BERD R Short Course  
Session 4 Homework Problems

1. Generate two independent samples: first sample with 100 observations from N(0,1) and second sample with 100 observations from N(1,3) and perform the following calculations:
   1. Calculate the min, max, 25th, 50th, 75th, mean and variance for each of the samples
   2. Use F test to test the equality of two variances
   3. Based on the testing result from item b, perform two sample t test on the equality of the means
2. Generate two independent samples: first sample with 100 observations from N(0,1) and second sample with 100 observations from Chi-squared distribution with df=3 and ncp=0 and perform the following calculations:
   1. Calculate the covariance and correlation coefficient between the two samples and test whether the correlation equals to zero
   2. Use Shapiro-Wilk test to test the normality of two samples separately
   3. Use Kolmogorov-Smirnov test to test the equality of two distributions
3. Use dataset ‘survey’ in R package ‘MASS’ as the input dataset to perform the following:
   1. Create contingency table of Sex by Smoke
   2. Use both Chi-squared test and Fisher’s exact test to test the independence of the two variables
4. Power analysis
   1. Suppose I want to test the effect of some medicine for control and treatment groups. The following parameters are decided to be used in the study (equal sample sizes in two groups, significant level=0.05, effect size=0.2, power=0.8, alternative=’greater’). Determine how many observations we should have in each of the group