



MODULE 3 SYMBOLS & FORMULAS

Chapter 9: Normal Curve

The formulas for this chapter are two of the formulas covered in the *Dispersion & Variability* chapter--the formulas for converting any raw score to a z score and for converting any z score back to a raw score.

FORMULAS

Formula for finding a z score from a raw score using sample statistics

$$z = \frac{X - \bar{X}}{s}$$

Formula for finding a raw score from a z score using sample statistics

$$X = zs + \bar{X}$$

Chapter 10: Hypothesis Testing

SYMBOLS

<i>Symbol</i>	<i>Stands For</i>
$\sigma_{\bar{X}}$	standard error of the mean (for population)
$\mu_{\bar{X}}$	mean of the sampling distribution of means, which equals μ
$Z_{\bar{X}}$	z score for the sampling distribution of means
$S_{\bar{X}}$	estimated standard error of the mean (for sample)

$t_{\bar{X}}$ or t	t score, which is really just a z score with estimated error added
CI	confidence interval
df	degrees of freedom; $df = N-1$ for a one-sample t -test
$t_{.05}$ or $t_{.01}$	t scores from t table; cut off deviant 5% or 1% of the t distribution
H_0	null hypothesis
α	alpha level, the level at which we test H_0
H_1	alternative hypothesis
μ_0	specific value representing the "untreated" population mean
t_{comp}	computed t score--this is the one that you calculate
t_{crit}	critical t score from t table--this is the standard for rejection
Type I, or alpha error	rejecting true H_0
Type II, or beta error	failing to reject false H_0

FORMULAS

Equation for estimated standard error of the mean

$$s_{\bar{X}} = \frac{s}{\sqrt{N}}$$

The estimated standard error is found by dividing the sample standard deviation by the square root of sample size.

One-sample t -test equation; yields computed t score

$$t_{\bar{X}} = \frac{\bar{X} - \mu}{s_{\bar{X}}}$$

This equation is used to test hypotheses about the value of m . It is the formula for the one-sample t test.

Equations for 95% and 99% confidence intervals

$$95\% \text{ CI} = \pm t_{.05} s_{\bar{X}} + \bar{X}$$

$$99\% \text{ CI} = \pm t_{.01} s_{\bar{X}} + \bar{X}$$

$t_{.05}$ and $t_{.01}$ are the t scores cutting off the deviant 5% and 1% of the distribution of t , respectively.

The values of t are found in the t table with $df = N - 1$.

[<< back to top](#)

[\(../../module3 \(1\)/symbols/index.html\)](#)

Content adapted from various sources including:

Online Statistics Education: A Multimedia Course of Study (<http://onlinestatbook.com/>). Project Leader: David M. Lane, Rice University

Thorne, M.B. and Giesen, J.M. (2002). *Statistics For The Behavioral Science* (4th ed.). New York: McGraw-Hill.

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