Testing the Difference Between Two Variances

- The traditional method involves using the F-Distribution table, and there is a different table for every value of α.

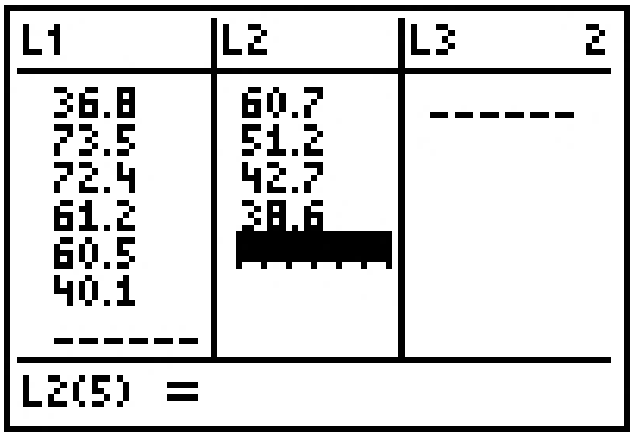
- The P-Value method uses the 2-Sample-F-Test on the calculator.

- We will be using the P-Value method.

- You can use this method with data and enter into L1 and L2, or you can enter the stats directly if you know them.

- We will cover both situations.

Two Variance Test on a Calculator using Data



Step 1 Enter data into **L1** and **L2**

Step 2 Press **STAT** and move the cursor to **TESTS**

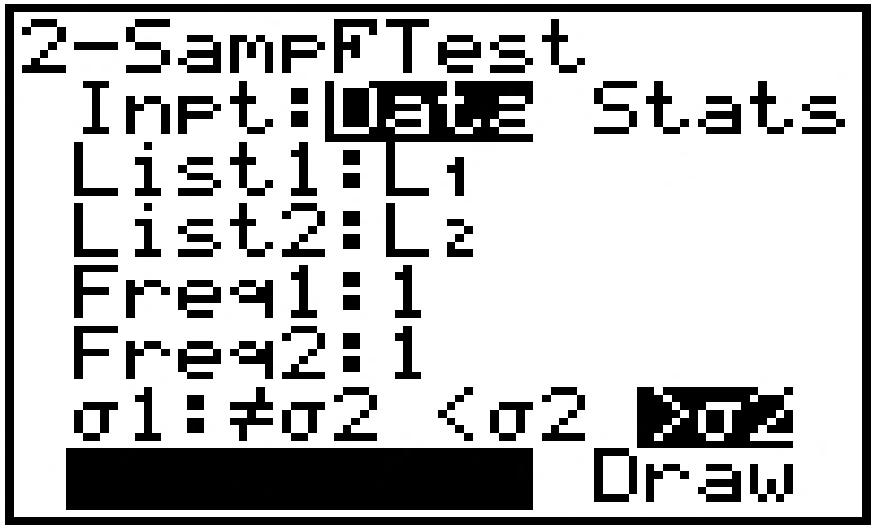
Step 3 Scroll down to **2-SampFTest**...

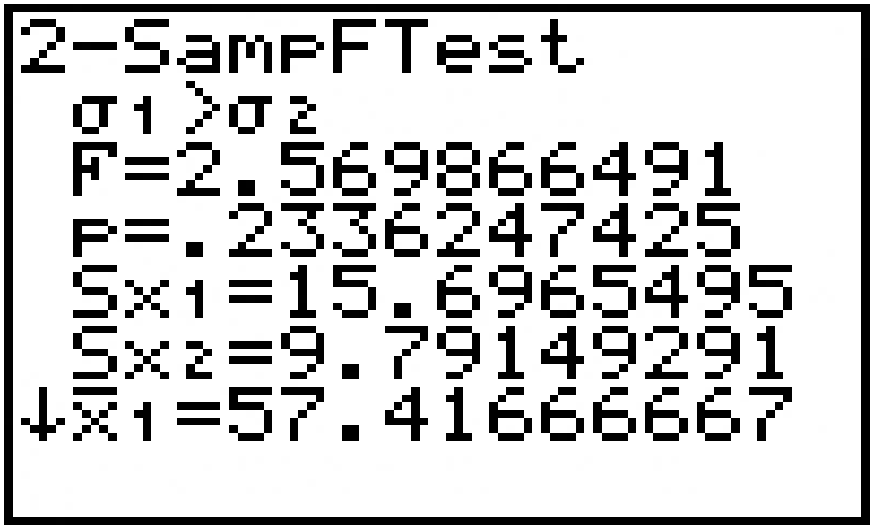
Step 4 Select **DATA**, press **ENTER**

Step 5 Make sure the **L1** and **L2** are selected and **Freq1** and **Freq2** both are 1.

Step 6 Select the appropriate alternative hypothesis.

Step 7 Select **Calculate** and press **ENTER**.





Two Variance Test on a Calculator using Stats

Step 1 Press **STAT** and move the cursor to **TESTS**

Step 2 Scroll down to **2-SampFTest**.

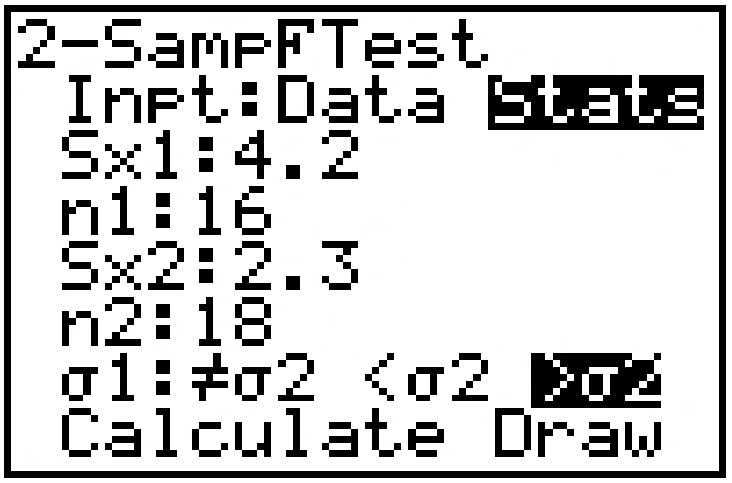
Step 3 Select **Stats**, press **ENTER**.

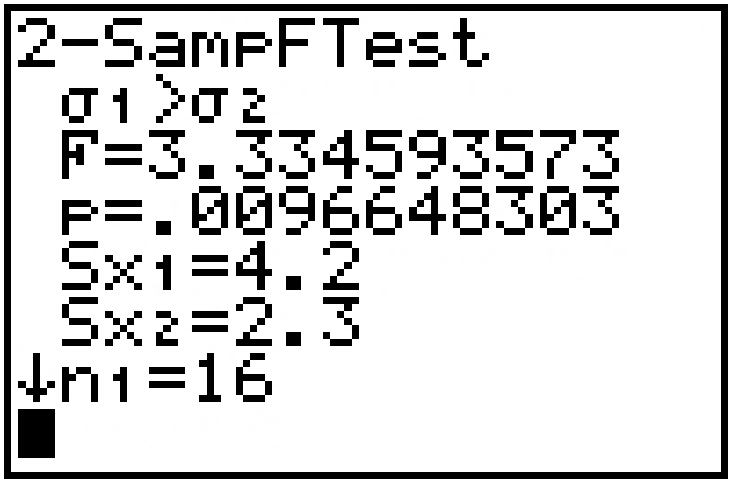
Step 4 Enter sample 1 s.d. in **Sx1** and sample size in **n1**.

Step 5 Enter sample 2 s.d. in **Sx2** and sample size in **n2**.

Step 6 Select the appropriate alternative hypothesis.

Step 7 Select **Calculate** and press **ENTER**.





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My notes only

The important number on both these screens is the P= number, which is the P-Value that you can compare directly to α.

In the first example it was P=.2336247425, which you will round to .234

In the second example it was P=.0096648303, which you will round to .0097

Testing the Difference Between Two Variances Using the P-Value Method

Step 1 State the hypothesis and identify the claim.

Step 2 Compute the P-Value on calculator.

Step 3 Make the decision.

Step 4 Summarize the results.

Step 5 There is no step 5.

Example 10-6

A medical researcher wishes to see whether the variances of the heart rates (in beats per minutes) of smokers are different from the variances of heart rates of people who do not smoke.
Two samples are selected, and the data are shown below. Using $\alpha = 0.05$, is there enough evidence to support the claim?

Smokers	Non-Smokers
$n_1 = 26$	$n_2 = 18$
$s_1 = 6$	$s_2 = 3.16$

Step 1 $H_0: \sigma_1^2 = \sigma_2^2$ $H_1: \sigma_1^2 \neq \sigma_2^2$

Step 2 P=.0084

Step 3 Reject H_0

Step 4 There is enough evidence to support the claim that the heart rate of smokers is higher than the heart rate of non-smokers.

10-53

The times (in minutes) it took six white mice to learn to run a simple maze and the time it took six brown mice to learn to run the same maze are recorded in the table below. At $\alpha = 0.05$, does the color of the mice make a difference in their learning rate?

White Mice	18	24	20	13	15	12
Brown Mice	25	16	19	14	16	10

A marketing manager wanted to know if there was a difference in price between Diet Sodas and Lo-Cal Sodas. The results of a survey is below. At $\alpha = 0.10$ is there a difference in price?

Diet	n =12	avg price = $1.43	s.d. = 0.12
Lo-Cal	n = 16	avg price = $1.25	s.d. = 0.15