Advanced Data Analysis 1, Stat 427/527 Homework 3 Name: _____
Fall 2017

(20pts) **1. Acid:** Use the Acid data (from HW 2).
Read the data from the website with:

```
d2 <- read.table("http://math.unm.edu/~luyan/ADA117/acid.txt")
```

(a) (10 pts) Carefully check the assumption of normality of the data by describing the shape of the data distribution and the sampling distribution of the mean (using the bootstrap). You need to do the Acid1 and Acid2 separately.
(b) (10 pts) Formally compare the experiments using two-sample t-procedures.

(40pts) **2. cAMP:** Cyclic adenosine monophosphate (cAMP) is a substance that can mediate cellular response to hormones. In a study of maturation of egg cells in the frog Xenopts laevis, oocytes from each of four females were divided into two batches: one batch was exposed to progesterone and the other was not. After two minutes, each batch was assayed for its cAMP content, with the results given in the table below.

	cAMP (pmol/oocyte)	
Frog	Control	Progesterone
1	6.01	5.23
2	2.28	1.21
3	1.51	1.40
4	2.12	1.38

Read the data from the website with:

```
d3 <- read.csv("http://math.unm.edu/~luyan/ADA117/camp.csv")
```

(a) (10 pts) Make a histogram and box plot of the differences between the cAMP levels for the control and progesterone samples.
(b) (10 pts) Test at the 10% level whether there is any difference in the population mean cAMP levels for batches of oocytes that are untreated versus those treated with progesterone.
(c) (10 pts) Compute and interpret a 90% CI for the difference in population mean cAMP levels for batches of oocytes that are untreated versus those treated with progesterone.
(d) (10 pts) Discuss any statistical assumptions that you have made in carrying out the analysis, and whether the assumptions seem reasonable.