1.What is the difference between training data and test data in regression?

Training data helps the model learn patterns, while test data checks how well it predicts new data. This ensures the model works correctly and avoids overfitting.

2. Name three evaluation metrics for regression models.

Three common evaluation metrics for regression models are:

1. **Mean Squared Error (MSE)** – Measures the average squared difference between actual and predicted values.
2. **Mean Absolute Error (MAE)** – Calculates the average absolute difference between actual and predicted values.
3. **R² Score (Coefficient of Determination)** – Indicates how well the model explains the variance in the target variable (ranges from 0 to 1).

3.Why is feature scaling important in regression?

Feature scaling keeps all variables balanced, preventing bias in the model. It also helps the regression algorithm learn faster and perform better.

4. What type of data is unsuitable for regression?

Regression doesn't work well with raw categorical data, highly correlated variables, strong non-linearity, or extreme outliers, as these can affect accuracy.

5.How does Mean Absolute Error (MAE) differ from Mean Squared Error(MSE)?

MAE takes the average of absolute errors, while MSE squares the errors, giving more weight to larger mistakes. This makes MSE more sensitive to outliers.

6.How do you interpret the coefficients of a regression model?

A regression coefficient shows how much the target variable changes when the predictor increases by one unit. A positive value increases the outcome, while a negative value decreases it.

7. What is a residual in regression?

A **residual** in regression is the difference between the actual value and the predicted value of the target variable. It shows how much error the model made for each data point.

8. Why is cross validation important in regression?

Cross-validation is important in regression because it tests the model on different data splits, ensuring it generalizes well to new data. It helps detect overfitting and improves model reliability.

9.How would you interpret an R2 value of 0.85?

An **R² value of 0.85** means that **85% of the variation** in the target variable is explained by the regression model. This indicates a strong fit, but 15% of the variation is still unexplained.

10. What steps can you take if your regression model is too slow to converge?

To speed up convergence in regression, you can scale features, reduce unnecessary variables, use a better optimizer, adjust the learning rate, or try mini-batch gradient descent.

11. A regression model is underperformimg .What steps can you take?

- ❖ Check and Clean Data
- ❖ Apply Feature Scaling
- ❖ Try Different Models
- ❖ Tune Hyperparameters
- ❖ Use Cross-Validation