Economics 521   Fall, 2006   Second exam

Turn off any connection with the outside world: cell phones, beepers, text messaging devices. Close out any Internet connections.

Do all five problems. EXPLAIN your reasoning for each answer!! [Tell me WHY you add when you add, WHY you multiply when you multiply, ... ] For each problem, include a statement of exactly what assumptions you are making.

1. (20 pts) The ballet critic of the New York Times claims that prima ballerinas of the American Ballet Theater are dropped by Mikhail Baryshnikov an average of $\mu = 3$ times per month. Baryshnikov asserts $\mu < 3$. A sample of 16 months falls showed an average of 2.4 with a standard deviation of 2.2. At the .05 level of significance, does the data support Baryshnikov or the critic?

2. (20 pts) Professor Kelly wants to know if Freihofer's chocolate chip cookies (population #1) and Mrs. Field's chocolate chip cookies (population #2) average the same number of chips per cookie ($H_0: \mu_1 = \mu_2$) or if they differ ($H_1: \mu_1 \neq \mu_2$). He samples 16 cookies from each company and determines $\bar{x}_1 = 12$, $s_1 = 1$; $\bar{x}_2 = 13$, $s_2 = 1$. What should he decide at a .05 level of significance?

3. (20 pts) A random sample of 10 Syracuse University economics majors at the time of graduation landed jobs paying, on average, $10,736,524 per year with a standard deviation of $450,000. Test $H_0: \sigma = 750,000$ against $H_1: \sigma < 750,000$ at the .05 level of significance.

4. (20 pts) Professor Lovely wishes to compare income inequality in Japan and the US. With $H_0: \sigma_j = \sigma_{US}$ and $H_1: \sigma_j \neq \sigma_{US}$, she gathers data on 25 households in each country. The results: $s_j = 6000$ (at current exchange rates) and $s_{US} = 4000$. Is this difference significant at the .10 level of significance?

5. (20 pts) Given a sequence of observations in a sample, the sample statistic $F$ is the frequency of the most frequently observed observation. For example, in the sample of 12 observations $3 1 3 3 1 3 2 2 4 2 4$, the number 3 occurs with frequency 5, the number 2 occurs with frequency 3, the number 4 and 1 each occur with frequency 2, so $F = 5$. Determine the sampling distribution of $F$ when, in the population, $X$ takes on the values 1, 2, 3, and 4 each with probability 1/4. Do this for sample size $n = 5$.

Extra credit (general culture): Who is the sculptor of the piece at the top of the page?