Homework 2

Due February 5, 2018

Question 1

Mercury contamination is a serious problem in fish populations. If mercury is present in a female fish, then mercury can show up in the eggs of the fish. For this problem, run the file `hw2-mercury.R`. The script loads the `mercury-in-eggs` data set which contains the mercury levels in $N = 1000$ trout eggs (in μg/g wet weight). The goal of this problem is to estimate the average mercury levels in the eggs by obtaining a simple random sample of $n = 20$ eggs. Do the following parts:

a) Obtain a simple random sample of $n = 20$ eggs. Tell how you obtained the twenty eggs. Record the egg number and the corresponding mercury level in the egg.

b) Compute the sample mean and standard deviation.

c) Compute a 95% confidence interval for the mean mercury level in the eggs and comment.

Question 2

The emerald ash borer is infecting trees in northern Ohio and efforts are underway to prevent the spread of this pest which kills its host tree. In a forested area in northern Ohio, there are $N = 2000$ ash trees. For this problem, run the file `hw2-emerald.R`. The script loads the `emerald-ash-borer` data set which contains the 2000 trees and indicates whether or not the tree is infested with the emerald ash borer (1 = infested and 0 = not infested). The goal is to determine the proportion of trees that are infested. Do the following parts:

a) Obtain a simple random sample of $n = 50$ ash trees from this file. List the trees you obtained and whether or not it was infected.

b) Compute the sample proportion $\widehat{p}$ for your data.

c) Compute a 95% confidence interval for p, the proportion of trees in the forest infested with the ash borer.