Formulae Sheet

Roll no-----------------------------------

1. $b(x; n, p) = c_x^n p^x q^{n-x}$, x = 0, 1, 2, …, n
2. $P(X = x) = h(x; N, n, k) = ({}_kC_x)({}_{N-k}C_{n-x})/({}_NC_n)$, $\max\{0, n-(N-k)\} \le x \le \min\{n, k\}$
3. $P(x; \lambda t) = \frac{(\lambda t)^x e^{-\lambda t}}{x!}$, x = 0, 1, 2, . . .
4. $g(x; p) = p\, q^{x-1}$, x = 1, 2, 3, · · ·
5. $b^*(x; k, p) = {}_{x-1}C_{k-1}\ p^k q^{x-k}$, x = k, k+1, k+2, …
6. $f(x_1, x_2, \ldots x_k; p_1, p_2, \ldots, p_k, n) = \frac{n!}{x_1! \times x_2! \ldots \times x_k!} \times p_1^{x_1} \times p_2^{x_2} \times \ldots \times p_k^{x_k}$
7. $f(x_1, x_2, . . . , x_k; a_1, a_2, . . . , a_k, N, n) = \{(a_1 C x_1)\,(a_2 C x_2) \ldots (a_n C x_n)\} / {}_NC_n$
8. $P(B) = \sum_{i=1}^{n} (A_i \cap B) = \sum_{i=1}^{n} P(A_i)P(B|A_i)$
9. $P(A_i|B) = \frac{P(A_i)P(B|A_i)}{\sum_{i=1}^{n} P(A_i)P(B|A_i)}$
10. ${}_nP_r = \frac{n!}{(n-r)!}$
11. $\frac{n!}{n_1! n_2! \cdots nk!}$ Or $\binom{n}{n_1, n_2, . . . , n_r} = \frac{n!}{n_1! n_2! \cdots n_r!}$
12. ${}_nC_r = \frac{n!}{r!(n-r)!}$
13. $(n-1)!$.
14. $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$
15. $Z_{cal} = \frac{\bar{x}-\mu}{\sigma/\sqrt{n}}$
16. $Z_{cal} = \frac{\bar{x}-\mu}{S/\sqrt{n}}$
17. $S = \sqrt{\frac{\sum(x-\bar{x})^2}{n}}$
18. $S = \sqrt{\frac{1}{n}\{\sum_{i=1}^{n} x^2 - \frac{(\sum_{i=1}^{n} x)^2}{n}\}}$
19. $t_{cal} = \frac{\bar{x}-\mu}{s/\sqrt{n}}$
20. $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
21. $s = \sqrt{\frac{1}{n(n-1)}\{n\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2\}}$
22. $\bar{x} - z_{\alpha/2}\frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$
41. $C.I = (\bar{x}_1 - \bar{x}_2) \pm z_{\alpha/2}\sqrt{\frac{S_1^2}{n1} + \frac{S_2^2}{n2}}$
42. $C.I = (\bar{x}_1 - \bar{x}_2) \pm t_{(\alpha/2, n_1+n_2-2)} S_p \sqrt{\frac{1}{n1} + \frac{1}{n2}}$
43. $C.I = (\bar{x}_1 - \bar{x}_2) \pm t_{(\alpha/2, v)}\sqrt{\frac{S_1^2}{n1} + \frac{S_2^2}{n2}}$
44. $C.I = (\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2}\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$
45. $Z_{cal} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$
46. $Z_{cal} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n1} + \frac{S_2^2}{n2}}}$
47. $t_{cal} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_p\sqrt{1/n_1 + 1/n_2}}$
48. $s_p^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}$
49. $t_{cal} = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$
50. $v = \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{[(s_1^2/n_1)^2/(n_1-1) + (s_2^2/n_2)^2/(n_2-1)]}$
51. $\hat{p} = \frac{x}{n}$
52. $Z_{cal} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$
53. $Z_{cal} = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{P_c q_c\left(\frac{1}{n1} + \frac{1}{n2}\right)}}$
54. $p_c = \frac{x_1 + x_2}{n_1 + n_2}$ and $q_c = 1 - p_c$
55. $r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2}\sqrt{n(\sum y^2) - (\sum y)^2}}$
56. $t_{cal} = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$

23. $\bar{x} - t_{(\alpha/2,n-1)} \frac{s}{\sqrt{n}} < \mu < \bar{x} + t_{(\alpha/2,\, n-1)} \frac{s}{\sqrt{n}}$

24. $\hat{p} - z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}} < p < \hat{p} + z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}}$

25. $\bar{d} - t_{(\alpha/2,n-1)} \frac{s_d}{\sqrt{n}} < \mu_d < \bar{d} + t_{(\alpha/2,\, n-1)} \frac{s_d}{\sqrt{n}}$

26. $s_d = \sqrt{\frac{\sum(d-\bar{d})^2}{n-1}}$

27. $sd = \sqrt{\frac{1}{n(n-1)}\{n\sum_{i=1}^{n} d^2{}_i \;\; - (\sum_{i=1}^{n} d_i)^2\}}$

28. $d_i = x_{1i} - x_{2i}$ OR $d_i = x_{2i} - x_{1i}$

29. $\bar{d} = \frac{\sum_{i=1}^{n} d_i}{n}$

30. $SST = \sum_{i=1}^{k} \sum_{j=1}^{n} (y_{ij} - \bar{y}_{i..})^2$

31. $SSA = n \sum_{i=1}^{k} (\bar{y}_{i.} - \bar{y}_{i..})^2$

32. $SSE = \sum_{i=1}^{k} \sum_{j=1}^{n} (y_{ij} - \bar{y}_{i.})^2$

33. $s_1^2 = \frac{SSA}{k-1}$

34. $s^2 = \frac{SSE}{k(n-1)}$

35. $f_{cal} = \frac{s_1^2}{s^2}$

36. $n = \left(\frac{\sigma z_{\alpha/2}}{e}\right)^2$

37. $n = \frac{\hat{p}\hat{q}\, z^2{}_{\alpha/2}}{e^2}$

38. $n = \frac{0.25\, z^2{}_{\alpha/2}}{e^2}$

39. $n = \frac{z^2{}_{\alpha/2}}{4e^2}$

40. $C.I = (\bar{x}_1 - \bar{x}_2) \pm z_{\alpha/2} \sqrt{\frac{\sigma_1{}^2}{n_1} + \frac{\sigma_2{}^2}{n_2}}$

57. $\hat{y} = b_0 + b_1 x$

58. $b_1 = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$

59. $b_0 = \bar{y} - b_1 \bar{x}$

or

$b_0 = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$

60. $\chi^2_{cal} = \sum \frac{(O_f - E_f)^2}{E_f}$

61. $P(\mu - k\sigma < X < \mu + k\sigma) \geq 1 - \frac{1}{k^2}$