1. What is prior probability? Give an example.

>>>Prior probability refers to the initial probability assigned to an event before considering any additional information or evidence. It's based on your initial beliefs or knowledge

2. What is posterior probability? Give an example.

>>>Posterior probability is the updated probability of an event after incorporating new evidence or information. It's calculated using Bayes' theorem

3. What is likelihood probability? Give an example.

>>>Likelihood probability represents how well the observed data supports a particular hypothesis or model. It's not a traditional probability but a measure of how probable the data is given the hypothesis.

4. What is Naïve Bayes classifier? Why is it named so?

>>>The Naïve Bayes classifier is a probabilistic machine learning algorithm used for classification tasks. It assumes that features are conditionally independent given the class label, which simplifies calculations.

5. What is optimal Bayes classifier?

>>>The optimal Bayes classifier, also known as the Bayes optimal classifier, is a theoretical classifier that assigns the class label that has the highest posterior probability given the data.

6. Write any two features of Bayesian learning methods.

>>>a. Incorporation of Prior Knowledge: Bayesian learning methods allow the integration of prior knowledge or beliefs into the learning process, which can be especially useful when data is limited.

b. Flexibility in Uncertainty Handling: Bayesian methods provide a principled way to handle uncertainty through probability distributions, allowing for better representation of uncertain knowledge.

7. Define the concept of consistent learners.

>>>Consistent learners are machine learning algorithms that, given a sufficiently large amount of data, will converge to the true underlying concept or function being learned.

a. Simple and Fast: Naïve Bayes classifiers are computationally efficient and easy to implement, making them suitable for large datasets.

b. Handles Irrelevant Features: The independence assumption allows the classifier to handle irrelevant features without significantly impacting performance.

9. Weaknesses of Bayes Classifier:

a. Overly Simplistic Assumption: The naïve independence assumption might not hold in all cases, leading to suboptimal predictions.

b. Sensitive to Feature Distribution: The classifier's performance can degrade when feature distributions are significantly different from the assumed distribution.

10. Naïve Bayes Classifier Usage:

Text Classification: Naïve Bayes is commonly used for text classification tasks such as sentiment analysis, spam detection, and topic categorization.

Spam Filtering: It's employed in spam filters to classify emails as spam or not based on the words and phrases present in the content.

Market Sentiment Analysis: Naïve Bayes can analyze market sentiment by classifying financial news articles as positive, negative, or neutral based on the words used.