

# The Sign Test – Altern. to the 1-Mean Test

If the conditions for the one mean test (no outliers, data from a normally distributed population) are not met, one alternative test that we can perform is the **Sign Test**. The sign test is known as a nonparametric test, and requires no assumptions.

We begin by rewriting the test in terms of the population median  $M$  instead of the population mean  $\mu$ . If we were doing this by hand, we would assign each value that is greater than the claimed median a plus sign (+) and each value that is less than the claimed median a minus sign (-). The test statistic is determined by the number of plus signs and minus signs, with a critical value used to determine whether to reject the null hypothesis or not. However, StatCrunch will generate a  $P$ -value for us.

**Step 1:** Translate the null and alternative hypotheses to be stated in terms of the population median,  $M$ , instead of the population mean,  $\mu$ .

$H_0: M = \#$

**Step 3:** Sign Test for One Median

**Step 4:** Stat > Nonparametrics > Sign Test

Select the column containing your data, enter the appropriate value for the population median in the null hypothesis, and choose the correct sign for the alternative hypothesis.

## Example 1

An experimental algebra exam is given to 20 randomly selected college algebra students. Their scores:

68    94    50    60    92    14    49    68    41    67  
76    71    32    15    54    54    65    92    58    68

Test the claim that the mean score for all college algebra students on this exam is below 60. Use  $\alpha=0.05$ .

## Example 2

A national report claimed that the mean credit-card debt of college students is higher than \$1200. Here are the amounts of credit-card debt for 20 COS students. Use the data to test whether the mean debt for COS students is also higher than \$1200 at the 0.05 level of significance.

6000	1060	2180	1210	570	1530	1630	1800	1720	2320
870	1790	2370	410	1050	1660	3180	2170	1270	1120

## Example 3

Test the claim that the mean weight of an NFL lineman is above 300 pounds at the 0.05 level of significance. Here are the weights of 30 randomly selected NFL linemen.

285	332	310	305	300	340	326	286	310	309
300	242	320	310	308	312	301	287	315	305
310	329	293	320	329	300	293	311	297	292