

# assignment 2 Maths

Topic.....

Date.....

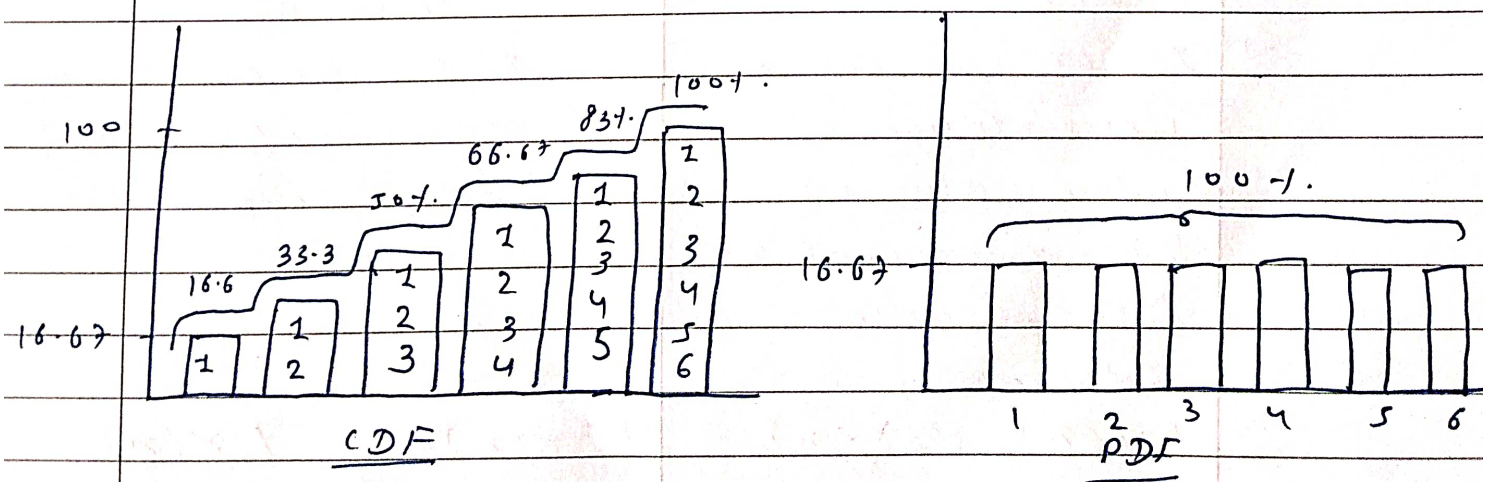
Q2) Difference between probability density functions (PDFs) and Cumulative distribution functions (CDFs).

→ Probability density functions (PDFs) is a probability that a random variable, will take a value exactly equal to it.

for example : if you roll a dice, the probability of getting 1, 2, 3, 4, 5, 6 is  $(1/6)$  each. The PDF that we will get exactly 2 is  $(1/6)$ .

→ The cumulative distribution function (CDF) is the probability that a random variable say  $x$  will take a value equal to or less than  $x$ .

for example: if you roll a dice, the probability of obtaining a 1 or 2 or 3 or 4 or 5 or 6 is  $(1/6)$  individually. The CDF of 1 is the probability that the next roll will take a value less than or equal to 1 is  $(16.66\%)$ . The CDF of 2 is  $33.33\%$ . as there are 2 possible ways (1 is less than 2 and 2 is equal to 2).



→ For continuous random variable, we cannot use a PDF directly, since the probability that  $x$  takes on any exact value is zero.

Teacher's Sign .....



	CDF	PDF
→	cumulative distribution function	→ probability density function
→	CDF is the probability that random variable values less than or equal to $x$ whereas PDF	→ PDF is the probability that a random variable say $X$ , will take a value exactly equal to $x$ .
→	Slope of CDF must always be equal to or greater than zero.	→ PDF is simply a derivative of CDF and as it is slope of CDF so it must always be positive i.e. $PDF > 0$ .
→	CDF values describe probability of a value being less than or equal to given number.	→ PDF values describe the probability of a value falling within a given range.
→	CDF values are often used to describe discrete random variables.	→ PDF values are often used to describe continuous random variables.
→	It is more accurate representation of random value since it takes in account all of the possible outcomes.	→ It can be misleading because it only shows a small snapshot of data.
→	$F_n(x) = P(X \leq x)$	→ $f_n(x) = \frac{d}{dx} F_n(x)$