Homework 1 (MATH 4300-01) **Name (Print):**
Due date: Friday, Sept. 13, 2013

1. Consider the following data.

x	1	2	3	4	5	6	7
y	100	25	11	6	4	3	2

a) Plot ln y versus x and ln x. Compare the data with a linear function if one of these plots supports the use of a linear function.
b) Graph the table data and the model that follows from the above relation.
c) Calculate the relative error of your model in %.
d) At which x is the value of y at $x = 2.5$ reduced by 25%?

2. Consider the following data.

x	1	2	3	4	5	6	7
y	2	35	150	500	1250	2500	5000

a) Plot ln y versus x and ln x. Compare the data with a linear function if one of these plots supports the use of a linear function.
b) Graph the table data and the model that follows from the above relation.
c) Calculate the relative error of your model in %.
d) At which x is the value of y at $x = 2.5$ increased by 150%?

3. The U.S. Bureau of Public Roads determined the following total stopping distances D (in ft) depending on the velocity v (in mph) of cars.

v	20	30	40	50	60	70	80
D	42	73.5	116	173	248	343	464

a) Use the data to plot ln D versus v and ln v. Compare the data with linear functions that reveal the parameters of corresponding exponential and power function models.
b) Use the data to plot D / v. Compare the data with a linear and a quadratic function.
c) Plot D according to the original data in comparison to the two models for D / v. Calculate the relative error of the two polynomial models.
d) Discuss the suitability of the models obtained for D. Identify one model that provides a formula that can be used to calculate the total stopping distance without using a calculator. Illustrate the use of this formula by three examples.