Statistics 3080
Homework 5
Due: Wednesday, November 15

Complete the following problems in a commented R file. Include any output requested as a comment following your code. Include any plots as a single PDF file. When conducting a hypothesis test:

1. The type of test you plan to conduct should be identified and justified.
2. The hypotheses should be stated as a comment (ie. Ho: mu=1 vs. Ha: mu not= 1).
3. The conclusions should be stated in both statistical and non-statistical terms.

Problem 1 (15 points): A sample of 200 participants respondents were asked to indicate their political views and whether they had ever attended a NASCAR race. The resulting data are shown below. Is there evidence of a relationship between political view and NASCAR race attendance at the 5% significnace level?

	Yes	No
Liberal	20	70
Conservative	40	70

Problem 2 (15 points): The Edison Electric Institute has published figures on the annual number of kilowatt hours expended by various home appliances and found most of them to be normally distributed. It is claimed that a vacuum cleaner expends an average of 46 kilowatt hours per year. If a random sample of 12 homes included in a planned study indicates that vacuum cleaners expend an average of 42 kilowatt hours per year with a standard deviation of 11.9 kilowatt hours, does this suggest evidence against the claim at the 5% significance level?

Problem 3 (15 points): There were two advance screenings of a new movie. The first audience was composed of regular listeners of a classical-music radio station, 82% of whom rated the movie favorably. The second was composed of regular listeners of a rock-and-roll radio station, 70% of whom rated the movie favorably. Both screenings filled the 350 seat theater completely. Is there significant evidence at the 10% level of significance that the regular listeners of the two radio stations have differing opinions on this movie?

Problem 4 (15 points): The data set *normtemp.txt* contains normal body temperature measurement for 130 healthy, randomly selected individuals. Is there a significant difference between the average body temperature of men (1) and women (2) at the 5% level of significance?

Problem 5 (15 points): Pepcid is a drug that can be used to heal duodenal ulcers. Suppose the manufacturer of Pepcid claims that more than 80% of patients are healed after taking 40mg of Pepcid every night for eight weeks. In clinical trials, 148 of 178 patients suffering from duodenal ulcers were healed after eight weeks. Is there sufficient evidence to support the manufacturer's claim at the 1% significance level?

Problem 6 (15 points): A team of researchers is interested in determining whether men download more movies onto their computers than women. The team randomly sampled four men and four women and recorded the number of gigabytes of movies they had on their primary computer (shown below). Is there evidence that center of the two populations is different at the 5% level of significance?

```
> men <- c(305, 16, 122, 68)
> woment <- c(25, 68, 84, 103)
```

Problem 7 (15 points): Students wishing to graduate with a particular degree must achieve a specific score on a standardized test. Those who fail the test must take a review course and then attempt the test again. A random sample of 12 students who have taken the review course in previous semesters is selected. The selected students' scores on the two attempts are given below. Is there any evidence of improvement in the students' scores following the review class at the 1% level of significance?

```
> pretest <- c(17, 12, 20, 12, 20, 21, 23, 10, 15, 17, 18, 18)
> posttest <- c(19, 25, 18, 18, 26, 19, 27, 14, 20, 22, 16, 18)
```

Problem 8 (45 points): The `exec.pay` data set in the `UsingR` package contains data on the salaries (in $10,000) of CEOs at 199 top companies in the United States.

(a) Is there evidence at the 5% significance level that the median pay is more than $220,000?

(b) Is there evidence at the 5% significance level that the average pay is more than $220,000?

(c) Which test is more appropriate? Explain.