1. **Define the Bayesian interpretation of probability.**

In the Bayesian view, a probability is assigned to a hypothesis. A Bayesian probabilist will specify a prior probability, which is then updated to a posterior probability based on new, relevant data. The Bayesian interpretation provides a standard set of procedures and formulae to perform this calculation.

Bayesian inference interprets probability as a measure of believability or confidence that an individual may possess about the occurrence of a particular event.

1. **Define probability of a union of two events with equation.**

If two events A and B are not disjoint, then the probability of their union (the event that A or B occurs) is equal to the sum of their probabilities minus the sum of their intersection. P(A) + P(B) - P(A and B)

1. **What is joint probability? What is its formula?**

Joint probability is the likelihood of two or more independent events occurring simultaneously. The formula for joint probability is P(A and B) = P(A) x P(B). Calculating probabilities is expressed as a percent and follows the formula: Probability = Favorable cases / possible cases x 100

1. **What is chain rule of probability?**

A probability chain is a random process in which someone communicates information to others according to the principles of probability, and these individuals subsequently notify even more people in the same way. This chain is also referred to as a random process

1. **What is conditional probability means? What is the formula of it?**

Conditional probability refers to the chances that some outcome occurs given that another event has also occurred. It is often stated as the probability of B given A and is written as P(B|A), where the probability of B depends on that of A happening.

f A and B are two events associated with the same sample space of a random experiment, the conditional probability of event A given that B has occurred is given by P(A/B) = P( A ∩ B)/ P (B), provided P(B) ≠ 0.

1. **What are continuous random variables?**

A continuous random variable is one which takes an infinite number of possible values. Continuous random variables are usually measurements. Examples include height, weight, the amount of sugar in an orange

1. **What are Bernoulli distributions? What is the formula of it?**

Bernoulli distribution is a discrete probability distribution where the Bernoulli random variable can have only 0 or 1 as the outcome. p is the probability of success and 1 - p is the probability of failure. The mean of a Bernoulli distribution is E[X] = p and the variance, Var[X] = p(1-p)

1. **What is binomial distribution? What is the formula?**

The binomial distribution is a type of probability distribution that deals with the number of successes in a certain number of trials. The formula for the binomial distribution is:

𝑃(𝑥∶𝑛,𝑝)=𝑛𝐶𝑥𝑥𝑝𝑥(1−𝑝)𝑛−𝑥

In this formula, n is the number of experiments, p is the probability of success in a single experiment, and q is the probability of failure in a single experiment.

1. **What is Poisson distribution? What is the formula?**

The Poisson distribution is a statistical distribution that shows the probability of an event happening within a given time period. The formula for the Poisson distribution is:

𝑃(𝑋=𝑘)=(𝜆𝑘𝑒−𝜆)/𝑘!

In this formula, lambda is the expected value of the random variable X, and k is the number of occurrences.

1. **Define covariance.**

covariance is a measure of the relationship between two random variables. The metric evaluates how much – to what extent – the variables change together. In other words, it is essentially a measure of the variance between two variables.

1. **Define correlation.**

The correlation coefficient is a statistical measure of the strength of a linear relationship between two variables. Its values can range from -1 to 1. A correlation coefficient of -1 describes a perfect negative, or inverse, correlation, with values in one series rising as those in the other decline, and vice versa.

1. **Define sampling with replacement. Give example.**

Sampling with replacement is a type of sampling where the selected subjects are put back into the population before another subject is sampled.   
For example, if you have a jar of 12 unique glass beads, and you are sampling with replacement from the jar, the chance of randomly selecting any 1 of the glass beads is 1/12. After selecting a bead, return it to the jar so that the probability of selecting any of the 12 beads in future sampling doesn't change. This means that if you repeat the process it is entirely possible you could randomly take out the same bead.

1. **What is sampling without replacement? Give example.**

Sampling without replacement means that each unit of the population has only one chance of being selected. For example, if you draw a simple random sample and no unit appears more than once, the sample is drawn without replacement.  
For example, You have a jar of glass beads and the chance of randomly selecting any one bead is 1/12. After selecting a bead, you do not return it to the jar. The probability of selecting any of the remaining 11 beads in future sampling is now 1/11.

1. **What is hypothesis? Give example.**

A hypothesis is a proposed explanation for a phenomenon. It is a statement that can be tested through experimentation or observation. A hypothesis is typically written as an "if-then" statement, where the "if" part is the proposed explanation and the "then" part is the predicted outcome. For example, the hypothesis "If I eat more vegetables, I will lose weight faster" can be tested by measuring the participant's weight before and after they start eating more vegetables.

Hypotheses are important because they allow scientists to make predictions about the world around them. These predictions can then be tested through experimentation, which can help scientists to learn more about the world. Hypotheses can also be used to develop new technologies and solve problems.