# FORMULAS

1. Relative frequency = $\frac{f}{n}$
2. Circle Degree = Relative frequency$\times 360^{\circ}$
3. Class length = $\frac{Max-Min}{K}$
4. $\mu = \bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$
5. Range = Max – Min
6. $\sigma^2 = \frac{\sum_{i=1}^{N}(x_i-\mu)^2}{N} = \frac{(x_1-\mu)^2+(x_2-\mu)^2+\cdots+(x_N-\mu)^2}{N}$
7. $\sigma = \sqrt{\sigma^2}$
8. $s^2 = \frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1} = \frac{(x_1-\bar{x})^2+(x_2-\bar{x})^2+\cdots+(x_n-\bar{x})^2}{n-1} = \frac{\sum_{i=1}^{n} x_i^2 - \frac{\left(\sum_{i=1}^{n} x_i\right)^2}{n}}{n-1}$
9. $s = \sqrt{s^2}$
10. ***Empirical Rule for a Normally Distributed Population***
    If a population has mean μ and standard deviation σ and is described by a normal curve, then approximately 68.26%, 95.44%, and 99.73% of the population measurements lie in the interval $[\mu \pm \sigma]$, $[\mu \pm 2\sigma]$ and $[\mu \pm 3\sigma]$, respectively.
11. $z = \frac{x - \text{mean}}{\text{standard deviation}}$
12. The position of percentile $= \frac{P(n+1)}{100}$
13. IQR = $Q_3 - Q_1$
14. **Lower & Upper Limits:** $Q_1 - 1.5(\text{IQR})$ and $Q_3 + 1.5(\text{IQR})$
15. **Counting Rule:** Total outcomes = $n_1 n_2 \cdots n_k$
16. ${}_nC_r = \frac{n!}{r!(n-r)!}$
17. $P(E) = \frac{n(E)}{n(S)}$
18. $P(\bar{A}) = 1 - P(A)$
19. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
20. $P(A|B) = \frac{P(A \cap B)}{P(B)}$, provided that $P(B) > 0$
21. $P(A \cap B) = P(A)P(B|A) = P(B)P(A|B)$
22. Two events $A$ and $B$ are independent if and only if $P(A|B) = P(A)$ or, equivalently, $P(B|A) = P(B)$.
23. If $A$ and $B$ are independent events, then $P(A \cap B) = P(A)P(B)$.
24. $\mu_x = \sum_{All\ x} xp(x)$
25. $\sigma_x^2 = \sum_{All\ x}(x-\mu_x)^2 p(x)$ and $\sigma_x = \sqrt{\sigma_x^2}$
26. $p(x) = \frac{n!}{x!(n-x)!} p^x q^{n-x}$, $\mu_x = np$, $\sigma_x^2 = npq$