## PROJECT & PAPER

Due date \_\_\_\_

In this project you will conduct a hypothesis test of the type we have been studying in class. You will formulate a problem, collect data, perform calculations, and present your results in a short paper.

Your first step will be to select a parameter, such as a mean, a proportion, the difference of two means, or the difference of two proportions, for which a doubtful (to you) claim has been made. Try to choose a problem that is meaningful and/or creative: parameters such as the probability of obtaining a head when a coin is tossed will be considered trivial and not acceptable. Set up hypotheses for your problem in terms of the claimed value and what you believe to be true. Do not use "artificial" alternatives, i. e., those made up for the sole purpose of completing the project.

Having formulated the problem, you are ready to select a sample from your population. The size of the sample will, of course, depend on the test you are performing. Though it may not be possible to select a true random sample, do the best you can.

<u>Type</u> up your results in a 3-5 page report. The first page should contain only the formal steps of the hypothesis test. Include computation of the p-value, but make your decision based on the  $\alpha = 0.05$  decision rule. On succeeding pages, explain your problem, motivating your choice of hypotheses, and giving references. Explain your sampling and any problems that might have arisen from it. Make conclusions and indicate how your study could be improved. Comment on any assumptions necessary for your test to be valid. List your data at the end of the report.

Take care in your paper to present your work clearly. Just as important as the formal calculations and conclusion are an intelligent motivation and statement of the problem, and the discussion of your sampling and results. Make every effort to write an interesting and understandable paper.

Summary of Project Requirements

- 1. Collect your own data.
- 2. Use a sample size of at least 30 (at least 60 if your study involves two independent samples)
- 3. Give a specific reference (date, title of publication, author, pages) as a basis for formulating your hypotheses.
- 4. Type the paper . (An automatic 10% grade penalty will apply to any paper not typed) You only need to type the discussion (pages 2 3) part of the paper.
- 5. Use the following format:
  - Page 1. Statement of the hypotheses, significance level = 0.05, test statistic, rejection region, calculation of the test statistic, conclusion, p-value.
  - Page 2-3 Describe what your project is about. Discuss the choice and motivation for the hypotheses, how the sample was taken, the population sampled, and any problems you encountered in collecting the data. Use your reference to explain the motivation for your choice of hypotheses.
  - Page 4 List the data collected and show how you made the summary calculations; a sample proportion if your project involved the parameter p, sample means and variances if your project involved one or more population means, etc.

First Step of the Project: To formulate the hypotheses, you must first find a published article (newspaper, magazine, etc.) concerning an advertised claim, the results of a public opinion poll, a consumer preference study, etc. The parameter involved in your hypotheses may be a population mean, a population proportion, the difference of two proportions, or the difference of two population means. (You may use any of the tests described in Chapters 7 and 8 of the text)

Some Examples:

1. Supermarket A claims to have lower prices than supermarket B (Give a reference). The purpose of my study is to show \_\_\_\_\_\_. Parameter:  $\mu$  = mean price difference (B – A) of all items sold at A and B. Population: all items of the same brand and size available for sale at supermarkets A and B.

Data:	<u>Item</u>	Price at A	Price at B	Price Difference (B – A)
	1	\$ .48	\$ .54	.06
	2	1.52	1.23	29
	n	4.93	5.62	.69

Analysis of paired data reduces to the one sample inference procedures studied in Sections 6.4 and 7.5 of the text

- 2. A recent Newsweek poll (give a specific reference) indicates that only 30 percent of the American public support paying a salary to college athletes. A much higher percentage of the population of ODU students is likely to support paying athletes for their services for the following reasons \_\_\_\_\_\_. Therefore, the purpose of my study is to show \_\_\_\_\_\_. Parameter: the population proportion p of ODU students that support paying a salary to college athletes. Null hypothesis: p ≤ 0.30. Alternative hypothesis: p > 0.30. Data: a list of students (excluding their names) and their support (yes or no) for paying a salary to college athletes.
- 3. Two independently selected samples (of at least 30 each) can be used to compare (1) men's and women's views about a particular social or campus issue, (2) the GPA of students who join fraternities or sororities with those of students who do not join such organizations, and (3) more generally, to compare two populations by making inferences about their means or proportions. Examples in Sections 8.2 and 8.3 of the text illustrate how two independently selected samples can be used to compare two population means or proportions.