Answers to Problems from Lecture (11/19)

1. Our test statistic is: $F = 8.028$
Rejection region is: $F > F_{.05}$, based on: 9 d.f. in the numerator
12 d.f. in the denominator
$\Rightarrow F > 2.80$
Therefore, we **reject the null hypothesis**.

2. Our test statistic is: $F = 3$
Rejection region is: $F > F_{.05}$, based on: 9 d.f. in the numerator
19 d.f. in the denominator
$\Rightarrow F > 2.42$
Therefore, we **reject the null hypothesis**.
A bound on the p-value is given by:
$.025 > p > .01$

3. Our test statistic is: $F = 2.079$
Rejection region is: $F > F_{.025}$, based on: 9 d.f. in the numerator
13 d.f. in the denominator
$\Rightarrow F > 2.71$
(*remember that the test is 2-tailed*)
Therefore, we **do not reject the null hypothesis**.
A bound on the p-value is given by:
$p > .2$
(*again, to see this, it's important to remember that the test is 2-tailed*)

4. Our test statistic is: $F = 2.079$ (given in the table)
The p-value is given in the table as $p = .2554$
Therefore, we **do not reject the null hypothesis**. A p-value this high means that we would not reject the null hypothesis for any reasonable size α test.
It is important to note that, although we do not reject the null hypothesis, we do *not* conclude that the variances are equal, and that the t-test is valid. This only shows us that we have *failed to conclude* that they are *unequal*. This is a subtle, but extremely important point; we never accept the null hypothesis. Rather, we fail to reject the null hypothesis.