**Statistics Symbol Sheet**

https://brownmath.com/swt/symbol.htm

μ and σ can take subscripts to show what you are taking the mean or standard deviation of. For instance, σx̅ (“sigma sub x-bar”) is the standard deviation of sample means, or standard error of the mean.

Here are symbols for various sample statistics and the corresponding population parameters. They are not repeated in the list at the right.

| **sample statistic** | **population parameter** | **description** |
| --- | --- | --- |
| n | N | number of members of sample or population |
| x̅ “x-bar” | μ “mu” or μx | mean |
| M or Med | (none) | median |
| s  (TIs say Sx) | σ “sigma”  or σx | standard deviation For variance, apply a squared symbol (s² or σ²). |
| r | ρ “rho” | coefficient of linear correlation |
| p̂ “p-hat” | p | proportion |
| z   t   χ² | (n/a) | calculated test statistic |

| **Relational Symbols** | | | |
| --- | --- | --- | --- |
| = | equals is the same as | ≠ | is not equal to is different from |
| > | is greater than is more than exceeds is above | ≥ or >= | is greater than or equal to is at least is not less than |
| < | is less than is fewer than is below | ≤ or <= | is less than or equal to is at most does not exceed is not greater than is no more than |
| A < x < B | | x is less than B, greater than A | |
| A ≤ x ≤ B | | x is less than or equal to B, greater than or equal to A | |
| A ≈ B | | A is approximately equal to B | |

**Roman Letters**

* *b* = y intercept of a line. (Some statistics books use *b*0.)
* BD or BPD = binomial probability distribution.
* CI = confidence interval.
* CLT = Central Limit Theorem.
* *d* = difference between paired data.
* *df* or *ν* “nu” = degrees of freedom in a Student’s t or χ² distribution.
* DPD = discrete probability distribution.
* *E* = margin of error, a/k/a maximum error of the estimate..
* *f* = frequency.
* *f*/*n* = relative frequency.
* HT = hypothesis test
* *Ho* = null hypothesis.
* *H1* or *Ha* = alternative hypothesis.
* *IQR* = interquartile range, Q3−Q1.
* *m* = slope of a line. (The TI-83 uses *a* and some statistics books use *b*1.)
* M or Med = median of a sample.
* *n* = sample size, number of data points. Also, number of trials in a probability experiment with a binomial model.
* N = population size.
* ND = normal distribution, whose graph is a bell-shaped curve; also “normally distributed”.
* *p* = probability value. The specific meaning depends on context.

In geometric and binomial probability distributions, *p* is the probability of “success” on any one trial and *q* = (1−*p*) is the probability of “failure” (the only other possibility) on any one trial.

In hypothesis testing, *p* is the calculated p-value, the probability that rejecting the null hypothesis would be a wrong decision.

In tests of population proportions, *p* stands for population proportion and p̂ for sample proportion (see table above).

* P(*A*) = the probability of event *A*.
* P(*A*C) or P(*not A*) = the probability that *A* does not happen.
* P(*B* | *A*) = the probability that event *B* will happen, given that event *A* definitely happens. It’s usually read as the probability of B given A.

Caution! The order of *A* and *B* may seem backward to you at first.

* *P80* or *P80* = 80th percentile (*Pk* or *Pk* = *k*-th percentile)
* *q* = probability of failure on any one trial in binomial or geometric distribution, equal to (1−*p*) where *p* is the probability of success on any one trial.
* *Q1* or *Q1* = first quartile (*Q3* or *Q3* = third quartile)
* *r* = linear correlation coefficient of a sample.
* *R²* = coefficient of determination.
* *s* = standard deviation of a sample.
* SD (or s.d.) = standard deviation.
* SEM = standard error of the mean (symbol is σx̅).
* SEP = standard error of the proportion (symbol is σp̂).
* *X* (capital *X*) = a variable.
* *x* (lower-case *x*) = one data value (“raw score”). As a column heading, *x* means a series of data values.
* x̅ “x-bar” = mean of a sample.
* ŷ “y-hat” = predicted average y value for a given x, found by using the regression equation.
* *z* = standard score or z-score.
* *z*(*area*) or *zarea* = the z-score, such that that much of the area under the normal curve lies to the right of that z. This is not a multiplication! (See [The z Function](https://brownmath.com/swt/chap07.htm#c07_zFunc).)

**Greek Letters**

* α “alpha” = significance level in hypothesis test, or acceptable probability of a Type I error (probability you can live with). 1−α = confidence level.
* β “beta” = in a hypothesis test, the acceptable probability of a Type II error; 1−β is called the *power* of the test.
* μ mu, pronounced “mew” = mean of a population.
* ν nu: see [*df*](https://brownmath.com/swt/symbol.htm#sym_df), above.
* ρ rho, pronounced “roe” = linear correlation coefficient of a population.
* σ “sigma” = standard deviation of a population.
* σx̅ “sigma-sub-x-bar”; see SEM above.
* σp̂ “sigma-sub-p-hat”; see SEP above.
* ∑ “sigma” = summation. (This is upper-case sigma. Lower-case sigma, σ, means standard deviation of a population.
* χ² “chi-squared” = distribution for multinomial experiments and contingency tables.