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.