\gamma = \beta_{\rm e}$	+ $\beta_1 x + \mu_1$ what is the estimated value of $\beta_0 2$	

4. In the equation $y = \beta_0 + \beta_1 x + u$, what is the estimated value of β_0 ? a. $\overline{y} - \hat{\beta}_1 \overline{x}$

a. $\overline{y} - \beta_1 \overline{x}$ b. $\overline{y} + \beta_1 \overline{x}$

^{c.}
$$\frac{\sum_{i=1}^{n} (x_i - \overline{x})(y_i - \overline{y})}{\sum_{i=1}^{n} (x_i)^2}$$

^{d.}
$$\frac{\sum_{i=1}^{n} xy}{\sum_{i=1}^{n} xy}$$

ANSWER:	a
RATIONALE:	FEEDBACK: The estimated value of β_0 is $\overline{\gamma} - \hat{\beta}_1 \overline{x}$.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Deriving the Ordinary Least Squares Estimates
KEYWORDS:	Bloom's: Knowledge

5. In the equation $c = \beta_0 + \beta_1 i + u$, *c* denotes consumption and *i* denotes income. What is the residual for the 5th observation if $c_{5}=$ \$500 and $\hat{c}_{5}=$ \$475?

	$-\phi i i j \delta$	
a. \$975		
b. \$300		
c. \$25		
d. \$50		
ANSWER:	c	
RATIONALE:	FEEDBACK: The formula for calculating the residual for the <i>i</i> th observation is $\hat{u}_1 = y_i - \hat{y}_1$	
	. In this case, the residual is $\hat{u}_5 = c_5 - \hat{c}_5 = \$500 - \$475 = \25 .	
POINTS:	1	
DIFFICULTY:	Easy	
NATIONAL STANDARDS:	United States - BUSPROG: Analytic	
TOPICS:	Deriving the Ordinary Least Squares Estimates	
KEYWORDS:	Bloom's: Application	
6. What does the equation $\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$ denote if the regression equation is $y = \beta_0 + \beta_1 x_1 + u_2$		
a. The explained sum of squaresb. The total sum of squares		
c. The sample regression function		
d. The population regression function		
ANSWER:	c	
RATIONALE:	FEEDBACK: The equation $\hat{\gamma} = \hat{\beta}_0 + \hat{\beta}_1 x$ denotes the sample regression function of the given regression model.	
POINTS:		
DIFFICULTY:	Easy	
	United States - BUSPROG: Analytic	
TOPICS:	Deriving the Ordinary Least Squares Estimates	
	Deriving the Ordinary Least Squares Estimates	

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KEYWORDS:

Bloom's: Knowledge

7. If x_i and y_i are positively correlated in the sample then the estimated slope is _____

/ I n n und f und f und positi en f	contenuere in the sample then the estimated stope is
a. less than zero	
b. greater than zero	
c. equal to zero	
d. equal to one	
ANSWER:	b
RATIONALE:	FEEDBACK: If x_i and y_i are positively correlated in the sample then the estimated slope is greater than zero.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Deriving the Ordinary Least Squares Estimates
KEYWORDS:	Bloom's: Knowledge

8. The sample correlation between *xi* and *yi* is denoted by _____.

a. $\hat{\beta}_1$	
b. $\hat{\sigma}_x$	
c. $\hat{\sigma}_y$	
d. $\hat{\rho}_{xy}$	
ANSWER:	d
RATIONALE:	FEEDBACK: The sample correlation between x_i and y_i is denoted by $\hat{\rho}_{xy}$.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Deriving the Ordinary Least Squares Estimates
KEYWORDS:	Bloom's: Knowledge

9. Consider the following regression model: $y = \alpha_0 + \beta_1 x_1 + u$. Which of the following is a property of Ordinary Least Square (OLS) estimates of this model and their associated statistics?

a. The sum, and therefore the sample average of the OLS residuals, is positive.

b. The sum of the OLS residuals is negative.

c. The sample covariance between the regressors and the OLS residuals is positive.

d. The point $(\overline{\mathbf{x}}, \overline{\mathbf{y}})$ always lies on the OLS regression line.

ANSWER:	d
RATIONALE:	FEEDBACK: An important property of the OLS estimates is that the point $(\overline{\mathbf{x}}, \overline{\mathbf{y}})$ always lies
	on the OLS regression line. In other words, if $\mathbf{x} = \overline{\mathbf{x}}$, the predicted value of y is $\overline{\mathbf{y}}$.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Properties of OLS on Any Sample of Data
KEYWORDS:	Bloom's: Knowledge

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10. The explained sum of squares for the regression function, $y_i = \beta_0 + \beta_1 x_1 + u_1$, is defined as _____.

*	
^{a.} $\sum_{i=1}^{n} (y_i - \overline{y})^2$	
^{b.} $\sum_{i=1}^{n} (y_i - \hat{y})^2$	
$\sum_{i=1}^{n} \hat{u}_i$	
$\sum_{i=1}^{n} (u_i)^2$	
ANSWER:	b
RATIONALE:	FEEDBACK: The explained sum of squares is defined as $\sum_{i=1}^{n} (y_i - \hat{y})^2$.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Properties of OLS on Any Sample of Data
KEYWORDS:	Bloom's: Knowledge

11. If the total sum of squares (SST) in a regression equation is 81, and the residual sum of squares (SSR) is 25, what is the explained sum of squares (SSE)?

1 1	
a. 64	
b. 56	
c. 32	
d. 18	
ANSWER:	b
RATIONALE:	FEEDBACK: Total sum of squares (SST) is given by the sum of explained sum of squares (SSE) and residual sum of squares (SSR). Therefore, in this case, SSE=81-25=56.
POINTS:	1
DIFFICULTY:	Moderate
NATIONAL STANDARDS:	United States - BUSPROG: Analytic - BUSPROG: Analytic
TOPICS:	Properties of OLS on Any Sample of Data
KEYWORDS:	Bloom's: Application

12. If the residual sum of squares (SSR) in a regression analysis is 66 and the total sum of squares (SST) is equal to 90, what is the value of the coefficient of determination?

a. 0.73
b. 0.55
c. 0.27
d. 1.2
ANSWER:
RATIONALE:

FEEDBACK: The formula for calculating the coefficient of determination is $R^2 = 1 - \frac{SSR}{SST}$.

In this case,
$$R^2 = 1 - \frac{66}{90} = 0.27$$
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POINTS:	1
DIFFICULTY:	Moderate
NATIONAL STANDARDS:	United States - BUSPROG: Analytic - BUSPROG: Analytic
TOPICS:	Properties of OLS on Any Sample of Data
KEYWORDS:	Bloom's: Application

13. Which of the following is a nonlinear regression model?

a.
$$y = \alpha_0 + \beta_1 x^{1/2} + u$$

b. $\log y = \alpha_0 + \beta_1 \log x + u$
c. $y = 1 / (\alpha_0 + \beta_1 x) + u$
d. $y = \alpha_0 + \beta_1 x + u$
ANSWER: c
RATIONALE: FEEDBACK: A regression model is nonlinear if the equation is nonlinear in the parameters.
In this case, $y = 1 / (\alpha_0 + \beta_1 x) + u$ is nonlinear as it is nonlinear in its parameters.
POINTS: 1
DIFFICULTY: Moderate
NATIONAL STANDARDS: United States - BUSPROG: Analytic
TOPICS: Properties of OLS on Any Sample of Data
KEYWORDS: Bloom's: Comprehension

14. In a regression equation, changing the units of measurement of only the independent variable does not affect the

a. dependent variable	
b. slope	
c. intercept	
d. error term	
ANSWER:	c
RATIONALE:	FEEDBACK: In a regression equation, changing the units of measurement of only the independent variable does not affect the intercept.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Units of Measurement and Functional Form
KEYWORDS:	Bloom's: Knowledge

15. Which of the following is assumed for establishing the unbiasedness of Ordinary Least Square (OLS) estimates? a. The error term has an expected value of 1 given any value of the explanatory variable.

b. The regression equation is linear in the explained and explanatory variables.

c. The sample outcomes on the explanatory variable are all the same value.

d. The error term has the same variance given any value of the explanatory variable.

ANSWER:	d
RATIONALE:	FEEDBACK: The error u has the same variance given any value of the explanatory variable.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic

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TOPICS:	Expected Values and Variances of the OLS Estimators
KEYWORDS:	Bloom's: Knowledge

16. The error term in a regression equation is said to exhibit homoskedasticty if _____.

- a. it has zero conditional mean
- b. it has the same variance for all values of the explanatory variable
- c. it has the same value for all values of the explanatory variable

d. if the error term has a value of one given any value of the explanatory variable

ANSWER:	b
RATIONALE:	FEEDBACK: The error term in a regression equation is said to exhibit homoskedasticty if it has the same variance for all values of the explanatory variable.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Expected Values and Variances of the OLS Estimators
KEYWORDS:	Bloom's: Knowledge

17. In the regression of *y* on *x*, the error term exhibits heteroskedasticity if _____.

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a. it has a constant variance		
b. $Var(y x)$ is a function	n of x	
c. <i>x</i> is a function of <i>y</i>		
d. <i>y</i> is a function of <i>x</i>		
ANSWER:	b	
RATIONALE:	FEEDBACK: Heteroskedasticity is present whenever $Var(y x)$ is a function of x because $Var(u x) = Var(y x)$.	
POINTS:	1	
DIFFICULTY:	Easy	
NATIONAL STANDARDS:	United States - BUSPROG: Analytic	
TOPICS:	Expected Values and Variances of the OLS Estimators	
KEYWORDS:	Bloom's: Knowledge	

18. What is the estimated value of the slope parameter when the regression equation, $y = \alpha_0 + \beta_1 x_1 + u$ passes through the origin?

a.
$$\sum_{i=1}^{n} y_i$$

b.
$$\sum_{i=1}^{n} (y_i - \overline{y})$$

c.
$$\frac{\sum_{i=1}^{n} x_i y_i}{\sum_{i=1}^{n} x_i^2}$$

d.
$$\sum_{i=1}^{n} (y_i - \overline{y})^2$$

ANSWER:

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RATIONALE:

FEEDBACK: The estimated value of the slope parameter when the regression equation passes

a 1.a ····	$\sum_{i=1}^{n} x_i y_i$
through the origin is	$\sum_{i=1}^{n} x_i^2$

DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Regression through the Origin and Regression on a ConstantKEYWORDS:Bloom's: Knowledge1.9. A natural measure of the association between two random variables is the correlation coefficient.a. True.b. FalseTueANSWER:TueRATIONALE:FEEDBACK: A natural measure of the association between two random variables is the correlation coefficient.POINTS:IDIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Definition of the Simple Regression ModelKEYWORDS:Bloom's: Knowledge20. Simple regression is an analysis of correlation between two variables.a. True.b. FalseTueANSWER:FEEDBACK: Simple regression is an analysis of correlation between two variables.POINTS:IDIFFICULTY:EasyANTONAL STANDARDS:United States - BUSPROG: AnalyticTOWTueANTONAL STANDARDS:United States - BUSPROG: AnalyticPOINTS:IDIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Deriving the Ordinary Least Squares EstimatesKEYWORDS:Bloom's: Knowledge1. Thre.b. False.ANTONAL STANDARDS:United States - BUSPROG: AnalyticCOPICS:Deriving the Ordinary Least Squares EstimatesKEYWORDS:Bloom's: Knowledge<	POINTS:	1
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DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Definition of the Simple Regression ModelKEYWORDS:Bloom's: Knowledge20. Simple regression is an analysis of correlation between two variables. a. True b. FalseNational States - BUSPROG: AnalyticANSWER:TrueRATIONALE:FEEDBACK: Simple regression is an analysis of correlation between two variables.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Deriving the Ordinary Least Squares EstimatesKEYWORDS:Bloom's: Knowledge21. The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. a. True b. FalseANSWER:FalseANSWER:FalsePOINTS:1DIFFICULTY:EEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. (OLS) residuals is zero.POINTS:1DIFFICULTY:EEDBACK: The sample covariance between the regressors and the Ordinary Least SquarePOINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticPOINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticPOINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticPOINTS:1DIFFICULTY:EasyNATIONAL STANDARDS	KAHOWALE.	
NATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Definition of the Simple Regression ModelKEYWORDS:Bloom's: Knowledge20. Simple regression is an analysis of correlation between two variables. a. True b. Falsea. TrueANSWER:TrueRATIONALE:FEEDBACK: Simple regression is an analysis of correlation between two variables.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Deriving the Ordinary Least Squares EstimatesKEYWORDS:Bloom's: Knowledge21. The sample covariance- b. FalseFEEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. a. True b. FalseANSWER:FalseRATIONALE:FEEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. (OLS) residuals is zero.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:1DIFFICULTY:Easy	POINTS:	1
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KEYWORDS:Bloom's: Knowledge20. Simple regression is an analysis of correlation between two variables.a. Trueb. FalseANSWER:TrueRATIONALE:FEEDBACK: Simple regression is an analysis of correlation between two variables.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Deriving the Ordinary Least Squares EstimatesKEYWORDS:Bloom's: Knowledge21. The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. a. True b. FalseANSWER:FalseRATIONALE:FEEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. (OLS) residuals is zero.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticPOINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticPOINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Properties of OLS on Any Sample of Data	NATIONAL STANDARDS:	United States - BUSPROG: Analytic
20. Simple regression is an analysis of correlation between two variables. a. True b. False ANSWER: True RATIONALE: FEEDBACK: Simple regression is an analysis of correlation between two variables. POINTS: 1 DIFFICULTY: Easy NATIONAL STANDARDS: United States - BUSPROG: Analytic TOPICS: Deriving the Ordinary Least Squares Estimates KEYWORDS: Bloom's: Knowledge 21. The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. a. True b. False ANSWER: False RATIONALE: FEEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. a. True b. False ANSWER: False RATIONALE: FEEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is zero. POINTS: 1 DIFFICULTY: Easy NATIONAL STANDARDS: United States - BUSPROG: Analytic TOPICS: Notice States - BUSPROG: Analytic	TOPICS:	Definition of the Simple Regression Model
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ANSWER:TrueRATIONALE:FEEDBACK: Simple regression is an analysis of correlation between two variables.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Deriving the Ordinary Least Squares EstimatesKEYWORDS:Bloom's: Knowledge21. The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. a. True b. FalseANSWER:FalseRATIONALE:FeEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is always positive. (OLS) residuals is zero.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:0Properties of OLS on Any Sample of Data	a. True	analysis of correlation between two variables.
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RATIONALE:EEDBACK: The sample covariance between the regressors and the Ordinary Least Square (DLS) residuals is zero.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Properties of OLS on Any Sample of Data	a. True	between the regressors and the Ordinary Least Square (OLS) residuals is always positive.
(OLS) residuals is zero.POINTS:1DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Properties of OLS on Any Sample of Data	ANSWER:	False
DIFFICULTY:EasyNATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Properties of OLS on Any Sample of Data	RATIONALE:	
NATIONAL STANDARDS:United States - BUSPROG: AnalyticTOPICS:Properties of OLS on Any Sample of Data	POINTS:	1
TOPICS: Properties of OLS on Any Sample of Data	DIFFICULTY:	Easy
	NATIONAL STANDARDS:	United States - BUSPROG: Analytic
KEYWORDS: Bloom's: Knowledge	TOPICS:	Properties of OLS on Any Sample of Data
	KEYWORDS:	Bloom's: Knowledge

22. R^2 is the ratio of the explained variation compared to the total variation.

22. R^2 is the ratio of the exp	plained variation compared to the total variation.
a. True	
b. False	
ANSWER:	True
RATIONALE:	FEEDBACK: The sample covariance between the regressors and the Ordinary Least Square (OLS) residuals is zero.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Properties of OLS on Any Sample of Data
KEYWORDS:	Bloom's: Knowledge
23. There are <i>n</i>-1 degrees oa. Trueb. False	f freedom in Ordinary Least Square residuals.
ANSWER:	False
RATIONALE:	FEEDBACK: There are n-2 degrees of freedom in Ordinary Least Square residuals.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Expected Values and Variances of the OLS Estimators
KEYWORDS:	Bloom's: Knowledge
24. The variance of the slopa. Trueb. False	be estimator increases as the error variance decreases.
ANSWER:	False
RATIONALE:	FEEDBACK: The variance of the slope estimator increases as the error variance increases.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Expected Values and Variances of the OLS Estimators
KEYWORDS:	Bloom's: Knowledge
25. In general, the constanta. Trueb. False	that produces the smallest sum of squared deviations is always the sample average.
ANSWER:	True
RATIONALE:	FEEDBACK: In general, the constant that produces the smallest sum of squared deviations is always the sample average.
POINTS:	1
DIFFICULTY:	Easy
NATIONAL STANDARDS:	United States - BUSPROG: Analytic
TOPICS:	Regression through the Origin and Regression on a Constant
KEYWORDS:	Bloom's: Knowledge