Math 160/263 Minitab Assignment # 9 - Windows Version

Chapter 5 - Introduction to Inference

Worksheet Name - data9.MTW

1. A manufacturer of pharmaceutical products analyzes a specimen from each batch of a product to verify the concentration of the active ingredient. Because the chemical analysis is not perfectly precise, repeated measurements on the same specimen give slightly different results. The results of 40 repeated measurements are given in data9.MTW. These measurements are approximately normally distributed with standard deviation 0.0068 grams per liter.

   (a) Use the **Stat > Basic Statistics > 1-Sample Z** menu command to find 90%, 95%, and 99% confidence intervals for the true concentration of the active ingredient.

   (b) Explain how the width of the confidence interval changes as the confidence level increases.

2. Sulpher compounds cause "off-odors" in wine, so oenologists (wine experts) have determined the odor threshold, the lowest concentration of a compound that the human nose can detect. For example, the odor threshold for dimethyl sulfide (DMS) is given in the oenology literature as 25 micrograms per liter of wine (μg/l). Untrained noses may be less sensitive, however. The DMS odor thresholds for 10 beginning students of oenology are given in data9.MTW. Assume that the standard deviation of the odor threshold for untrained noses is known to be $\sigma = 7\mu$g/l.

   (a) Create a graph of the data, and briefly describe the shape of the distribution.

   (b) Use the **Stat > Basic Statistics > 1-Sample Z** menu command to find a 95% confidence interval for the mean DMS odor threshold among all beginning oenology students.

3. The Stanford-Binet "IQ test" is adjusted so that the scores for each age group of children are approximately normally distributed with mean 100 and standard deviation 15.

   (a) If you were to compute a 90% confidence interval from each of 20 samples from the population of scores on the "IQ test", how many would you expect to contain the true mean?

   (b) Use the **Calc > Random Data > Normal** menu command to simulate 50 scores on the "IQ test" in each of 20 columns of the worksheet.

   (c) Use the **Stat > Basic Statistics > 1-Sample Z** menu command to compute a 90% confidence interval from each of your columns.

   (d) How many of your confidence intervals actually contain the true mean?