

STAT 320: Assignment 2.
Due February 8/2006 (Wednesday)

February 3/2006

(A) (30 points, 10 for each question)

A local department store wants to determine the average age of adults in its existing marketing area to help target its advertising. A random sample of 400 adults is selected. The sample mean age is found to be 35 years with a sample standard deviation of 5 years.

- (1) Calculate the 94th percentile of the sample mean age.
- (2) Construct by hand the 97% confidence interval estimate of the population average age of the adults
- (3) Construct by hand the 95% confidence interval estimate of the population average age of the adults with a random sample of 20 adults is selected and its sample mean age is found to be 32 years with a sample standard deviation of 3 years.

(B) (30 points, 15 for each question)

To investigate an alleged unfair trade practice, the Federal Trade Commission (FTC) takes a random sample of sixteen "5-ounce" candy bars from a large shipment. The mean of the sample weights is 4.85 ounces and the sample standard deviation is 0.1 ounce.

- (1) Test the hypotheses $H_0: \mu > 5$ versus $H_a: \mu < 5$ at the 5% level of significance
- (2) Assume the population of candy bar weights is approximately normally distributed. Based on the results of the test, does the FTC have grounds to proceed against the manufacturer for the unfair practice of short-weight selling? State the decision rule, the test statistic, and your decision

(C) (40 points, 10 for each question)

Investigate the following data:

X	1	2	3	4	5	6
Y	3	5	7	9	11	13

- (1) Plot X against Y by hand (this is what is called a Scatterplot)
- (2) Do the same in JMP?
- (3) Can we draw a line (by hand) or pseudo line that summarizes the relationship between X and Y?
- (4) Can you guess the equation $Y=a+bX$ that summarizes the relationship between X and Y

(D)CLT:

The **uniform** distribution is obviously *non*-Normal. X summarizes the random variable describing the following 26 numerical values. Call the following data the parent population that has a uniform distribution.

0.96	0.51	0.16	0.03	0.87	0.77	0.46	0.52	0.98	0.42	0.79	0.34	0.88
0.81	0.73	0.63	0.61	0.51	0.66	0.64	0.51	0.59	0.77	0.03	0.98	0.04

- To compute an average, \bar{X} , **two** samples are drawn, at random, from the parent distribution and averaged. Draw 10 samples of **two values (which means draw two values at random 10 times)** and calculate the average \bar{X} (10 times). Make a graph of \bar{X} and show the distribution of averages of two.
- Repeatedly take **three** from the parent distribution, and compute the averages, and produce the probability density.
- Repeatedly take **four** from the parent distribution, and compute the averages, and produce the probability density.
- Repeatedly take **eight** from the parent distribution, and compute the averages, and produce the probability density.
- Repeatedly take **sixteen** from the parent distribution, and compute the averages, and produce the probability density
- What is your conclusion