Name

Date \_\_\_\_\_

**Elementary Statistics** 

Period	_
--------	---

## Chapter 7 Final Exam Review Estimates & Sample Sizes

1. The following confidence interval is obtained to estimate the population proportion, p: 0.0268 . Use these confidence interval limits to find the margin of error E.

a. 0.0531 b. 0.0799 c. 0.1062 d. 0.1598

2. A sample of 50 people are randomly selected from a certain population and there were 22 people with a college degree. What is the best point estimate of the proportion of people in the population who have a college degree?

a. 22 b. 50 c. 0.44 d. 2.27

\_\_\_\_\_ 3. You are want to estimate the mean of a population with a 95% confidence level, when the sample size is 16,  $\sigma$  is known, and the population appears to be very skewed. Find the critical value:  $z_{\alpha/2}$ ,  $t_{\alpha/2}$ , or state that neither applies.

a.  $z_{\alpha/2} = 1.96$  b.  $t_{\alpha/2} = 2.2228$  c. neither

4. Find the chi-square value  $\chi_L^2$  corresponding to a sample size of 12 and a confidence level of 95%.

a. 4.575 b. 3.816 c. 19.675 d. 21.920

\_\_\_\_\_ 5. As the degrees of freedom increase, what distribution does the Student's t-distribution become more like?

a. Uniform b. Normal c. Chi-square d. Skewed to the right

\_\_\_\_\_ 6. Consider a 90% confidence interval for  $\mu$ . Assume  $\sigma$  is not known. For which sample size, is the confidence interval longest?

a. n = 5 b. n = 10 c. n = 20 d. n = 30

**For questions 7-9:** If necessary, round your final answers for each part to the **thousandths place**. (Except sample size estimates which should be rounded appropriately.)

7. Sixteen large companies reported the following percents of total income from foreign sales. Assume the population approximates a normal distribution. You want to estimate the population proportion of large companies that receive more than half of their total income from foreign sales.

 62.8
 55.7
 47.0
 59.6
 55.3
 41.0
 65.1
 51.1

 53.4
 50.8
 48.5
 44.6
 49.4
 61.2
 39.3
 41.8

a. Find the best point estimate of p.

b. Find a 90% confidence interval estimate for the population proportion of large companies that receive more than half of their total income from foreign sales.

c. If you wanted your estimate to be within 3 percentage points of the actual population proportion, how many large businesses should be included in your sample?

8. A random sample was taken of prices (in dollars) for 10 sleeping bags effective in temperatures ranging from 20° to 45°F. The data was from a population that is approximately normal, the sample mean was found to be \$83.75, and the sample standard deviation was \$28.97.

a. Find the best point estimate of  $\mu$ .

b. Find a 95% confidence interval estimate for the mean price of all sleeping bags that will keep you warm in these colder temperatures.

c. How would your confidence interval estimate of the mean change if you knew the population standard deviation?

d. How many people should be included in your sample if you want your estimate to be in error by at most \$4 (using a confidence level of 95%)? Use the sample standard deviation as  $\sigma$ .

9. An antifreeze company wants to test its' containers to be sure that the standard deviation is less than 30 mL; otherwise, some containers would overflow and others would not have enough coolant. They randomly select 24 containers and found that the sample mean is 3789 ML and the standard deviation is 42.8 mL.

a. Find the best point estimate of  $\sigma$ .

b. Construct the 99% confidence interval for the true value of  $\boldsymbol{\sigma}.$ 

c. If you wanted your estimate to be within 10% of the population standard deviation, data from how many containers of antifreeze should be used?

Table 7-2			
Sample Size for $\sigma^2$		Sample Size for $\sigma$	
To be 95% confident that s <sup>2</sup> is within	of the value of $\sigma^2$ , the sample size <i>n</i> should be at least	To be 95% confident that s is within	of the value of $\sigma$ , the sample size <i>n</i> 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 <sup>2</sup> is within	of the value of $\sigma^2$ , the sample size <i>n</i> should be at least	To be 99% confident that s is within	of the value of $\sigma$ the sample size <i>i</i> should be at leas
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