1. What is regression analysis?

Regression analysis is a statistical method used to investigate the relationship between a dependent variable and one or more independent variables. It involves analyzing and modeling the relationship between these variables to understand how changes in the independent variable(s) affect the dependent variable.

1. What is the difference between regression analysis and correlation analysis?

Regression analysis and correlation analysis both measure the relationship between two variables. However, correlation analysis measures the strength and direction of the relationship between two variables, while regression analysis also models the relationship and can be used to make predictions about the dependent variable.

1. What are the assumptions of linear regression?

The assumptions of linear regression include: linearity, independence, homoscedasticity, normality, and absence of multicollinearity.

1. What is the difference between simple linear regression and multiple linear regression?

Simple linear regression involves modeling the relationship between one independent variable and one dependent variable. Multiple linear regression involves modeling the relationship between two or more independent variables and one dependent variable.

1. What is the purpose of linear regression?

The purpose of linear regression is to understand the relationship between the dependent variable and independent variable(s), and to predict the value of the dependent variable based on the values of the independent variable(s).

1. What is the difference between population regression and sample regression?

Population regression involves modeling the relationship between a dependent variable and one or more independent variables for an entire population. Sample regression involves modeling the relationship between a dependent variable and one or more independent variables for a sample of the population.

1. What are the types of variables in regression analysis?

The types of variables in regression analysis include: dependent variable, independent variable, categorical variable, continuous variable, and dummy variable.

1. What is the difference between dependent and independent variables?

The dependent variable is the variable being predicted or explained, while the independent variable is the variable(s) that is/are used to predict or explain the dependent variable.

1. What is the role of the dependent variable in regression analysis?

The dependent variable is the variable being predicted or explained in regression analysis. It is the variable that is being modeled and predicted based on the values of the independent variable(s).

1. What is the role of the independent variable in regression analysis?

The independent variable is the variable(s) used to predict or explain the dependent variable in regression analysis. It is the variable(s) that is/are being manipulated or observed to determine their effect on the dependent variable.

1. What is the difference between a continuous variable and a categorical variable?

A continuous variable can take on any value within a certain range, such as height, weight, or temperature. On the other hand, a categorical variable represents discrete categories, such as gender, race, or type of car. Continuous variables can be measured with precision and can take on an infinite number of possible values, while categorical variables are typically measured using discrete categories.

**Example**:

Continuous variable - Age of a person, temperature of a room, height of a building

Categorical variable - Gender of a person, type of car, color of a dress

1. What is the difference between a predictor variable and a response variable?
2. What is the difference between a linear relationship and a nonlinear relationship?
3. What is the difference between correlation and causation?
4. What is the difference between a parametric model and a nonparametric model?
5. What is the difference between a linear model and a nonlinear model?
6. What is the difference between a parametric linear model and a nonparametric linear model?
7. What is the difference between an intercept and a slope in linear regression?
8. What is the role of the intercept in linear regression?
9. What is the role of the slope in linear regression?
10. What is the difference between a simple linear regression model and a multiple linear regression model?
11. What is the difference between the residuals and the predicted values in linear regression?
12. What is the difference between the least squares method and maximum likelihood method in linear regression?
13. What is the cost function in linear regression?
14. What is the gradient descent algorithm and how is it used in linear regression?
15. What is overfitting in linear regression?
16. What is underfitting in linear regression?
17. What is the bias-variance tradeoff in linear regression?
18. What is regularization in linear regression?