A few CS130 Final Review Questions

1) Consider the following two cold medicines tested for acetaminophen. Using SPSS, test the claim that the mean amount of acetaminophen is the same for both medicines.

```
Brand A   472   487   506   512   489   503   511   501   495   504   494   462
Brand B   562   512   523   528   554   513   516   510   524   510   524   508
```

a) Which hypothesis test are you going to perform?

b) State the Null Hypothesis.

c) Perform the test.

d) Do you accept or reject the Null Hypothesis? Why?

2) For a random number of selected homes sold in Washington County, the annual tax amount (in thousands of dollars) and selling price (in thousands of dollars) are as follows.

```
Taxes:   4.0   2.4   1.8   1.5   1.4   1.4   3.0   1.9
```

```
Selling Price:   265   142   114   160   130   150   228   145
```

a) Perform a Linear Regression on the above data using SPSS and paste in your results.

b) Using the equation editor, show the linear equation and R-squared value produced by performing the Linear Regression in SPSS.

c) For an annual tax amount of $3,400, what might we expect the selling price of this house to be? Use the equation editor to show the equation.

d) For a selling price of $335,000, what might we expect the taxes to be for this house? Use the equation editor to show the equation.

3) It is often the case that bacterial cultures, confined to a petri dish, will grow quite rapidly until the amount of bacteria approaches a critical value.

Given the formula for bacteria growth as P(t) $=7.74e^{0.143t}$

where P is the amount of bacteria present at time t hours later. Create a worksheet that allows the user to input a time and that reports the amount of bacteria present at that particular time.

a) Create a comment (right click on a cell and choose Insert Comment) that shows the number of bacteria that can be expected at time t=1000. The comment is to be placed and displayed in cell A5.

b) Next, in a separate worksheet, create a table listing the size of the population at t=0, t=5, t=10, ... through t=250 (increase t by 5 each time).

c) Finally, take the table data into SPSS and create an appropriate graphshowing the results. Make sure the graph is completely and properly labeled

4) You have been offered a 5 year loan on a $10,000 car with an 8.7% annual interest rate. What will your monthly payment be assuming the payment is made at the beginning of the month (not the end of the month). Show a table of your monthly payments. The ending balance is to zero out.

The above problem is hard as the payment is made at the beginning of the month, not the end. People have problems with this.

5) You have been hired at a water treatment plant to manage the water quality of the treated water. A new set of filters are installed and you want to determine if they were worth the money. You measure the bacteria count in treated water before and after the new filters are installed. The data you collected is shown below, two samples for each of the 11 clean water tanks. Did the new filter reduce the amount of bacteria in the clean water tanks?

Tank #	1	2	3	4	5	6	7	8	9	10	11
Old Filter	10	15	1	3	10	2	18	16	8	5	1
New Filter	4	10	2	1	7	1	3	5	2	3	2

a) What hypothesis test will you use?

b) State the Null Hypothesis.

c) Perform the test

d) Do you accept or reject the Null Hypothesis? Why?