

**Homework 3**  
(Return date: 29.1.2003)

**Testing normal distributions**

**Exercise 1.**

The army reports that the distribution of head circumference among male soldiers is approximately normal with mean 57.9cm and standard deviation 2.8cm. Use the 68-95-99.7 rule to answer the following questions.

- a) What percent of soldiers have head circumference greater than 60.7cm?
- b) The army plans to make helmets in advance to fit the middle 95% of head circumferences. Soldiers who fall outside this range will get custom-fitted helmets. What head circumferences are small enough or big enough to require custom fitting?

**Exercise 2.**

A study of bacterial contamination in milk counted the number of coliform organisms (fecal bacteria) per milliliter in 100 specimens of milk purchased in East Coast groceries. The U.S. Public Health Service recommends no more than 10 coliform bacteria per milliliter. Here are the data:

5 8 6 7 8 3 2 4 7 8 6 4 4 8 8 8 6 10 6 5  
6 6 6 6 4 3 7 7 5 7 4 5 6 7 4 4 4 3 5 7  
7 5 8 3 9 7 3 4 6 6 8 7 4 8 5 7 9 4 4 7  
8 8 7 5 4 10 7 6 6 7 8 6 6 6 0 4 5 10 4 5  
7 9 8 9 5 6 3 6 3 7 1 6 9 6 8 5 2 8 5 3

- a) Make a table of the counts of each of the values 0 to 10 in this set of 100 observations.
- b) Draw a histogram of these data.
- c) Describe the shape of the distribution. Are the data symmetric? If so, approximately where is the center about which they are symmetric?
- d) Calculate the mean value and standard deviation. What percent of the 100 observations fall within one, two, and three standard deviations of the mean? Do you feel that the distribution of coliform counts is approximately normal?