

6D The F-Test

If $\sigma_x^2 = \sigma_y^2$, the value of s_x^2/s_y^2 should be close to:

The steps for an F-test of whether two variances are the same:

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Two-tailed F-tests:

1. Two samples of sizes 13 and 9 are taken from normal distributions X and Y with variances σ_x^2 and σ_y^2 respectively. The two samples give values $s_x^2 = 24$ and $s_y^2 = 18$. Test, at the 5% level, $H_0: \sigma_x^2 = \sigma_y^2$ against $H_1: \sigma_x^2 > \sigma_y^2$.

2. Two samples of sizes 7 and 11 are taken from normal distributions X and Y with variances σ_x^2 and σ_y^2 respectively. The two samples give values $s_x^2 = 5$ and $s_y^2 = 25$. Test, at the 5% level of significance, $H_0: \sigma_x^2 = \sigma_y^2$ against $H_1: \sigma_x^2 < \sigma_y^2$.

3. Two samples of sizes 11 and 13 are taken from normal distributions X and Y with variances σ_x^2 and σ_y^2 respectively. The two samples give values $s_x^2 = 1.6$ and $s_y^2 = 2.4$. Test, at the 10% level of significance, $H_0: \sigma_x^2 = \sigma_y^2$ against $H_1: \sigma_x^2 \neq \sigma_y^2$.

4. A manufacturer of wooden furniture stores some of its wood outside and some inside a special store. It is believed that the wood stored inside should have less variable hardness properties than that stored outside. A random sample of 25 pieces of wood stored outside was taken and compared to a random sample of 21 similar pieces taken from the inside store, with the following results:

	Outside	Inside
Sample size	25	21
Mean hardness (coded units)	110	122
Sum of squares about the mean	5190	3972

- a) Test, at the 0.05 level of significance, whether the manufacturer's belief is correct.

- b) State an assumption you made in order to do this test.