

Unit 6 – Estimation
Homework #9 (Unit 6 – Estimation part 1 of 2)

Due Monday November 9, 2015
Last submission date for credit: Monday November 16, 2015

1. **This exercise gives you practice calculating a confidence interval for the mean of a Normal distribution in the setting where the variance parameter is known. See 6. Estimation, pages 33-37**

The results of IQ tests are known to be normally distributed. Suppose that in 2014, the distribution of IQ test scores for persons aged 18-35 years has a variance $\sigma^2 = 225$. A simple random sample of 9 persons take the IQ test. The sample mean score is 115. Calculate the 50%, 75%, 90% and 95% confidence interval estimates of the unknown population mean IQ score.

2. **This exercise is asking you to think about, and compare, two aspects of the concept of a confidence interval: (1) its width, and (2) the level of confidence that we attach to the interval we are reporting. *Hint* – precision versus confidence...**

What trade-offs are involved in reporting one interval estimate over another?

3. **This exercise is review of the ideas of sampling distributions. It is asking you to compute a probability for a sample mean. It is also a review of the Normal distribution. See 5. Normal, page19.**

If it is known that the population mean IQ score is $\mu = 105$ and $\sigma^2 = 225$, what proportion of samples of size 6 will result in sample mean values in the interval $[135, 150]$?

4. **This exercise is a straightforward confidence interval calculation for a binomial proportion. See 6. Estimation, pages 61-62**

An entomologist samples a field for egg masses of a harmful insect by placing a yard-square frame at random locations and carefully examining the ground within the frame. A simple random sample of 75 locations selected from a county's pasture land found egg masses in 13 locations. Compute a 95 confidence interval estimate of all possible locations that are infested.