# Sign Test procedure.

The sign test involves converting data values to positive and negative signs, then testing to determine whether either sign occurs significantly more often than the other sign.

The sign test procedure is not at all as complicated as it might appear. It basically has three key elements:

1. Check to determine whether the sample data contradict the alternative hypothesis;
2. based on the sample size, determine whether to use Table A-7 or the normal distribution;
3. Form the conclusion.

Here is the complete procedure for conducting a sign test.

First, assign positive and negative signs to the data and discard any zeros.

Next, let n equal the total number of signs.

Let *x* equal the number of the LESS FREQUENT sign.

The next step is very important because it helps us to avoid making a fundamental and serious error when applying the sign test.

Consider whether the data CONTRADICT the alternative hypothesis.

Here's an example of such a contradiction:

When testing the claim that a gender selection method makes the probability of a boy GREATER THAN 0.5, you find that among 100 births there are only 10 boys.

Does the data contradict the alternative hypothesis?

In this example the alternative hypothesis is that the probability of a boy is greater than 0.5.

That’s incorrect. Remember, the alternative hypothesis is that the probability of a boy is greater than 0.5.

Please try again.

That’s correct. The sample has a proportion of 0.10 and that contradicts the alternative hypothesis that the probability of a boy is greater than 0.5.

Clearly, there is NO WAY to support a claim that the probability of a boy is GREATER than 0.5 when the sample proportion of boys is 0.1.

There is no need to go through the steps of conducting this hypothesis test when the conclusion is obvious.

When the sample data contradict the alternative hypothesis, go directly to the conclusion of failing to reject the null hypothesis.

Now, it is time to test your knowledge.

On the other hand, if the data do NOT contradict the alternative hypothesis, proceed with the analysis by considering the size of the sample.

If the sample size is less than or equal to 25, then the test statistic is *x* and the critical x values are found in Table A-7 “Critical Values for the Sign Test”.

However, if the sample size is greater than 25, convert the test statistic *x* to the test statistic *z* using the equation shown in the flowchart.

The critical *z* values are then found from Table A-2.

Finally, consider whether the test statistic is less than or equal to the critical value or values.

If the test statistic is NOT less than or equal to the critical value, then FAIL TO REJECT the null hypothesis.

If the test statistic is less than or equal to the critical value or values, then REJECT the null hypothesis.

Now, it is time to test your knowledge.

In this activity we reviewed the sign test procedure.

Remember the 3 key elements of the sign test:

1. Check to determine whether the sample data contradict the alternative hypothesis;
2. based on the sample size, determine whether to use Table A-7 or the normal distribution;
3. Form the conclusion.

Congratulations, you have mastered an important concept of Statistics!

It’s a sign of the times.