STA 220F Summer 2005 Final Extra Questions
Circle the letter corresponding to the best answer.

1. A 90% confidence interval for the mean percentage of airline reservations being canceled on the day of the flight is (1.3%, 5.1%). What is the point estimate of the mean percentage of reservations that are canceled on the day of the flight?

   (a) 1.3%
   (b) 1.90%
   (c) 2.55%
   (d) 3.20% ∎
   (e) 3.8%
   (f) 5.1%

2. To help consumers assess the risks they are taking, the Food and Drug Administration (FDA) publishes the amount of nicotine found in all commercial brands of cigarettes. A new cigarette has recently been marketed. The FDA tests on this cigarette gave a mean nicotine content of 28.7 milligrams and standard deviation of 2.4 milligrams for a sample of n = 9 cigarettes. Assuming that amount of nicotine in a brand of cigarette has a distribution that s approximately normal, construct a 90% confidence interval for the mean nicotine content of this brand of cigarette.

   (a) 28.7 ± 1.578
   (b) 28.7 ± 1.555
   (c) 28.7 ± 1.488 ∎
   (d) 28.7 ± 1.466
   (e) Impossible to tell

3. A marketing research company needs to estimate which of two soft drinks college students prefer. A random sample of 339 college students produced the following 95% confidence interval for the proportion of college students who prefer one of the colas: (.339, .457). What assumptions are necessary for any inferences derived from this printout to be valid?

   (a) The sample proportion equals the population proportion.
   (b) The population proportion has an approximately normal distribution.
   (c) The sample was randomly selected from an approximately normal population.
   (d) None of the above ∎
   (e) All of the above
   (f) Impossible to tell

4. An article in a Florida newspaper reported on the topics that teenagers most want to discuss with their parents. The findings, the results of a poll, showed that 46% would like more discussion about the family's financial situation, 37% would like to talk about school, and 30% would like to talk about religion. These and other percentages were based on a national sampling of 513 teenagers. Estimate the proportion of all teenagers who want more family discussions about school. Use a 90% confidence level.

   (a) .37 ± .002

   (b) .37 ± .035 ■

   (c) .63 ± .035

   (d) .63 ± .002

   (e)

   (f) Impossible to tell

5. The Midwest Organization of Retired Oncologists and Neurologists has recently taken flack from some of its members regarding the poor choice of the organization's name. The organization bylaws require that more than 60% of the organization must approve a name change. Rather than convene a meeting, it is first desired to use a sample to determine if a meeting is necessary. A random sample of 50 of members were asked if they want the organization to change its name. Forty of the respondents said "yes." Is the sample size of n = 50 large enough to use a z-test to determine whether the population proportion exceeds 0.60?

   (a) No.

   (b) Yes, since the Central Limit theorem works whenever proportions are used.

   (c) Yes, since the interval $p \pm 3\sqrt{pq/n}$ does not include either the value 0 or 1. ■

   (d) Yes, since the interval $p \pm 3\sqrt{pq/n}$ includes the value 0.

   (e) Yes, since the interval $p \pm 3\sqrt{pq/n}$ includes the value 1.

   (f) Yes, since $n \geq 30$.

   (g)

   (h) Impossible to tell

6. During the last 10 years marketing executives believed that the same proportion of adult men and adult women watched TV news programs. Current information indicates there may have been a change. The marketing executives would like to perform a formal statistical test. State the null hypothesis in symbols, and the alternative hypothesis in words.

   (a) $H_0 : p_W = p_M$. The alternative is that the proportion of women watching TV news programs is greater than the proportion of men watching TV news programs.

   (b) $H_0 : p_W = p_M$. The alternative is that the proportion of women watching TV news programs is less than the proportion of men watching TV news programs.

   (c) $H_0 : p_W = p_M$. The alternative is that the proportion of women watching TV news programs is not equal to the proportion of men watching TV news programs. ■

   (d) $H_0 : p_W \leq p_M$. The alternative is that the proportion of women watching TV news programs is greater than the proportion of men watching TV news programs.

   (e) $H_0 : p_W \geq p_M$. The alternative is that the proportion of women watching TV news programs is less than the proportion of men watching TV news programs.

   (f) $H_0 : p_W = p_M$. The alternative is that the proportion of women watching TV news programs equals the proportion of men watching TV news programs.

   (g) Impossible to tell

7. A test of perceptual accuracy is given to 21 individuals before and after a special training procedure designed to improve perceptual accuracy. Accuracy scores are known to have a normal distribution. To reject H_0 2-tailed at $\alpha = 0.05$, what is required?

   (a) $t > 1.721$

   (b) $t > 1.725$

   (c) $|t| > 2.080$

   (d) $|t| > 2.086$ ■

   (e) $|t| > 1.960$

   (f) $t > 1.645$

   (g) Impossible to tell

8. The diameter of ball bearings produced in a manufacturing process can be explained using a uniform distribution over the interval 6.5 to 8.5 millimeters. What is the (population) mean diameter produced in this manufacturing process?

   (a) 7.5 millimeters ■

   (b) 8.5 millimeters

   (c) 7.0 millimeters

   (d) 8.0 millimeters

9. The amount of corn chips dispensed into a 20-ounce bag by the dispensing machine has been identified as possessing a normal distribution with a mean of 20.5 ounces and a standard deviation of 0.2 ounce. What proportion of the 20 ounce bags contain more than the advertised 20 ounces of chips?

   (a) 0.9938 ■

   (b) 0.5062

   (c) 0.0062

   (d) 0.4938

10. Suppose a labor union wishes to estimate the mean number of hours per month a union member is absent from work. The union decides to sample 348 of its members at random and monitor their working time for 1 month. At the end of the month, the total number of hours absent from work is recorded for each employee. If the mean and standard deviation of the sample are $\overline{X} = 7.1$ hours and $S = 3.1$ hours, find a 95% confidence interval for the true mean number of hours absent per month per employee.

   (a) $7.1 \pm .185$

   (b) $7.1 \pm .158$

   (c) $7.1 \pm .017$

   (d) $7.1 \pm .326$ ■

   (e) $7.1 \pm .166$

   (f) Impossible to tell

11. A bottling company needs to produce bottles that will hold 12 ounces of liquid for a local brewery. Periodically, the company gets complaints that their bottles are not holding enough liquid. To test this claim, the bottling company randomly samples 36 bottles and finds the average amount of liquid held by the 36 bottles is 11.9155 ounces with a standard deviation of 0.30 ounce. Suppose the p-value of this test turned out to be 0.0455. State the proper conclusion.

    (a) At $\alpha = 0.025$, reject the null hypothesis and the results are not statistically significant.

    (b) At $\alpha = 0.035$, accept the null hypothesis and the results are not statistically significant.

    (c) At $\alpha = 0.05$, reject the null hypothesis and the results are not statistically significant.

    (d) At $\alpha = 0.085$, fail to reject the null hypothesis and the results are not statistically significant.

    (e) At $\alpha = 0.025$, reject the null hypothesis and the results are statistically significant.

    (f) At $\alpha = 0.035$, accept the null hypothesis and the results are statistically significant.

    (g) At $\alpha = 0.05$, reject the null hypothesis and the results are statistically significant. ■

    (h) At $\alpha = 0.085$, fail to reject the null hypothesis and the results are statistically significant.

12. A revenue department is under orders to reduce the time small business owners spend on filling out pension form ABC-5500. Previously the average time spent on the form was 6.1 hours. In order to prove that the time to fill out the form is reduced, a sample of 80 small business owners who annually complete the form is randomly chosen, and their completion times are recorded. The mean completion time for ABC-5500 form was 5.8 hours with a standard deviation of 2 hours. In order to establish that the time to complete the form is reduced, state the appropriate null and alternative hypotheses to test.

    (a) H_0: $\mu = 6.1$, H_a: $\mu < 6.1$ ■
    (b) H_0: $\mu > 6.1$, H_a: $\mu < 6.1$
    (c) H_0: $\mu = 6.1$, H_a: $\mu > 6.1$
    (d) H_0: $\mu = 6.1$, H_a: $\mu \neq 6.1$
    (e) H_0: $\mu = 6.1$, H_a: $\mu = 5.8$
    (f) H_0: $\mu = 5.8$, H_a: $\mu = 6.1$
    (g) H_0: $\mu = 5.8$, H_a: $\mu < 5.8$
    (h) H_0: $\mu > 5.8$, H_a: $\mu < 5.8$
    (i) H_0: $\mu = 5.8$, H_a: $\mu > 5.8$
    (j) H_0: $\mu = 5.8$, H_a: $\mu \neq 5.8$

(k) Impossible to tell

13. How many tissues should a package of tissues contain? Established expert opinion is that 51 tissues is the average number of tissues used during a cold. Suppose a random sample of 2500 tissue users yielded the following data on the number of tissues used during a cold: $\overline{X} = 46$, $S = 23$. Suppose the test statistic falls in the rejection region at $\alpha = .05$. What is the correct conclusion?

    (a) At $\alpha = .10$, we fail to reject H_0 and the results are statistically significant.

    (b) At $\alpha = .10$, we fail to reject H_0 and the results are not statistically significant.

    (c) At $\alpha = .05$, accept H_0 and the results are statistically significant.

    (d) At $\alpha = .05$, accept H_0 and the results are not statistically significant.

    (e) At $\alpha = .05$, we fail to reject H_0 and the results are statistically significant and the results are not statistically significant.

    (f) At $\alpha = .05$, we fail to reject H_0 and the results are not statistically significant.

    (g) At $\alpha = .05$, reject H_0 and the results are statistically significant. ■

    (h) At $\alpha = .05$, reject H_0.

    (i) Impossible to tell

14. Researchers have claimed that the average number of headaches during a semester of Statistics is 11. Statistics professors dispute this claim vehemently. They believe the average is much higher. They sample n = 14 students and find the sample mean is 12.5 and the sample standard deviation is 3.0. Give the value of the test statistic and the conclusion.

    (a) t = 2.141, Reject H_0 in favor of H_a.

    (b) t = 1.341, The p-value is equal to 0.0005.

    (c) t = 1.871, Fail to reject H_0 in favor of H_a. ♡

    (d) t = 0.871, Accept H_0 in favor of H_a.

    (e) Analysis may inappropriate – seek more information. ■