MATH 140 WORKSHEET VII FALL 2011

1. Consider we have a researcher who is interested in studying the average weight of Pennsylvania cats as opposed to the general cat population. He sets $\alpha = .05$. He finds that the National Institute of Standards and Technology (NIST) reports the average weight of cats in the USA is 14 lbs. with a standard deviation of 4 ounces. The researcher hires an outside firm to create a programme to pseudo-random sample Pennsylvania households and the data is summarised as follows:

$\overline{X} = 15.5$ lbs.

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity.

A. State the null and alternate hypothesis.

B. Compleat the study and determine if the null is rejected or not (include the graph for illustrative purposes).

2. A statistician is interested in the number of dates per week that women at KU report to have is somewhat similar to the number of dates on average of 'typical' female students at universities in the USA ($\mu = 4$ and $\sigma = 1$).. The statistician set $\alpha = .05$ prior to collection of the data. Random numbers were generated to get ID numbers for female students at KU, then the subjects were asked to the number of dates for the past week they had. Thus, the researcher collected for a 'random' sample of women (16 students) at KU in the spring of 2011. The raw data is presented in the table below.

Sample Number of Dates	3 4 4 8 3 2 7 0 6 1 5 1 3 3 5 6

with 2 decimal place accuracy:

$\overline{X} \doteq 3.812 \qquad S \doteq 2.257$

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity.

A. State the null and alternate hypothesis.

B. Compleat the study and determine if the null is rejected or not (include the graph for illustrative purposes).

3. Two statisticians are interested in the number of dates per week that males at KU report to have is somewhat similar to the number of dates on average of 'typical' male students at universities in the USA ($\mu = 2$ and $\sigma = 0.3$).. The statisticians set $\alpha = .05$ prior to collection of the data. They disagreed on the research design; so, each did his study separately.

A. Researcher 1 was interested in whether the number of dates the KU males had were different on average of 'typical' male students at universities in the USA. He used random numbers that were generated to get ID numbers for male students at KU, then the subjects were asked to the number of dates for the past week they had. Thus, the researcher collected for a 'random' sample of males (24 students) at KU in the spring of 2011. The raw data is presented in the table below.

Sample Number of Dates	1 2 1 2 1 9 0 0 1 1 0 0 1 2 1 2 2 3 6 2 2 2 2 2

with 2 decimal place accuracy:

$\overline{X} \doteq 1.125 \qquad S \doteq 1.825$

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity.

A. State the null and alternate hypothesis.

B. Compleat the study and determine if the null is rejected or not (include the graph for illustrative purposes).

B. Researcher 2 was interested in whether the number of dates the KU males had were more than on average than the 'typical' male students at universities in the USA. He used random numbers that were generated to get ID numbers for male students at KU, then the subjects were asked to the number of dates for the past week they had. Thus, the researcher collected for a 'random' sample of males (24 students) at KU in the spring of 2011. The raw data is presented in the table below.

Sample Number of Dates	1 2 1 2 1 9 0 0 1 1 0 0 1 2 1 2 2 3 6 2 2 2 2 2

with 2 decimal place accuracy:

$\overline{X} \doteq 1.125 \quad S \doteq 1.825$

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity.

A. State the null and alternate hypothesis.

B. Compleat the study and determine if the null is rejected or not (include the graph for illustrative purposes).

4. Consider the following:

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity. Test (n = 16) the following on the data set results:

$H_0: \mu = 40$

$H_1: \mu \neq 40$ such that α = .05.

The sample results: $\overline{X} = 43$, $s_x = 5$ where we assume $\sigma = 1.2$

5. Consider the following:

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity. Test (n = 16) the following on the data set results:

$H_0: \mu \leq 40$

$H_1: \mu > 40$ such that α = .05.

The sample results: $\overline{X} = 43$, $s_x = 5$ where we assume $\sigma = 1.2$

6. Consider the following:

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity. Test (n = 16) the following on the data set results:

$H_0: \mu \leq 40$

$H_1: \mu > 40$ such that α = .05.

The sample results: $\overline{X} = 48$, $s_x = 5$ where we assume $\sigma = 1.2$

7. Consider the following:

Assume the sample is from a normal population, the observations are independent, and there was no error of measurement of the quantity. Test (n = 16) the following on the data set results:

$H_0: \mu \leq 40$

$H_1: \mu > 40$ such that α = .05.

The sample results: $\overline{X} = 43$, $s_x = 5$ where we assume $\sigma = 0.4$