Homework Assignment 2: Due at the beginning of class 7/2/01

Table 1 gives the Kelley Blue Book™ value of different model years of Volkswagen Golf two door hatchbacks. Questions 1, 2, and 3 use the data in Table 1.

Model Year	1985	1986	1987	1988	1989
Value (dollars)	2250	2550	2900[1]	2950	3275

Table 1: Kelley Blue Book™ Value of Volkswagen hatchbacks, 1985-1989.

[1] During the 1987 model year, Volkswagen did not manufacture a basic hatchback, only the enhanced GL model hatchback.

1.   Plot a graph showing the value of a Volkswagen Golf hatchback versus model year.

2.   Find the equation of a linear function that does a reasonable job of giving value as a function of year for Volkswagen hatchbacks. Draw the graph of your linear function using the same set of axes as Problem 1. Where does the linear function do a good job of representing the data from Table 1?

3.   Based on the information in this problem, what do you think the value of a 1987 basic Volkswagen golf should be?

Arnold 'Mad Dog' Johnson operates a taxi company in New York City. Mr. Johnson charges customers $1.50 for the first quarter mile, and 50 cents for each subsequent quarter mile (or part thereof). Questions 4, 5, 6 and 7 are based on this.

4.   Use the information about Mr. Johnson's taxi company to complete the table below.

Length of Trip (miles)	0.35	0.57	3/4		2	
Cost of Trip (dollars)				$2.25		$10.00

5.   Plot a graph showing the cost of a taxi ride versus the length of the ride in miles. Is the graph that you have drawn the graph of a function? Is it the graph of a linear function? In both cases, explain how you reach your conclusions.

6.   Find the equation of a linear function that could be used to help predict the cost of a taxi ride. You will not be able to find a linear function that will give the cost of a taxi ride as a function of the length of the ride. Instead, you should strive for a linear function that will help you to predict the cost of some rides (e.g. rides of 0 miles, 0.25 miles, 0.5 miles etc.) and then explain how you could use the outputs from this linear function to obtain the cost of any ride in Mr Johnson's cab.

7.   Suppose that it costs $14.00 to ride Mr. Johnson's taxi from your home to the airport. Can you tell how far the airport is from your home? What is the best that you can do?

Graphs are excellent devices for showing patterns and trends in data. You have to be careful, though, because sometimes accepting the patterns at face value can give you an incorrect picture of what is going on. In problems 8, 9 and 10, you'll look at a set of data that seems to have astonishing implications, but a little thought will show you that there is more going on than meets the eye.

Table 2 (below) shows the amount of petroleum used to generate electricity (in millions of barrels of oil per day) and the average cigarette consumption (in cigarettes per person) for several different years.

Petroleum Used to Generate Electricity (Millions of barrels per day)	Average Cigarette Consumption (Cigarettes per person each year)
0.21	3552
0.24	4171
0.93	3985
1.15	3849
0.55	2817
0.37	2423

Table 2: Petroleum Consumption for Electric Utilities and Per Capita Cigarette Consumption, 1950-1995[1].

8.   Plot the data from Table 2 on a graph of cigarette consumption versus petroleum consumption.

9.   Describe the appearance of your plot in words. The health dangers of smoking cigarettes has been well documented. If society wanted to reduce the average number of cigarettes smoked to 2000 cigarettes per person, then what course of action does your plot suggest? (Your answer should include an equation modeling the data in your plot along with appropriate calculations.)

10.   Do you think that the implications of your plot are reasonable? Explain why or why not. How would you explain the appearance of your plot?

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[1] Source: U.S. Department of Energy and U.S. Department of Health and Human Services.