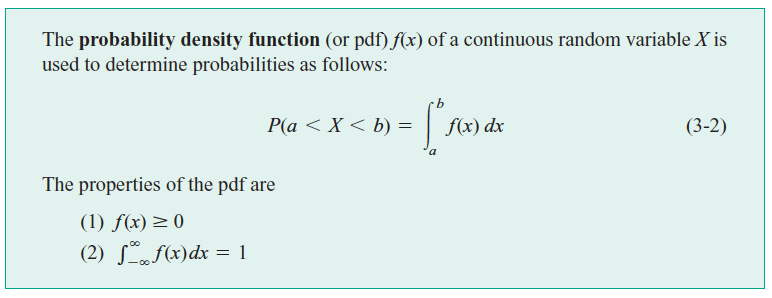
**Formulae Sheet**

**CHE320**



For a continuous random variable, the probability that the variable falls between the values and is given by:

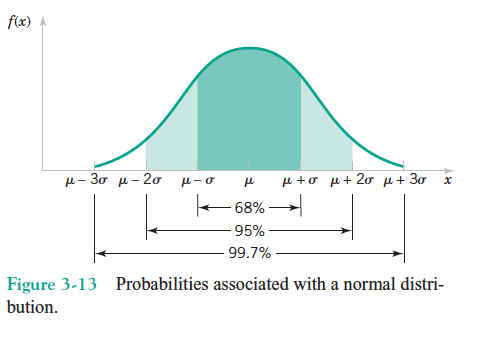
where and are cumulative of defined by:

.

The normal probability distribution function is given by:

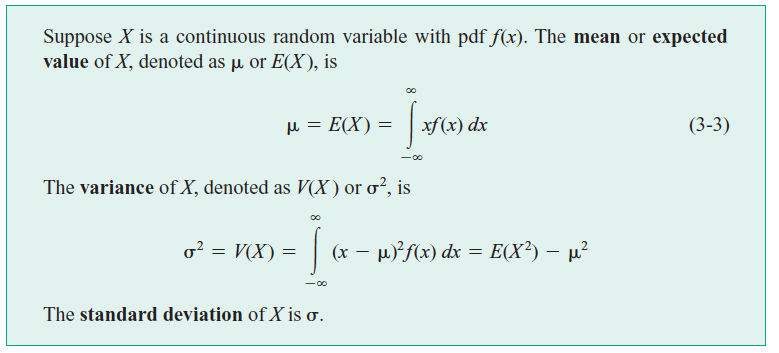


The normal distribution function with mean and standard deviation is shown below:



The normal distribution function with and standard deviation is called standard normal distribution. This is given by:

The cumulative of this function is available as “standard normal distribution table”



**Lognormal probability distribution** function is given by: 

**Binomial distribution:**

If the probability distribution of  is given by:



where  is the number of trials and  is the probability of success. This is called binomial distribution. 

**Poisson Process:**

If the probability distribution of is given by:



Here  is the average number of events in the given interval. 

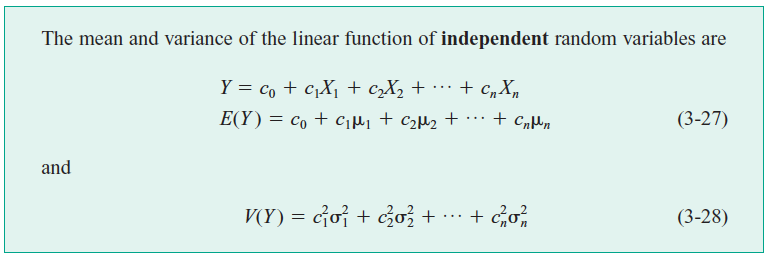
**Exponential distribution:**

If the probability distribution of is given by:

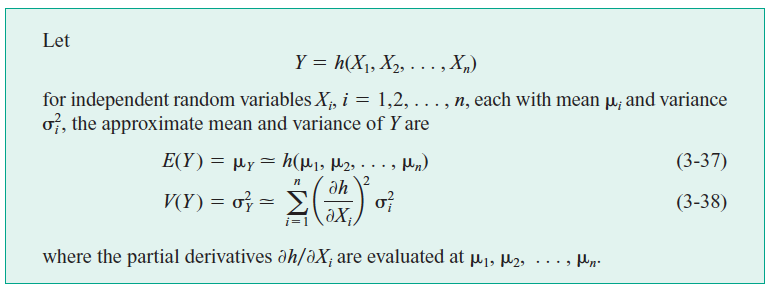


**Functions of Random variables:**

**Linear function of independent random variable:**



**Non-linear function of independent random variable:**



Test of independence: If the joint probability density function is given by:

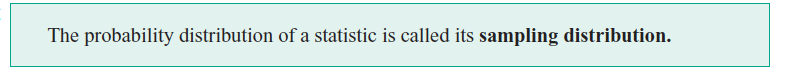
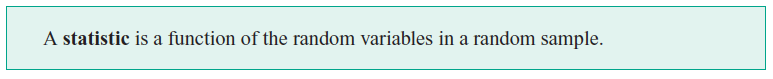
, X and Y are independent.

**Dependent random variables:**



Correlation coefficient:

**Statistic, sampling distribution and central limit theorem:**



If we are sampling from a population that has an **unknown probability distribution** whose mean is and variance is , the probability distribution of the sample mean ( is approximately normal with mean and variance