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$$\sum_{x \in E} P(x) = 1$$

$$\int_{-\infty}^{\infty} f(x)dx = 1$$

$$F(a) = P(X \leq a)$$

$$\bar{x}_w = \frac{1}{\sum_{i=1}^{n} w_i} \sum_{i=1}^{n} w_i x_i$$

$$\mathrm{E}(X) = \sum_{i=1}^{\infty} P(x_i) x_i$$

$$\mathrm{E}(X) = \int_{-\infty}^{\infty} x f(x) dx$$

$$\mathrm{E}[g(X)] = \sum_{i=1}^{\infty} P(x_i) g(x_i)$$

$$\mathrm{E}[g(X)] = \int_{-\infty}^{\infty} g(x) f(x) dx$$

$$s^2 = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2$$

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

$$\mathrm{Var}(X) = \mathrm{E}(X^2) - [\mathrm{E}(X)]^2$$

$$\mathrm{SD}(X) = \sqrt{\mathrm{Var}(X)}$$

$$CV = \frac{s}{\bar{x}}$$

$$z_i = \frac{x_i - \bar{x}}{s}$$

$$Z(X) = \frac{X - \mathrm{E}(X)}{\sqrt{\mathrm{Var}(X)}}$$

$$(n)_k = \frac{n!}{(n-k)!}$$

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$P(A) = \frac{n_A}{n}$$

$$P(A) = \lim_{n \to \infty} \frac{n_A}{n}$$

$$P(A^c) = 1 - P(A)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$$

$$\mathrm{E}(X) = np$$

$$\mathrm{Var}(X) = np(1-p)$$

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}}\, e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$z = \frac{x - \mu}{\sigma}$$

$$\varphi(x) = \frac{1}{\sqrt{2\pi}}\, e^{-\frac{x^2}{2}}$$

$$\Phi(z) = \int_{-\infty}^{z} \varphi(x)\,dx = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{z} e^{-\frac{x^2}{2}}\,dx$$

$$\Phi(-z) = 1 - \Phi(z)$$

$$\sum_{j=1}^{c} f_{ij} = f_{i.}$$

$$\sum_{i=1}^{r} f_{ij} = f_{.j}$$

$$e_{ij} = \frac{f_{i.} f_{.j}}{n}$$

$$\frac{f_{ij} - e_{ij}}{\sqrt{e_{ij}}}$$

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \left(\frac{f_{ij} - e_{ij}}{\sqrt{e_{ij}}} \right)^2$$

$$df = (r-1)(c-1)$$

$$s_{xy} = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})$$

$$\mathrm{Cov}(X,\, Y) = \mathrm{E}(XY) - \mathrm{E}(X)\mathrm{E}(Y)$$

$$r_{xy} = \frac{1}{n-1} \sum_{i=1}^{n} \frac{(x_i - \bar{x})}{s_x} \frac{(y_i - \bar{y})}{s_y}$$

$$r_{xy} = \frac{s_{xy}}{s_x s_y}$$

$$r_{xy} = 1 - \frac{6 \sum_{i=1}^{n} d_i^2}{n^3 - n}$$

$$r_{xy.z} = \frac{r_{xy} - r_{xz} r_{yz}}{\sqrt{(1 - r_{xz}^2)(1 - r_{yz}^2)}}$$