

# Kolmogorov-Smirnov (K-S) test

- It is a **Simple non-parametric method** for testing whether there is a significant difference between an **observed frequency distribution** and a **theoretical frequency distribution**.
- **The KS One sample test is more powerful than the  $\chi^2$  test** since it can be used for small sample unlike  $\chi^2$

- **The null hypothesis assumes no difference** between the observed and theoretical distribution and the value of test statistics 'D' is calculated as

$$D = \text{Maximum}|F_0(X) - F_r(X)|$$

Where-

- $F_0(X)$  = Observed cumulative frequency distribution of a random sample of n observations.
- $F_0(X) = k/n$ , where k=the number of observations equal to or less than X  
(No. of observations  $\leq X$ )/(Total no. of observations)
- $F_r(X)$  = The theoretical frequency distribution under  $H_0$

- The critical value of  $D$  is found from the **K-S** table values for one sample test.
- **Acceptance Criteria:** If calculated value is less than critical value accept null hypothesis
- **Rejection Criteria:** If calculated value is greater than table value reject null hypothesis.