MGS 9920 Prob & Stat Theory I
Homework 11: Means and Proportion of Two Populations

6. [Page 401]

The nation's 40,000 mortgage brokerages are some of the most profitable small businesses in the United States. These low-profile companies find loans for customers in exchange for commissions. Mortgage Bankers Association of America provides data on the average size of loans handled by mortgage brokerages (*The Wall Street Journal*, February 24, 2003). The CD file named Mortgage contains data from a sample of 250 loans made in 2001 and a sample of 270 loans made in 2002 that are consistent with these data. Based on historical loan data, the population standard deviations for the loan amounts can be assumed known at $55,000 in 2002 and $50,000 in 2001. Do the sample data indicate an increase in the mean loan amount between 2001 and 2002? Use $\alpha = .05$.

During the 2003 season, Major League Baseball took steps to speed up the play of baseball games in order to maintain fan interest (*CNN Headline News*, September 30, 2003). The following results come from a sample of 60 games played during the summer of 2002 and a sample of 50 games played during the summer of 2003. The sample mean shows the mean duration of the games included in each sample.

14. [Page 408]

14. Coastal areas of the United States including Cape Cod, the Outer Banks, the Carolinas, and the Gulf Coast had relatively high population growth rates during the 1990s. Data were collected on residents living in the coastal communities as well as on residents living in noncoastal areas throughout the United States (*USA Today*, July 21, 2000). Assume that the following sample results were obtained on the ages of individuals in the two populations:

Coastal Areas	Noncoastal Areas
$n_1 = 150$	$n_2 = 175$
$\bar{x}_1 = 39.3$ years	$\bar{x}_2 = 35.4$ years
$s_1 = 16.8$ years	$s_2 = 15.2$ years

Test the hypothesis of no difference between the two population means. Use $\alpha = .05$.

a. Formulate the null and alternative hypotheses.
b. What is the value of the test statistic?
c. What is the *p*-value?
d. What is your conclusion?

25. [Page 415]

25. In recent years, a growing array of entertainment options competes for consumer time. By 2004, cable television and radio surpassed broadcast television, recorded music, and the daily newspaper to become the two entertainment media with the greatest usage (*The Wall Street Journal*, January 26, 2004). Researchers used a sample of 15 individuals and collected data on the hours per week spent watching cable television and hours per week spent listening to the radio.

Individual	Television	Radio	Individual	Television	Radio
1	22	25	9	21	21
2	8	10	10	23	23
3	25	29	11	14	15
4	22	19	12	14	18
5	12	13	13	14	17
6	26	28	14	16	15
7	22	23	15	24	23
8	19	21			

a. Use a .05 level of significance and test for a difference between the population mean usage for cable television and radio. What is the *p*-value?
b. What is the sample mean number of hours per week spent watching cable television? What is the sample mean number of hours per week spent listening to radio? Which medium has the greater usage?

32. [Page 421]

32. An American Automobile Association (AAA) study investigated the question of whether a man or a woman was more likely to stop and ask for directions (AAA, January 2006). The situation referred to in the study stated the following: "If you and your spouse are driving together and become lost, would you stop and ask for directions?" A sample representative of the data used by AAA showed 300 of 811 women said that they would stop and ask for directions, while 255 of 750 men said that they would stop and ask for directions.
a. The AAA research hypothesis was that women would be more likely to say that they would stop and ask for directions. Formulate the null and alternative hypotheses for this study.
b. What is the percentage of women who indicated that they would stop and ask for directions?
c. What is the percentage of men who indicated that they would stop and ask for directions?
d. At $\alpha = .05$, test the hypothesis. What is the *p*-value, and what conclusion would you expect AAA to draw from this study?