

DECODED**Score: 85.0%****17/20 points**

Regression Assessment

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4. Which of the following best defines Regression?

- ☒ A technique used to model the relationship between a dependent numerical variable and independent predictor variables
- ☐ A technique used to create new variables that were previously unknown
- ☐ A technique used to create a relationship between variables that are uncorrelated
- ☐ A method to predict values of independent variables

1/1 point

5. Which of the following **is not** a type of regression?

- ☐ Linear
- ☐ Logistic
- ☐ Polynomial

☒ Inelastic

1/1 point

6. What is the purpose of a simple linear regression?

- ☐ To assess whether there is a significant difference between repeated measures
- ☐ To predict scores on an independent variable from scores on a single dependent variable
- ☒ To predict scores on a dependent variable from scores on multiple independent variables
- ☐ To predict scores on a dependent variable from scores on a single independent variable

0/1 point

The correct answer was "To predict scores on a dependent variable from scores on a single independent variable" - also known as univariate regression

7. What is the purpose of a multiple regression?

- ☐ To predict scores on a dependent variable from scores on a single independent variable
- ☒ To predict scores on a dependent variable from scores on multiple independent variables
- ☐ To assess whether there is a significant difference between repeated measures
- ☐ To predict scores on an independent variable from scores on a single dependent variable

1/1 point

8. Name the type of regression where the line of best fit is **always** a straight line:

- ☒ Linear regression
- ☐ Polynomial regression
- ☐ Lasso regression
- ☐ Elasticnet regression

1/1 point

9. Linear Regression establishes a relationship between a dependent variable (Y) and one or more independent variables (X). It is represented by the equation $Y = a + b \cdot X + e$, where a is ____, b is ____ of the line and e is ____ term. Fill in the blanks accordingly:

- ☐ slope, intercept, error
- ☒ intercept, slope, error
- ☐ error, intercept, slope
- ☐ intercept, error, slope

1/1 point

10. What does the Adjusted R squared value tell you?

- ☐ The Adjusted R squared value tells you if there is a negative relationship
- ☐ The Adjusted R squared value tells you if there is a significant relationship

- ☒ The Adjusted R squared value tells you how much of the variance in the dependent variable can be accounted for by the independent variable
- ☐ The Adjusted R squared value tells you if there is a positive relationship

1/1 point

11. What are residuals?

- ☐ Confidence intervals
- ☐ Uncontrolled variables
- ☐ Mediator variables
- ☒ The differences between the observed and expected dependent variable scores

1/1 point

12. Which of the following is **not true** for linear regression?

- ☐ It is fast and easy to model, and is particularly useful when the relationship to be modeled is simple and there isn't a lot of data
- ☐ It is very intuitive to understand and interpret
- ☒ It is useful to create a model that is suitable for handling non-linearly separable data
- ☐ It is very sensitive to outliers

0/1 point

The correct answer was "It is useful to create a model that is suitable for handling non-linearly separable data"

13. What is Logistic Regression?

- ☒ Logistic Regression is a statistical technique where the score of a variable Y is predicted from the score of a second variable X
- ☐ Logistic Regression is a technique to predict the binary outcome from a linear combination of predictor variables
- ☐ Logistic Regression is a method that performs both variable selection and regularisation in order to enhance the prediction accuracy and interpretability of the statistical model it produces
- ☐ Logistic Regression is a technique for analysing multiple regression data that suffer from multicollinearity.

0/1 point

The correct answer was "Logistic Regression is a technique to predict the binary outcome from a linear combination of predictor variables"

14. In a polynomial regression equation, the power of some of the independent variables is greater than 1.

- ☒ TRUE
- ☐ FALSE

1/1 point

15. Which of the following equations represents a polynomial regression equation?

- ☐ $y = a + b \cdot x + e$
- ☐ $y = a + b \cdot 2$
- ☒ $y = a + b \cdot x^2$

☐ $\text{logit}(p) = \ln(p/(1-p)) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \dots + b_kX_k$

1/1 point

16. A standard linear or polynomial regression will fail in cases where there is high collinearity among the independent variables. How would you define collinearity?

- ☐ Collinearity is where all the independent variables are uncorrelated
- ☒ Collinearity is when some of the independent variables are highly correlated
- ☐ Collinearity is when one predictor variable in a multiple regression model cannot accurately be linearly predicted from the others
- ☐ Collinearity means that no variables are linear combinations of one another

1/1 point

17. Which type of regression can be used when the data suffers from multicollinearity?

- ☐ Linear
- ☐ Polynomial
- ☐ Logistic
- ☒ Ridge

1/1 point

18. Similar to Ridge Regression, Lasso Regression penalizes the

absolute size of the regression coefficients. In addition, it is capable of reducing the variability and improving the accuracy of linear regression models. What does Lasso stand for?

- ☐ Linear Absolute Selection Sub Operator
- ☐ Logistic Approximation of Selected Operator
- ☒ Least Absolute Shrinkage and Selection Operator
- ☐ Least Approximation Selection Operator

1/1 point

19. ElasticNet is a hybrid of ____ and ____ Regression techniques.

- ☒ Lasso and Ridge
- ☐ Linear and Polynomial
- ☐ Lasso and Logistic
- ☐ Logistic and Ridge

1/1 point

20. Both covariance and correlation assess the relationship between variables. Which of the following options is **incorrect**?

- ☐ Covariance measures the total variation of two random variables from their expected values, and tells us the direction of the relationship
- ☐ Covariance does not indicate the strength of the relationship, nor the dependency between the variables
- ☒ Covariance is the scaled measure of correlation

- ☐ Correlation measures the strength of the relationship between variables

1/1 point

21. The product moment correlation coefficient, r , can be used to tell us how strong the correlation between two variables is. A positive value indicates a positive correlation and the higher the value, the stronger the correlation. Similarly, a negative value indicates a negative correlation and the lower the value the stronger the correlation. Which of the following options is **not true**?

- ☐ If there is a perfect positive correlation, then $r = 1$
- ☐ If there is a perfect negative correlation, then $r = -1$
- ☐ If there is no correlation, then $r = 0$
- ☒ If there is no correlation, then $r = \text{infinite}$

1/1 point

22. Consider a linear regression model that estimates a person's annual Income as a function of two variables, Age and Education, both expressed in years. In this case, Income is the outcome variable, and the input variables are Age and Education. In this example, the model would be expressed as shown in the equation:

- ☒ $\text{Income} = a_0 + a_1 \cdot \text{Age} + a_2 \cdot \text{Education} + e$
- ☐ $\text{Income} = a_0 \cdot \text{Education} + \text{Age} + e$
- ☐ $\text{Education} = a_0 + a_1 \cdot \text{Age} + a_2 \cdot \text{Income} + e$
- ☐ $\text{Age} = a_0 \cdot \text{Income} + a_1 \cdot \text{Education} + e$

1/1 point

23. Ordinary least squares (OLS) is a type of linear least squares method for estimating:

- ☒ The unknown parameters in a linear regression model
- ☐ The unknown parameters in a polynomial regression model
- ☐ The unknown parameters in a ridge regression model
- ☐ The unknown parameters in any type of regression model

1/1 point

Done