that the model can be updated as its environment changes.

7. List out the differences between probability Mass functions and probability Density functions?

probability Density function	probability Mass function
1) It is used when there is a need to find a solution in a range of continuous random variables	1. It is used when there is a need to find a solution in a rang of discrete random variables
2) It uses continous random variables	2) It uses discrete random variables
3) $F(x) = p(a < x$	3) $p(x) = p(X = x)$
4) the solution falls in the radius range of continuous random variables	4) the solutions falls in the radius b/w numbers of discrete random variables

5) Applications

(i) It is used in shaping the data of atmospheric Nox temporal concentration yearly

(ii) It is treated to shaped the diesel engine combustion

(iii) It is used to work on the probabilities attached with random variables in statistics

5) Applications

i) It has a main role in statistics as it helps in defining the probabilities for discrete random variables

(ii) It is used to find mean and various of the distinct grouping

(iii) It is used in binomial and passion distribution where discrete values are used

8. What is a hypothesis and how it is tested?

Statisticians follows a formal process to determine whether to reject a null hypothesis, based on sample data. This process, called hypothesis testing.

All hypothesis tests are conducted the same way. the researcher states a hypothesis to be tested, formulates an analysis plan, analysis

sample data according to the plan and accepts or rejects the null hypothesis, based on results of the analysis

· State the hypotheses: every hypothesis test requires the analyst to state a null hypothesis and an alternative hypothesis. The hypotheses are stated in such a way that they are mutually exclusive. That is, if one is true, the other must be false, and vice versa.

⇒ Formulate an analysis plan: The analysis plan describes how to use sample data to accept or reject the null hypothesis. It should specify the following element

. significance level often, researchers choose significance levels equal to 0.01, 0.05 or 0.10 but any value blw 0 and 1 can be used

· Analyze sample data: Using sample data, perform computations called for in the analysis plan.

· Test statistic: When the null hypothesis involves a mean or proportion, use either of the following equations to compute the test statistic.

Test statistic = (statistic - parameter) / (standard deviation of statistic)

Interpret the results: If the sample findings are unlikely, given the null hypothesis, the researcher rejects the null hypothesis. Typically, this involves comparing the P-value to the significance level, and rejecting the null hypothesis when the P-value is less than the significance level.

12) What is statistical hypothesis? Briefly describle various statistics?

A statistical hypothesis is an assumption about a population parameter. This assumption may or maynot be true. Hypothesis testing refers to the format procedures used by statisticians to accept or reject statistical hypotheses

The best way to determine whether a statistical hypothesis is true would be to examine the entire population. Since that is often impractical, researchers typically examine a random sample from the population. If sample data are not consistent with the statistical hypothesis, the hypothesis is rejected.

There are two types of statiscal hypothesis

. Null hypothesis: The null hypothesis denoted by H_0, is usually the hypothesis that sample observations result purely from chance

. Alternative hypothesis: the alternative hypothesis, denoted by H1 or Ha, is the hypothesis that sample observations are influenced by some-non random cause.

For example, suppose we wanted to determine whether a coin was fair and balanced. A null hypothesis might be that half the flips would results in Heads and half, in Tails. The Alternative hypothesis might be that the number of heads and Tails would be very different. Symbolically, these hypotheses would be expressed as

$H_0: P = 0.5$

$H_a: P \neq 0.5$

Suppose we flipped the coin 50 times, resulting in 40 heads and 10 Tails. Given th

Q) How random variables are different from traditional variables used is algebra?

A random variable is different from the variable in algebra as it has whole set of values and it can take any of these randomly

⇒ A variable is a unknown quantity that has an undetermined magnitude and random variables are used represent events in a sample data a related values as a dataset

⇒ a variable can be defined with domain as a set of real nos. while random variables can be either real or some discrete non math entities in a set a random variable can be ~~either~~ used to denote an event relate to some object its purpose of a random variable is to interdense a mathematically manipulative value to that event

⇒ Random variables are often designated by letters & can be classified as discrete, values which are variables that have specific values or continuous which are variables that can have any values within a continuous range.

10

(a) List out the properties of probability mass & Density functions?

Probability Mass function (PMF)

Also called a probability function as frequency function on which characteristics the distributed of a discrete random variable.

⇒ Let x be a discrete random variables of a function, then the probability mass function of a random variable x is given by

⇒ P(x): p(x=x) ∀ x ∈ range of x.

⇒ It is noted that the probability function should fall on the condn

$P(x) \geq 0$ and

$\sum_{x \in Range(x)} p_x(1) = 1$

(Range(x) → countable set & can be written as $\{x_1, x_2, x_3 \ldots\}$

⇒ This means that the random var x takes $x_1, x_2 \ldots$

⇒ probability Density function (PDF):

⇒ PDF defines the probability function requesting the density of a continuous

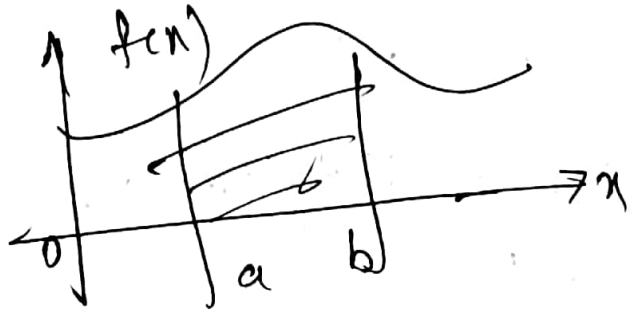
random variable lying b/w a specific range of values
⇒ It produces the likelihood of value the continuous random variable

The formula is give as

$$P(a<x<b) = \int_a^b f(x)\,dx$$

$$P(a\leq x\leq b) = \int_a^b f(x)\,dx$$

Probability Density function on Graph



PDF properties

Let x be the continuous random variable with density function should satisfy the following conditions

⇒ For a continuous random variable that takes some value b/w certain limits say a and b. The PDF is calculated by finding the area under its curve & the x axis within the lower limit a and upper limit b.

(11) What is the purpose of sample statistics and explain the properties of sample statistics?

Ans: In statistics a sample is an analytic subset of a larger population

⇒ The use of samples allows researchers to control their studies with more manageble dates. in a timely manner

⇒ As the data for a sample is collected in random sampling it doesn't draw basics

⇒ A sample is just a part of a population

Sample statistics

A metric calculated for a sample of data drawn from a larger population

properties

Sample statistic is drawn from a sample distribution. The distribution of a sample statistic is known as the sampling distributions

The frequency distribution of a sample statistic tells us how that metric would turn out

differently from sample to sample

⇒ the distribution of a sample statistic such as the mean is likely to be more regular & bell shaped than the distribution of the data itself

⇒ The larger the sample the statistic is based on the more this is true. Also the larger the sample the narrower the distribution of the sample statistic