

13-2 Sign Test

Key Concept This section introduces the *sign test*, which involves converting data values to positive and negative signs, then testing to determine whether either sign occurs disproportionately more often.

DEFINITION The **sign test** is a nonparametric (distribution-free) test that uses positive and negative signs to test different claims, including:

1. Claims involving matched pairs of sample data
2. Claims involving nominal data with two categories
3. Claims about the median of a single population

Basic Concept of the Sign Test The basic idea underlying the sign test is to analyze the frequencies of the positive and negative signs to determine whether they are significantly different. For example, consider the results of clinical trials of the Micro-Sort method of gender selection. Among 726 couples who used the XSORT method in trying to have a baby girl, 668 couples did have baby girls. Is 668 girls in 726 births *significant*? Common sense probably suggests that 668 girls in 726 births is significant, but what about 365 girls in 726 births? Or 400 girls in 726 births? The sign test allows us to determine when such results are significant. Figure 13-1 on page 640 summarizes the sign test procedure.

For consistency and simplicity, we will use a test statistic based on the number of times that the *less frequent* sign occurs.

Sign Test

Objective

Use positive and negative signs to test a claim falling into one of the following three categories:

1. Matched Pairs

- Subtract the second value in each pair from the first, record the sign of the difference, and ignore any 0s.

2. Nominal Data with Two Categories

- Represent each member of one category by a positive sign and represent each member of the other category by a negative sign.

3. Median of a Single Population

- Subtract the median from each sample value, record the sign of the difference, and ignore any 0s.

Notation

x = the number of times the *less frequent* sign occurs
 n = the total number of positive and negative signs combined

Requirements

The sample data are a simple random sample.
Note: There is *no* requirement that the sample data come from a population with a particular distribution, such as a normal distribution.