Mid-Term

Probability and Statistics

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1. Injuries to Major League Baseball players have been increasing in recent years. For the period 1992 to 2001, league expansion caused Major League Baseball rosters to increase 15%. However, the number of players being put on the disabled list due to injury increased 32% over the same period (*USA Today*, July 8, 2002). A research question addressed whether Major League Baseball players being put on the disabled list are longer in 2001 than players put on the disabled list a decade earlier. Assume that the following data apply:

Data Categories	**2001 Season**	**1992 Season**
Sample Size	45	38
Sample mean	60 days	51 days
Sample standard derivation	18 days	15 days

Do these data suggest that Major League Baseball should be concerned about the situation? Use $\alpha = .01$. (20%)

2. The filling variance for boxes of cereal is designed to be .02 ounces or less. A sample of 41 boxes of cereal shows a sample standard deviation of .16 ounces. Use α =.05 to determine whether the variance in the cereal box fillings is exceeding the design specification. (20%)

$n_1 = 41$

$s_1^2 = (0.16)^2$

3. Two new assembly methods are tested and the variances in the assembly times are reported. Use α =.10 and test for equality of the two population variances.

	Method A	Method B
Sample Size	31	25
Sample Variance	25	12

(20%)

4. 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			

Use a .05 level of significance and test for a difference between the population mean usage for cable television and radio. (20%)

5. A 2003 *New York Times*/CBS News poll sampled 523 adults who were planning a vacation during the next six months and found that 141 were expecting to travel by airplane (*New York Times News Service*, March 2, 2003). A similar survey question in a May 1993 *New York Times*/CBS News poll found that of 477 adults who were planning a vacation in the next six months, 81 were expecting to travel by airplane. Whether a significant change occurred in the population proportion planning to travel by airplane over the 10-year period? Use $\alpha = .01$. (20%)