

**Statistics 300:
Elementary Statistics**

Section 9-5

**Section 9-5 concerns
Hypothesis tests that
Compare two standard
deviations, s_1 vs. s_2 , or
variances, s_1^2 vs. s_2^2 .**

**The presentation given
here differs from that given
in the text book, not in
principle, but in the
pattern for the test.
Use one or the other, so you
will not be confused.**

There are three options for the alternative (H_1 ;) hypothesis, and each one affects what goes where in the test statistic.

With $H_1 : s_1^2 \neq s_2^2$

The test statistic is:

$$F = \frac{\max(s_1^2 \text{ and } s_2^2)}{\min(s_1^2 \text{ and } s_2^2)}$$

(larger sample variance goes in numerator)

With $H_1 : s_1^2 > s_2^2$

The test statistic is:

$$F = \frac{s_1^2}{s_2^2}$$

With $H_1: s_1^2 < s_2^2$

The test statistic is:

$$F = \frac{s_2^2}{s_1^2}$$

Because of the way in which we have set up the test statistics in the preceding slides, the tests are all “right tailed”.

The critical regions are based on the “F” distribution (Table A.5).

Numerator d.f. and denominator d.f. come from samples that gave the num. and denom. variances

**For $H_1: s_1^2 \neq s_2^2$, $\alpha/2$ goes
in the right tail**

**For $H_1: s_1^2 > s_2^2$ and $H_1: s_1^2 < s_2^2$
the whole α goes in the
right tail.**
