**Continuous Probability Density Fucntions**

A continuous probability density functions (PDF) is a function f(x) such that  on a given interval  and .

**The Properties:**

1. The mode is the value of x at the maximum value of f(x) on .
2. The median m is the solution for m of equation 
3. The mean is defines as 
4. The variance is defined as 

Ex)  is a probability density function.

1. Find b.
2. Find the mean
3. Find the variance and the standard deviation.

Practice) is a probability density function.

1. Find k.
2. Find the mode
3. Find the mean
4. Find the variance and the standard deviation.

**The Normal Distribution (Distribution for a continuous random variable)**

Manu naturally occurring phenomena have a distribution that is normal or close to normal (a Bell-shaped distribution).

**The Standard Normal Curve**

 **(for** **) and where**  (Standardized variable)

**Using the standard Normal (Use Graphing Calculator)**

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 **This means :**

1. 
2. **The percentage of values of z less than 2 is 97.73%.**
3. **The probability (randomly chosen value of the standard normal variable less than 2) is 0.9772** .

**Ex) Use “Area under the standard normal curve” table**

1. Find  b. Find 
2. Find  d. Find 

Answers:

1. .0446 b. .1894 c. .9370 d. .0384

**Finding Probabilities using the normal distribution function;**



**Ex) X is a normal random variable with mean 80 and variance 16. Find** .

Solution: Change the x value of 78 to Z value () and then use the table to find. Or Evaluate 

Answer: .3085

**The Standard Normal Distribution:**

**Notation:** 

Ex) Given ;

1. Find 
2. Find  Answers: a. 0.9974 b. 0.9426

**Ex) A production line produces bags of sugar with a mean weight of 1.01 kg and standard deviation of 0.02 Kg.**

1. **Find the proportion of the bags that weight less than 1.03 Kg.**
2. **Find the proportion of the bags that weigh more than 1.02 kg.**
3. **Find the percent of the bags that weigh between 1.00 kg and 1.05 kg.**

Answers: a. 0.8413 b. 0.3085 c. .6687

**Inverse to find Quartiles;**

**Ex) Find the values of a in each of these statements that refer to the standard normal variables, Z. (Use “Inverse Normal probabilities table)**

1. 
2. 
3. 

Answers: a. 0.1201 b. -.2533 c. -1.645

Ex) If , find the value of k such that

1. 
2. 

Answers: a. 106 b. 95.8

Ex) The life time of a particular make of television tube is normally distributed with a mean of 8 years, and a standard deviation of n years. The chances that the tube will not last 5 years are 0.05. What is the value of the standard deviation, n?

Ex) The weight of a population of men is found to be normally distributed with mean 69.5 kg. 13 % of the men weight at least 72.1 Kg. Find the standard deviation of their weight?