Name: _____   Date: _____

Elementary Statistics   Period: _____

Chapter 7 Test Review:

Confidence Intervals and Sample Sizes

1. Identify the distribution (normal, student t, or chi-square) that applies to each of the following situations. If none of the three distributions is appropriate, then state so.

    a. In constructing a confidence interval of μ, you have 50 sample values and they appear to be from a population with a skewed distribution. The population standard deviation is not known.

    b. In constructing a confidence interval estimate of μ, you have 50 sample values and they appear to be from a population with a skewed distribution. The population standard deviation is known to be 18.2 cm.

    c. In constructing a confidence interval estimate of σ, you have 50 sample values and they appear to be from a population with a skewed distribution.

    d. In constructing a confidence interval estimate of σ, you have 50 sample values and they appear to be from a population with a normal distribution.

    e. In constructing a confidence interval estimate of p, you have 850 survey responses and 10% of them answered "yes" to the first question.

2. Based on data from the Journal of the American Medical Association, the following confidence interval estimates the proportion of female medical students: $0.449 < p < 0.511$

    a. What is the best point estimate of the proportion of females in the population of medical school students?

    b. What is the margin of error?

3. You have been hired by a college foundation to conduct a survey of graduates.

    a. If you want to estimate the proportion of graduates who have made a donation to the college after graduation, how many graduates must you survey if you want 98% confidence that your proportion has a margin of error of 5 percentage points?

    b. If you want to estimate the mean amount of all charitable contributions made by graduates, how many graduates must you survey if you want 98% confidence that your sample mean is in error by no more than $50? (Based on results from a previous study, assume the standard deviation of donations by graduates is $337)

    c. If you plan to obtain the estimates described in parts a and b with a single survey having several questions, how many graduates must be surveyed?

4. In a Gallup poll of 557 randomly selected adults, 284 said that they were underpaid.

   a. Identify the best point estimate for the proportion of all adults who say that they are underpaid.

   b. Construct a 95% confidence interval estimate for the proportion of all adults who say that they are underpaid.

   c. Can we safely conclude that the majority of adults say that they are underpaid?

5. Data set 1 in Appendix B includes a simple random sample of 7 crash test measurements for small cars. The sample data has a mean of 42.7 g and a standard deviation of 5.6 g, where g is a force of gravity. Use the sample data to <u>construct a 95% confidence interval estimate of the mean</u> chest deceleration measurement for the population of all small cars. (Assume that the sample is a simple random sample and the data is from a normally distributed population.)

6. Use the same sample data from question 4 to <u>construct a 95% confidence interval estimate of the standard deviation</u> of chest deceleration for the population of all small cars.

7. If you wanted to construct a confidence interval estimate of the standard deviation of chest deceleration with a 99% level of confidence and a margin of error of 10%, how many small cars would you need to include in the sample?

Table 7-2

Sample Size for σ^2		Sample Size for σ	
To be 95% confident that s^2 is within	of the value of σ^2, the sample size n should be at least	To be 95% confident that s is within	of the value of σ, the sample size n should be at least
1%	77,207	1%	19,204
5%	3,148	5%	767
10%	805	10%	191
20%	210	20%	47
30%	97	30%	20
40%	56	40%	11
50%	37	50%	7
To be 99% confident that s^2 is within	of the value of σ^2, the sample size n should be at least	To be 99% confident that s is within	of the value of σ, the sample size n should be at least
1%	133,448	1%	33,218
5%	5,457	5%	1,335
10%	1,401	10%	335
20%	368	20%	84
30%	171	30%	37
40%	100	40%	21
50%	67	50%	13