**ML Assignment 16**

1. In a linear equation, what is the difference between a dependent variable and an independent variable?

Ans-) In a linear equation, the dependent variable is the variable that is being predicted or explained by the independent variable. The independent variable, on the other hand, is the variable that is used to make predictions or explain the variability in the dependent variable.

2. What is the concept of simple linear regression? Give a specific example.

Ans-) Simple linear regression is a statistical method that is used to model the relationship between a dependent variable and one independent variable. For example, if you want to predict a person's weight based on their height, you could use simple linear regression to model the relationship between weight (dependent variable) and height (independent variable).

3. In a linear regression, define the slope.

Ans-) In a linear regression, the slope represents the rate at which the dependent variable changes for a unit change in the independent variable. It is a measure of the direction and strength of the relationship between the variables.

4. Determine the graph’s slope, where the lower point on the line is represented as (3,2) and the higher point is represented as (2, 2).

Ans-)The slope of the graph would be undefined since the two points have the same y-coordinate. A vertical line has an undefined slope.

5. In linear regression, what are the conditions for a positive slope?

Ans-)In linear regression, a positive slope occurs when there is a direct relationship between the independent and dependent variables. As the independent variable increases, the dependent variable also increases.

6. In linear regression, what are the conditions for a negative slope?

Ans-)In linear regression, a negative slope occurs when there is an inverse relationship between the independent and dependent variables. As the independent variable increases, the dependent variable decreases.

7. What is multiple linear regression and how does it work?

Ans-)Multiple linear regression is a statistical method used to model the relationship between a dependent variable and two or more independent variables. It works by finding the best linear equation that explains the variability in the dependent variable based on the values of the independent variables.

8. In multiple linear regression, define the number of squares due to error.

Ans-)In multiple linear regression, the number of squares due to error represents the amount of unexplained variance in the dependent variable that is not accounted for by the independent variables.

9. In multiple linear regression, define the number of squares due to regression.

Ans-)In multiple linear regression, the number of squares due to regression represents the amount of variance in the dependent variable that is explained by the independent variables.

10. In a regression equation, what is multicollinearity?

Ans-)Multicollinearity is a phenomenon that occurs when two or more independent variables in a regression model are highly correlated with each other. This can lead to problems in the estimation of the regression coefficients and can make it difficult to interpret the results.

11. What is heteroskedasticity, and what does it mean?

Ans-)Heteroskedasticity is a phenomenon that occurs when the variance of the errors in a regression model is not constant across all levels of the independent variable. This can lead to biased estimates of the regression coefficients and can make it difficult to make accurate predictions.

12. Describe the concept of ridge regression.

Ans-)Ridge regression is a technique used to deal with multicollinearity in a regression model. It works by adding a penalty term to the regression equation that shrinks the coefficients towards zero.

13. Describe the concept of lasso regression.

Ans-)Lasso regression is a technique used to select a subset of the independent variables in a regression model that are most important for predicting the dependent variable. It works by adding a penalty term to the regression equation that forces some of the coefficients to be zero.

14. What is polynomial regression and how does it work?

Ans-)Polynomial regression is a type of regression analysis that models the relationship between the dependent variable and one or more independent variables by fitting a polynomial equation to the data.

15. Describe the basis function.

Ans-)A basis function is a mathematical function that is used to transform the independent variables in a regression model into a set of basis functions that can be used to fit a more complex model.

16. Describe how logistic regression works.

Ans-)Logistic regression is a statistical method used to model the relationship between a binary dependent variable and one or more independent variables. It works by fitting a logistic curve to the data, which represents the probability of the dependent variable being in one of the two categories as a function of the independent variables.