1. $Class\ width \approx \frac{(Max.data\ value)-(Min.\ data\ value)}{No.\ of\ classes}$
2. $Relative\ Frequency\ for\ a\ class = \frac{Frequency\ of\ the\ class}{Sum\ of\ the\ all\ frequency}$
3. $Percentage\ for\ a\ class = \frac{Frequency\ of\ the\ class}{Sum\ of\ the\ all\ frequency} \times$
4. $\bar{x} = \frac{\Sigma x}{n}$ Mean
5. $\bar{x} = \frac{\Sigma(f.x)}{\Sigma f}$ Mean (Frequency Table)
6. $Median = \left(\frac{n+1}{2}\right)^{th} item,\ \ when\ n\ is\ odd$

   $Median = \frac{\left(\frac{n}{2}\right)^{th} item + \left(\frac{n}{2}+1\right)^{th} item}{2},\ when\ n\ is\ even$
7. $Range = (max.data\ value) - (min.data\ value)$
8. $Midrange = \frac{(max.data\ value)+(min.data\ value)}{2}$
9. $Mode = Most\ frequently\ occuring\ item$
10. $s = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$ sample Standard Deviation
11. S=$\sqrt{\frac{n(\Sigma x^2)-(\Sigma x)^2}{n(n-1)}}$ sample Standard Deviation (Shortcut)
12. $\sigma = \sqrt{\frac{\Sigma(x-\mu)^2}{N}}$ Population Standard Deviation
13. $z = \frac{X-\bar{X}}{s}$ for sample
14. $z = \frac{X-\mu}{\sigma}$ $for\ Population$
15. $P(A) = \frac{No.of\ way\ A\ occured}{Total\ No.\ of\ different\ simple\ events} = \frac{s}{n}$
16. P(A or B) = P(A) + P(B) ; if A, B are mutually exclusive
17. P(A orB) = P(A) + P(B) – P(A and B)

    If A, B are not mutually exclusive
18. $P(A\ and\ B) = P(A) \cdot P(B|A),\ if\ A, B\ are\ independent$

    Multiplication Rule
19. $P(A\ and\ B) = P(A) \cdot P(B),\ if\ A, B\ are\ independent$
20. $P(A) = 1 - P(A^c),\ \ \ Rule\ of\ complement$
21. $P(B|A) = \frac{P(Aand\ B)}{P(A)}$ Conditional Probability

22. $nP_r = \frac{n!}{(n-r)!}$ *Permutation*

23. $nC_r = \frac{n!}{(n-r)!\,r!}$ *Combination*

24. Probability distribution Requirements

    a. There is numerical random variable x and its value are associated with corresponding probability.

    b. $\Sigma P(X) = 1$, where X assumes all possible value.

    c. $0 \leq X \leq 1$, for every individual value of the random variable X.

25. $\mu = \Sigma[x \cdot P(x)]$ Mean of the probability distribution.

26. $\sigma^2 = \Sigma[(x-\mu)^2 \cdot P(x)]$ Variance

27. $\sigma^2 = \Sigma[x^2 \cdot P(x)] - \mu^2$ Variance

28. $\sigma = \sqrt{\Sigma[(x-\mu)^2 \cdot P(x)]}$ Standard Deviation

29. $\sigma = \sqrt{\Sigma[x^2 \cdot P(x)] - \mu^2}$ Standard Deviation

30. $P(x) = \frac{n!}{(n-x)!x!} \cdot p^x \cdot q^{n-x}$ $for\ x = 0,1,2,3, \ldots \ldots \ldots .., n$ (Binomial Probability)

    $where\ n =\ number\ of\ trials$

    $x = \text{number of successes among n trials}$

    $\text{p} = \text{probability of success and q} = \text{probabilityof failure i. e. (q} = 1 - \text{p)}$

    $mean\quad \mu = np$

    $Variance\ \ \sigma^2 = npq\ , Standard\ deviation\ \sigma = \sqrt{npq}$

31. $P(x) = \frac{\mu^x \cdot e^{-\mu}}{x!}$, where e=2.71828 Poisson Probability

    $\mu = mean,\qquad \sigma = \sqrt{\mu}\quad (Standard\ Deviation)$

32. $P(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$ $(Normal\ Ddistribution\ Probability)$

33. Estimation of Population Proportion p.

    $Margin\ of\ error,\ \ E = Z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$ Where $\hat{p} = sample\ proportion, \hat{q} = 1 - \hat{p}$

    $Z_{\alpha/2} = z\ score\ seperating\ area\ of\ {}^{\alpha}/_{2}\ in\ the\ right\ tail\ of\ standard\ normal\ distribution$

    $Confidence\ Interval\ \ \hat{p} - E < p < \hat{p} + E$

    $n = \frac{\left[Z_{\alpha/2}\right]^2 \hat{p}\hat{q}}{E^2}$ $when\ an\ estimate\ \widehat{p}\ is\ known$

    $n = \frac{\left[Z_{\alpha/2}\right]^2 0.25}{E^2}$ $when\ no\ estimate\ \widehat{p}\ is\ known$

34. Estimation of Population mean with σ not known

    $Margin\ of\ error,\ \ E = t_{\alpha/2}\frac{s}{\sqrt{n}}$ Where $s = sample\ standard\ deviation,$

    $t_{\alpha/2} = critical\ t\ value\ seperating\ area\ of\ {}^{\alpha}/_{2}\ in\ the\ right\ tail\ of\ t\ distribution$

    $Confidence\ Interval\ \ \bar{x} - E < \mu < \bar{x} + E$ Where $\mu = Population\ mean$

    $\bar{x} = sample\ mean, \sigma = population\ standard\ deviation$

    $n = \left[\frac{Z_{\alpha/2}\sigma}{E}\right]^2$ $Required\ sample\ size$

35. Estimation of Population mean with σ known

    $Margin\ of\ error,\ \ E = z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$ Where $\sigma = population\ standard\ deviation,$

    $z_{\alpha/2} = critical\ z\ score\ seperating\ area\ of\ {}^{\alpha}/_{2}\ in\ the\ right\ tail\ of\ z\ distribution$

    $Confidence\ Interval\ \ \bar{x} - E < \mu < \bar{x} + E$ Where $\mu = Population\ mean$

$\bar{x} = sample\ mean, \sigma = population\ standard\ deviation$

$n = \left[\frac{Z_{\alpha/2}\sigma}{E}\right]^2$ $\quad$ *Required sample size*

36. Estimation of Population standard deviation σ or variance σ^2

 Confidence Interval for population variance $\quad \frac{(n-1)s^2}{\chi_R^2} < \sigma^2 < \frac{(n-1)s^2}{\chi_L^2}$

 Confidence Interval for population S.D. $\quad \sqrt{\frac{(n-1)s^2}{\chi_R^2}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L^2}}$

 Where $s = sample\ standard\ deviation$

 $\sigma = population\ standard\ deviation, \sigma^2 = population\ variance$

 $\chi_R^2 = Right\ tailed\ critica\ value\ of\ \ \chi, \chi_L^2 = Left\ tailed\ critica\ value\ of\ \ \chi$

37. Testing of a claim about a population proportion p.

 $np \geq 5\ and\ nq \geq 5;\quad \mu = np;\quad \sigma = \sqrt{npq}\ ;\quad \hat{p} = \frac{x}{n}\ ;\quad q = 1 - p$

 $z = \frac{\hat{p}-p}{\sqrt{\frac{pq}{n}}}$

38. Testing of a claim about a population mean with σ not known.

 $\bar{x} = sample\ mean;\quad n = sample\ size;\quad \mu_{\bar{x}} = population\ mean\ ;\quad n \geq 30$

 $t = \frac{\bar{x}-\mu_{\bar{x}}}{\frac{s}{\sqrt{n}}}\quad ; with\ df = n - 1$

39. Testing of a claim about a population mean with σ known.

 $\bar{x} = sample\ mean;\quad n = sample\ size;\quad \mu_{\bar{x}} = population\ mean\ ;\quad n \geq \quad 30$

 $z = \frac{\bar{x}-\mu_{\bar{x}}}{\frac{\sigma}{\sqrt{n}}}$

40. Testing of a claim about σ or σ^2.

 $s = sample\ S.D.;\quad n = sample\ size;\quad s^2 = samlle\ variance\ ;\quad \sigma = claimed\ population\ S.D.$

 $\chi^2 = \frac{(n-1)s^2}{\sigma^2}\quad ; with\ df = n - 1$