

Frequently Used Formulas

* Mean = $\frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n} = \bar{x}_n$

Variance = $\frac{\sum_{i=1}^n (x_i - \bar{x}_n)^2}{n-1} = s^2 \Leftarrow$ the step-by-step way.

or $s^2 = \frac{n \left(\sum_{i=1}^n x_i^2 \right) - \left(\sum_{i=1}^n x_i \right)^2}{n \cdot (n-1)} \Leftarrow$ relatively easy but difficult to understand.

* Chebyshev Thm.: At least cover this many % of data points: $1 - \frac{1}{k^2}$, $k > 1$

$k = 2 \Leftrightarrow 75\%$

$k = 1.5 \Leftrightarrow 55.6\%$

$k = 3 \Leftrightarrow 88.9\%$

$k = 2.5 \Leftrightarrow 84\%$

* Z-score: $z = \frac{x - \mu}{\sigma}$ μ : mean
 σ : s.d.

* Percentile formula = $\frac{(\# \text{ of points below } x) + 0.5}{\text{total } \# \text{ of points.}}$ (*)

* Coefficient of Variation: $CV = \frac{s}{\bar{x}_n} \times 100\%$ $\left\{ \begin{array}{l} s: \text{ s.d.} \\ \bar{x}_n: \text{ mean} \end{array} \right.$

* Conditional prob: $p(A|B) = \frac{p(A \text{ and } B)}{p(B)}$ (*)
"prob. of A given B"

* Permutation Formulas:

Combination Formula:

$${}_n P_r = \frac{n!}{(n-r)!}$$

$${}_n C_r = \frac{n!}{(n-r)! \cdot r!}$$

* Probability formula: $p(A \text{ or } B) = p(A) + p(B) - p(A \text{ and } B)$ (*)