Stats without Tears
Statistics Symbol Sheet

Updated 14 Feb 2018

View or Print: These pages change automatically for your screen or printer. Underlined text, printed URLs, and the table of contents become live links on screen; and you can use your browser's commands to change the size of the text or search for key words.

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 between A and B, exclusive	
A ≤ x ≤ B		x is between A and B, inclusive	
A ≈ B		A is approximately equal to B	

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

sample statistic	population parameter	description
n	N	number of members of sample or population
$\bar{x}$ "x-bar"	μ "mu" or μ_x	mean
M or Med or $\tilde{x}$ "x-tilde"	(none)	median
s (TIs say Sx)	σ "sigma" or σ_x	standard deviation For variance, apply a squared symbol (s^2 or σ^2).
r	ϱ "rho"	coefficient of linear correlation
$\hat{p}$ "p-hat"	p	proportion
z t χ^2	(n/a)	calculated test statistic

μ and σ can take subscripts to show what you are taking the mean or standard deviation of. For instance, $\sigma_{\bar{x}}$ ("sigma sub x-bar") is the standard deviation of sample means, or standard error of the mean.

Roman Letters

- b = y intercept of a line. Defined here in Chapter 4. (Some statistics books use b_0.)
- BD or BPD = binomial probability distribution. Defined here in Chapter 6.
- CI = confidence interval. Defined here in Chapter 9.
- CLT = Central Limit Theorem. Defined here in Chapter 8.
- d = difference between paired data. Defined here in Chapter 11.
- df or ν "nu" = degrees of freedom in a Student's t or χ^2 distribution. Defined here in Chapter 9. Defined here in Chapter 12.
- DPD = discrete probability distribution. Defined here in Chapter 6.
- E = margin of error, a/k/a maximum error of the estimate. Defined here in Chapter 9.
- f = frequency. Defined here in Chapter 2.
- f/n = relative frequency. Defined here in Chapter 2.
- HT = hypothesis test. Defined here in Chapter 10.
- H_0 = null hypothesis. Defined here in Chapter 10.
- H_1 or H_a = alternative hypothesis. Defined here in Chapter 10.
- IQR = interquartile range, Q_3–Q_1. Defined here in Chapter 3.
- m = slope of a line. Defined here in Chapter 4. (The TI-83 uses a and some statistics books use b_1.)
- M or Med = median of a sample. Defined here in Chapter 3.
- n = sample size, number of data points. Defined here in Chapter 2. Also, number of trials in a probability experiment with a binomial model. Defined here in Chapter 6.
- N = population size.
- ND = normal distribution, whose graph is a bell-shaped curve; also "normally distributed". Defined here in Chapter 7.
- p = probability value. The specific meaning depends on context.
  In geometric and binomial probability distributions, p is the probability of "success" (defined here in Chapter 6) 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 (defined here in Chapter 10), the probability that rejecting the null hypothesis would be a wrong decision.
  In tests of population proportions, p stands for population proportion and $\hat{p}$ 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. Defined here in Chapter 5.

- $P(B \mid A)$ = the probability that event *B* will happen, given that event *A* definitely happens. It's usually read as the probability of B given A. Defined here in Chapter 5.
  Caution! The order of *A* and *B* may seem backward to you at first.
- $P80$ or P_{80} = 80th percentile (Pk or P_k = *k*-th percentile) Defined here in Chapter 3.
- 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. Defined here in Chapter 6.
- $Q1$ or Q_1 = first quartile ($Q3$ or Q_3 = third quartile) Defined here in Chapter 3.
- r = linear correlation coefficient of a sample. Defined here in Chapter 4.
- R^2 = coefficient of determination. Defined here in Chapter 4.
- s = standard deviation of a sample. Defined here in Chapter 3.
- SD (or s.d.) = standard deviation. Defined here in Chapter 3.
- SEM = standard error of the mean (symbol is $\sigma_{\bar{x}}$). Defined here in Chapter 8.
- SEP = standard error of the proportion (symbol is $\sigma_{\hat{p}}$). Defined here in Chapter 8.
- 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.
- $\bar{x}$ "x-bar" = mean of a sample. Defined here in Chapter 3.
- $\tilde{x}$ "x-tilde" = median of a sample. Defined here in Chapter 3.
- $\hat{y}$ "y-hat" = predicted average y value for a given x, found by using the regression equation. Defined here in Chapter 4.
- z = standard score or z-score. Defined here in Chapter 3.
- $z(area)$ or z_{area} = 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 [URL: 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). Defined here in Chapter 10. 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. Defined here in Chapter 3.
- ν nu: see *df*, above.
- ρ rho, pronounced "roe" = linear correlation coefficient of a population.
- σ "sigma" = standard deviation of a population. Defined here in Chapter 3.

- $\sigma_{\bar{x}}$ "sigma-sub-x-bar"; see SEM above.
- $\sigma_{\hat{p}}$ "sigma-sub-p-hat"; see SEP above.
- $\sum$ "sigma" = summation. (This is upper-case sigma. Lower-case sigma, σ, means standard deviation of a population; see the table near the start of this page.) See $\sum$ Means Add 'em Up [URL: https://BrownMath.com/swt/chap01.htm#c01_BigSigma] in Chapter 1.
- χ^2 "chi-squared" = distribution for multinomial experiments and contingency tables. Defined here in Chapter 12.

Updates and new info: https://BrownMath.com/swt/