MATH 185 – Homework 2
Due Wednesday, 04/18, by 11:59 PM

Send your code here. For Homework 1, write "MATH 185 - HW 1" *in subject line and nothing else in the body. There should only be one file attached, with the name* hw1-lastname-firstname.R. *Make sure your code is clean, commented and running. Keep your code simple, using packages only if really necessary. If your code does not run, include an explanation of what is going on.*

Problem 1. Write a function chisqBootTest(tab, B=1e4) that takes a table of counts tab and a number of replicates B (defaulted to 10,000), and returns the bootstrap p-value for the chi-squared test for independence based on B replicates. Apply your function to the following case study (http://onlinestatbook.com/2/case_studies/diet.html).

Problem 2. We perform some simulations to quantify the level of the Student confidence interval for the mean. Set the desired confidence level at 95%.

A. Generate a standard normal sample of size $n = 15$ and compute the Student CI at level 95%. Repeat that $B = 10000$ times. Compute the fraction of times the interval contains the true mean. Repeat the whole thing with $n = 150$. Offer some brief comments.

B. Same thing, except generate a sample from the double-exponential distribution with rate $\lambda = \sqrt{2}$, which also has mean 0 and variance 1. This distribution is not in the normal family but is symmetric about 0.

C. Same thing, except generate a sample from the exponential distribution with rate $\lambda = 1$, which also has mean 1 and variance 1, and is not in the normal family. This distribution is not in the normal family and is skewed.