

In a single-sample t-test, two-tailed, what are the respective critical values for:

- a.  $\alpha=.05, n=10$     b.  $\alpha=.01, n=31$     c.  $\alpha=.05, n=40$   
 d.  $\alpha=.01, n=107$

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2 (a) How does a t distribution differ from a normal curve distribution? (b) How do degrees of freedom affect this? (c) What is the effect of the difference on hypothesis testing?

4 A sample of  $n = 16$  scores has a mean of 45 and Sum of squares = 960. Calculate the sample standard deviation ( $s$ ) and the estimated standard error for the sample mean ( $s_M$ ). Describe what is measured by the standard deviation and what is measured by the estimated standard error.

Look at the t-test formula. For each of the following, indicate whether the factor influences the numerator or denominator of the t statistic and determine whether the effect would be to increase the value of t (farther from zero) or decrease the value of t (closer to zero). In each case, assume that all other factors remain constant.

- a. Increase the variability of the scores  
 b. Increase the number of scores in the sample  
 c. Increase the difference between the sample mean and the population mean

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

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5<sup>th</sup> graders can, on average, do 12 pushups. A P.E. instructor uses a special physical education program on 25 students. Subsequently, they average 15 pushups each. The sample variance ( $s^2$ ) is 81.

- 🔑 Analyze these findings using a one-sample, t-test, with  $\alpha = .01$ .  
 Write up the four part conclusion discussed in class (1. What did we do? 2. What did we find? 3. What does it mean? 4. Where do we go from here?)

5

6 A psychologist was developing a test battery that, it was hoped, might provide an early diagnosis for females with Alzheimer's disease. One of the test items being considered was a "block design" task, in which participants attempt to reproduce a series of designs by use of a box of patterned blocks. The score on the test is the total time taken to complete the set of items.

It is already known that for normal 60-year-old females the mean is 2.7 minutes.

A sample of 40 female Alzheimer patients aged 60 years had a mean of 3.8 minutes with a sample standard deviation of 2.6.

- a. Analyze these findings using a one-sample, t-test, with  $\alpha = .05$ .  
 b. Write up the four part conclusion discussed in class (1. What did we do? 2. What did we find? 3. What does it mean? 4. Where do we go from here?)

7 Overall, the average annual rainfall in Denver, CO is reported as 11 inches. However, a tourist website indicates that average, annual rainfall over the last 49 years is significantly lower. Use the following SPSS output to determine whether the website's report is accurate.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Annual	49	7.7276	3.18705	.45529

One-Sample Test						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Annual	-7.188	48	0.000000004	-3.27245	-4.1879	-2.3570

- a. What is the average, annual rainfall for the last 49 years?  
 b. What is the computed t-statistic for this study?  
 c. What is the statistical conclusion—accept or reject?  
 d. Write the value you used to answer (c)  
 e. Write a brief conclusion and APA style concluding sentence.

*Statistics are human beings with the tears wiped off.*