

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

# Social Science Statistics

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

- [Home](#) | 
 [Donate](#) | 
 [Statistical Test Calculators](#) | 
 [Quick P Value Calculators](#) | 
 [About](#) | 
 [Contact](#)

Donate



### Navigation Menu

- ▼ Home
  - ▼ Descriptive Statistics
    - ▶ Mean, Median & Mode Calculator
    - ▶ Variance/Standard Deviation Calc.
    - ▶ Easy Histogram Creator
    - ▶ Easy Bar Chart Creator
  - ▼ Statistical Calculators
    - ▶ Chi^2 for 5 x 5 (or Less) Table
    - ▶ Chi^2 for 2 x 2 Table
    - ▶ Fisher Exact Test for 2 x 2 Table
    - ▶ Chi^2 Goodness of Fit
    - ▶ Student T Test
    - ▶ T Test for Dependent Means
    - ▶ Single Sample T Test
    - ▶ Mann-Whitney U Value
    - ▶ Wilcoxon Signed-Rank
    - ▶ Pearson Correlation Coefficient
    - ▶ Spearman's Rho
    - ▶ Z Test for 2 Population Proportion
    - ▶ Z Test for Single Sample
  - ▼ P Value Calculators
    - ▶ P Value from Z Score
    - ▶ P Value from T Score
    - ▶ P Value from Chi^2 Score
    - ▶ P Value from Pearson r Score

## T-Test Calculator for 2 Dependent Means

The value of *t* is -2.359987.

### Explanation of results

The output of this calculator is pretty straightforward. The values of *t* and *p* appear at the bottom of the page. If the text is blue, your result is significant; if it's red, it's not. The only thing that might catch you out is the way that we've rounded the data. The data you see in front of you, apart from the *t* and *p* values, has been rounded to 2 significant figures. However, we did not round when actually calculating the values of *t* and *p*. This means that if you try to calculate these values on the basis of the summary data provided here, you're likely going to end up with a slightly different - and less accurate - result.

Treatment 1	Treatment 2	Diff (T2 - T1)	Dev (Diff - M)	Sq. Dev
20.9	20.6	-0.3	-0.11	0.01
20.7	21.1	0.4	0.59	0.35
21.8	21.6	-0.2	-0.01	0.00
21.0	20.6	-0.4	-0.21	0.04
21.4	21.4	0.0	0.19	0.04
21.6	21.6	0.0	0.19	0.04
20.7	20.4	-0.3	-0.11	0.01
21.6	21.6	0.0	0.19	0.04
20.6	20.5	-0.1	0.09	0.01
20.7	20.7	0.0	0.19	0.04
20.3	20.5	0.2	0.39	0.15
21.1	20.6	-0.5	-0.31	0.09
20.9	20.0	-0.9	-0.71	0.50
20.3	19.9	-0.4	-0.21	0.04
20.1	19.7	-0.4	-0.21	0.04
		M: -0.19		S: 1.41

Significance Level:

- 0.01  
 0.05  
 0.10

One-tailed or two-tailed hypothesis?:

- One-tailed  
 Two-tailed

### Difference Scores Calculations

Mean: -0.19  
 $\mu = 0$   
 $S^2 = SS/df = 1.41/(15-1) = 0.10$   
 $S^2_M = S^2/N = 0.10/15 = 0.01$   
 $S_M = \sqrt{S^2_M} = \sqrt{0.01} = 0.08$

### T-value Calculation

$t = (M - \mu)/S_M = (-0.19 - 0)/0.08 = -2.36$

The value of *t* is -2.359987. The value of *p* is 0.033323. The result is significant at  $p \leq 0.05$ .