

MATH 254 – Test 2

19 March 2009

You must show all your work to receive full credit. You may use a calculator or Excel for routine calculations. However, your written work should make clear what calculations Excel or your calculator is performing. The number of points for questions on this test sum to 80 which, when added to the 20 points on the take-home part of this test, will total 100 points. GOOD LUCK!

1) (20 points) Consider this table, which shows how many households in China had cable television, starting in the year 2000:

year (x)	households with cable (millions) (y)
0	68
1	72
2	80
3	83

(Note that the “year” column, $x = 0$ corresponds to the year 2000, $x = 1$ corresponds to the year 2001, etc.). The regression line for these data is

$$y = 5.3x + 67.8$$

- Use this regression line to predict the number of Chinese households with cable in the year 2010.
- Do you think this will provide an accurate estimate? Why?
- Do you think it will give an overestimate or an underestimate? Why?

2) (20 points) Data were collected to compare the length of time x (in months) couples have been in a relationship to the amount of money y (in dollars) that is spent when they go out on a date. The equation of the regression line for these data was found to be

$$y = 70 - 5x$$

- Give an interpretation of the intercept 70.
- Give an interpretation of the slope -5 .
- Are there any limitations to this model? Explain.

3) (12 points) Studies have shown that the correlation between people having ulcers and people eating spicy food is 0.85.

a) Which variable here should be the explanatory variable and which should be the response variable? Explain.

b) Do you believe, in this example, that the explanatory variable causes the response variable? Explain.

4) (16 points) The following table gives data for the population of prisoners at a certain correctional institution. In the table, the prisoners are divided by gender and also by whether they are violent or non-violent offenders.

	male	female
violent	265	84
non-violent	479	123

a) What percent of the prisoners are female?

b) What percent of the male prisoners are non-violent offenders?

c) Female violent offenders make up what percent of the prison population?

5) (12 points) From a population of 500 people, a simple random sample (SRS) of 6 people must be selected. Use the provided Internet link to a table of random digits to select this SRS. Start at Line 101 of the table.