Advanced Data Analysis 1, Stat 427/527 Homework 1 Name: _____
Fall 2011 Prof. Erik B. Erhardt

Part I. (60 points) Do all calculations in Minitab. Use a word processor of your choice to write a report. Insert computer text output and graphics to support what you are saying, but you need to write something that looks like an academic paper – not a pile of computer output. Turn in a hard copy of your HW in class (i.e. don't email me your HW).

(15pts) **1. Precip:** The Dept of Meteorology at the University of Stockholm monitors chemical constituents of the atmosphere at several stations throughout Sweden. The chemicals are precipitated out of the atmosphere by rain and deposited on filters, from which the amount of chemical, in milligrams per square meter of filter surface, can be measured. The monthly sulphur (Sulphur) for each of the 12 months (Month) (1=Jan, 2=Feb, etc) and the monthly precipitation (Precip) is given in the table below for one station.

Month	Precip(mm)	Sulphur(mg/m2)
1	35	55
2	25	30
3	12	25
4	36	43
5	81	135
6	19	38
7	55	63
8	63	93
9	69	64
10	23	17
11	52	34
12	35	34

Enter the Precip data into the Minitab worksheet. Note: you can copy the data (Ctrl-C) to the clipboard then, in Minitab, click on the first cell in the first column and choose EDIT/PASTE CELLS. Stay with the default USE SPACES AS DELIMITERS.

(a) (3 pts) Make a stem-and-leaf display, histogram, and high-quality boxplot for the Precip data. Make sure to specify the following options in the dialog box for the boxplot: IQRange Box, Median Symbol, Outlier Symbol.

(b) (2 pts) Compute the mean, median, standard deviation, and interquartile range for the Precip data.

(c) (4 pts) Is there much difference between the mean and median? Discuss, briefly, whether the size and the direction of the difference is sensible, given the graphical summaries.

(d) (6 pts) Using the graphical summaries, describe the shape of the Precip distribution. Discuss modality, presence/absence of outliers, whether skewness is present, and if so, in what direction, and whether it would be reasonable to assume that the Precip distribution is normal.

15 pts

(15pts) **2. Sulphur:** Repeat with the Sulphur data in the previous problem.

15 pts

30 pts

(15pts) **3. Mammals:** These data, from Holling (1982), are the body masses (in grams) for 36 species of boreal forest mammals found east of the Manitoba-Ontario border in pure or mixed conifer strands. Repeat the steps in problem 1.

15 pts

mass(g)
3.69
4.11
4.25
5.24
5.50
8.36
13.18
22.45
22.96
24.52
26.93
28.30
28.35
33.00
42.53
43.94
44.51
80.80
104.90
191.36
839.15
1224.70
1496.85
2642.17
3118.45
8504.85
9071.84
10149.12
12303.68
14061.35
23995.02
43204.64
86416.53
105686.93
169643.40
481828.10

(15pts) **4. log(Mammals):** Repeat with the natural logarithm of the data in the previous problem. You should use the Minitab calculator to transform the original data to the log scale in a new column.

15 pts

30 pts