The *mean* of a sample of n measured responses

$$\bar{y} = \frac{1}{n}\sum_{i=1}^{n} y_i$$

The *variance* of a sample of measurements

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

The *standard deviation* of a sample of measurements is the positive square root of the variance

$$s = \sqrt{s^2}$$

The *union* of a set

$$A \cup B$$

The *intersection* of a set

$$A \cap B$$

The *compliment* of a set

$$\overline{A}$$

The *permutation* of a set

$$\frac{n!}{(n-r)!}$$

The *combination* of a set

$$\frac{n!}{r!\,(n-r)!}$$

The *conditional probability* of an event A, given that an event B has occurred

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

Two events being *independent*

$$P(A|B) = P(A)$$

$$P(B|A) = P(B)$$

$$P(A \cap B) = P(A)\,P(B)$$

Multiplicative Law

$$P(A \cap B) = P(A)\,P(A|B)$$

Additive Law

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

Expected value of a random variable

$$E(Y) = \sum_{y} yp(y)$$

The formula for *binomial distribution*

$$\mathrm{p(y)} = \binom{n}{y} p^y q^{n-y}$$

The formula for *geometric distribution*

$$p(y) = q^{y-1}p$$

The formula *negative binomial distribution*

$$p(y) = \binom{y-1}{r-1} p^r q^{y-r}$$

The formula for *hypergeometric distribution*

$$p(y) = \frac{\binom{r}{y}\binom{N-r}{n-y}}{\binom{N}{n}}$$

The formula for *Poisson distribution*

$$p(y) = \frac{\lambda^y}{y!} e^{-\lambda}$$

The formula for *Tchebysheff's theorem*

$$P(|y - \mu| < \kappa\sigma) \geq 1 - \frac{1}{k^2}$$

Or

$$P(|y - \mu| \geq \kappa\sigma) \leq \frac{1}{k^2}$$