HW 5

1. In a given situation, suppose H0 was not rejected at $\alpha=.02$. Answer the following questions as "yes", "no", or "can't tell" as the case may be.

(a) Would H0 also be retained at $\alpha=.01$?

(b) Would H0 also be retained at $\alpha=.05$?

(c) Is the p-value smaller than .02?

2. A company's mixed nuts are sold in cans and the label says that 25% of the contents is cashews. Suspecting that this might be an overstatement, an inspector takes a random sample of 35 cans and measures the percent weight of cashews [i.e. 100(weight of cashews/weight of all nuts)] in each can. The mean and standard deviation of these measurements are found to be 23.5 and 3.1, respectively. Do these results constitute strong evidence in support of the inspector's belief?

(a) Identify H0 and H1.

(b) Carry out the hypothesis test at the 5% level of significance using the p-value (use normal distribution).

3. From extensive records, it is known that the duration of treating a disease by a standard therapy has a mean of 15 days. It is claimed that a new therapy can reduce the treatment time. To test this claim, the new therapy is tried on 70 patients, and from the data of their homes to recovery, the sample mean and standard deviation are found to be 14.6 and 3.0 days, respectively.
(a) Perform the hypothesis test using a 2.5% level of significance, based on the rejection region.

(b) Calculate the p-value and interpret the result.

(c) State any assumptions you make about the populations.

4. In a study of interspousal aggression and its possible effect on child behavior, the behavior problem checklist scores were recorded for 47 children whose parents were classified as aggressive. The sample mean and standard deviation were 7.92 and 3.45, respectively. For a sample of 38 children whose parents were classified as nonaggressive, the mean and standard deviation of the BPC scores were 5.80 and 2.87, respectively.

(a) Do these observations substantiate the conjecture that the children of aggressive families have a higher mean BPC than those of nonaggressive families? (Answer by calculating the p-value.)

(b) State any assumptions you make about the populations.

5. The data on the weight of male and female wolves are as follows:

Female	57	84	90	71	71	77	68	73			
Male	71	93	101	84	88	117	86	86	93	86	106

(a) Test the null hypothesis that the mean weights of males and females are equal versus a two-sided alternative. Take $\alpha = 0.05$.

(b) State any assumptions you make about the populations for (a).

(c) Test the null hypothesis that the variances of weights of males and females are equal. Take $\alpha = 0.05$.

(d) State any assumptions you make about the populations for (c).