Prince Sultan University
Department of Mathematical Sciences
STAT 271 – First Examination
24 March 2010

1. (5 points) A parent believes the average height for 14 year old girls differs from that of 14 year old boys. Estimate the difference in the height between girls and boys using a 99% confidence interval. The summary data are listed below where height is in feet. Based on your interval, do you think there is a significant difference between the true mean height of 14 year old girls and boys? Explain.

$$n_1 = 40 \quad \bar{x}_1 = 5.1 \quad s_1 = 0.2$$
$$n_2 = 40 \quad \bar{x}_2 = 4.8 \quad s_2 = 0.3$$

2. (5 points) A quality control engineer wants to determine what proportion of defective parts are coming off the assembly line. Past experiments based on large sample sizes show this proportion to be 0.19. What sample size does the engineer need in order to estimate this proportion with a margin of error of 0.12 with 90% confidence?

3. (5 points) Random sample of $n = 50$ observations from a quantitative population produced $\bar{x} = 65.4$ and $s^2 = 2.8$. Give the best point estimate for the population mean μ, and calculate the margin of error.

4. (5 points) A machine produces aluminum tins used in packaging cheese. A random sample of 1000 tins was selected and 43 were found to be defective. Find a 95% upper confidence bound for the true proportion of defective tins produced by the machine.

5. (5 points) In a study to compare the effects of two pain relievers it was found that of $n_1 = 200$ randomly selected individuals instructed to use the first pain reliever, 93% indicated that it relieved their pain. Of $n_2 = 450$ randomly selected individuals instructed to use the second pain reliever, 96% indicated that it relieved their pain. Calculate the width of a 95% confidence interval for the difference in the proportions experiencing relief from pain for these two pain relievers.

6. (5 points) A random sample of 100 observations from a quantitative population produced a sample mean of 26.8 and a sample standard deviation of 6.5. Use the p-value approach to determine whether the population mean is different from 28. Explain your conclusions.