Understand that valid statistical conclusions are based on randomly selected, representative samples of the population. That is to say, if the sample is not representative of the population, then all bets are off.

Understand the caveats that statistical conclusions are based on the sample data and the level of significance. That is to say, if we were to use a different sample and/or a different level of significance, then we might arrive at a different conclusion regarding the hypotheses.

For any problems dealing with hypothesis testing: you must be able to correctly
     state both the null hypothesis and the alternate hypothesis;
     determine the appropriate critical value(s);
     calculate the pertinent test statistic;
     decide whether to "Reject the Null" or to "Fail to Reject the Null";
     draw a proper conclusion about the problem specifics based on your decision regarding the null hypothesis.
    Remember "Reject the Null" is a strong conclusion.
    In general, "Fail to Reject the Null" is at its best, a suggestion that there is
    insufficient evidence to warrant rejecting the H_0, or equivalently, *insufficient evidence to warrant accepting H_1.*

Be mindful that hypotheses are assumptions about population parameters and that conclusions are not facts but only suppositions with some associated degree of confidence. We can never know whether the null hypothesis is true or false and therefore we risk encountering either a Type I or a Type II Error regardless of how carefully we conducted the experiment and how diligently we collected the data

Use a ***One-Way*** **ANOVA** table to determine whether or not there is a statistically significant difference among means for a multi-level single-factor experiment. In the case where we rejected the null hypothesis, the proper statement for the conclusion would be "At least one sample (or equivalently, one level of treatment) is significantly different".

For the test, you will be given a set of data and a partial ANOVA Table
If you wish, you may use the data set with EXCEL to create an ANOVA Table including the statistics.
Or you may use the partial ANOVA Table to solve the problem.
You may use a paper copy of a F Distribution Table or you may access the table via the Internet.
No other papers, notes, etc., (except F-Distribution Table) are permitted.
You may use you own calculator (NO SHARING) and MS Excel to help calculate your answers.
CELL PHONES (even as calculators) are not permitted (PUT THEM AWAY).
Making copies (pictures, notes, scans) of the tests or of your answers is NOT PERMITTED.

Practice Review Problems: (Use $\alpha = 5\%$ for all problems. It is not necessary to calculate any p-values.)
     Homework #9   One-Way ANOVA

Example Problem from Previous Exam (see page 2).

ANOVA

Suppose as a newly hired engineer (albeit whether you might be a biomedical, human factors, or industrial systems, or electrical, or mechanical, or even a computer science/engineering) your supervisor at a major pharmaceutical facility has asked that you investigate whether or not a series of formulating machines are generating equals outputs of product per hour. Data from five different machines are taken at random to be processed by a statistical software program. As sometimes happens, the computer crashes before completing the calculations. Wanting to impress your boss, you continue the analysis, using the partial computer output and determine whether or not the machines produce equal output of product per hour ($\alpha = 5\%$).

Machine   **Output of Product in Pounds per Hour**

Machine					
1	242	246	254	242	228
2	246	252	243	244	216
3	246	234	237	216	241
4	224	234	241	233	229
5	242	226	242	222	241

Partial Computer ANOVA Results

Source	Sum Squares	df	Mean Sum Squares	F_{test}
Machines	365	_____	_____	_____
Error	_____	_____	_____	
Total	2565			