HW#1 Solutions Problems 1.4, 1.10, 1.15, 1.16, 1.27, 1.38

Problem 1.4

(Note there are many correct answers to this problem. The key point is to get you to think about how there are many different ways to define "leisure time" and then measure it. Each way will have its own advantages and disadvantages)

(a) "leisure time" will be defined as all time spent doing activities that are not considered work, sleep or daily routine (eg shavering, attending to bodily functions, travelling/commuting). So activities such as watching TV, reading, exercising, partying etc will all be considered leisure.

(b) Perhaps the easiest way would be to get "Sally" to keep a daily log of all her activities for a week and then review the log book to count the minutes spent doing leisure activities. (Note that this could potentially have problems because "Sally" might find it troublesome to keep the log and misreport her activities).

Problem 1.10

We want the measures of reliability to be directly comparable between brands. So use

"proportion of owners needing service call" = $\frac{\#\text{ needing service call}}{\#\text{ owning}}$

For Brand A

$$\frac{2942}{13376} = 0.2199 \text{ (4dp)}$$

For Brand B

$$\frac{192}{480} = 0.4$$

Since Brand B has a higher rate of owners needing a service call, Brand A is the more reliable brand.

Problem 1.15

(a) Reading directly off the stem plot the smallest two percentages are 10.9% and 11.0%

(b) Shape - symmetric
Center - About 13.9%
Spread - from 11.0% – 16.0%

Problem 1.16

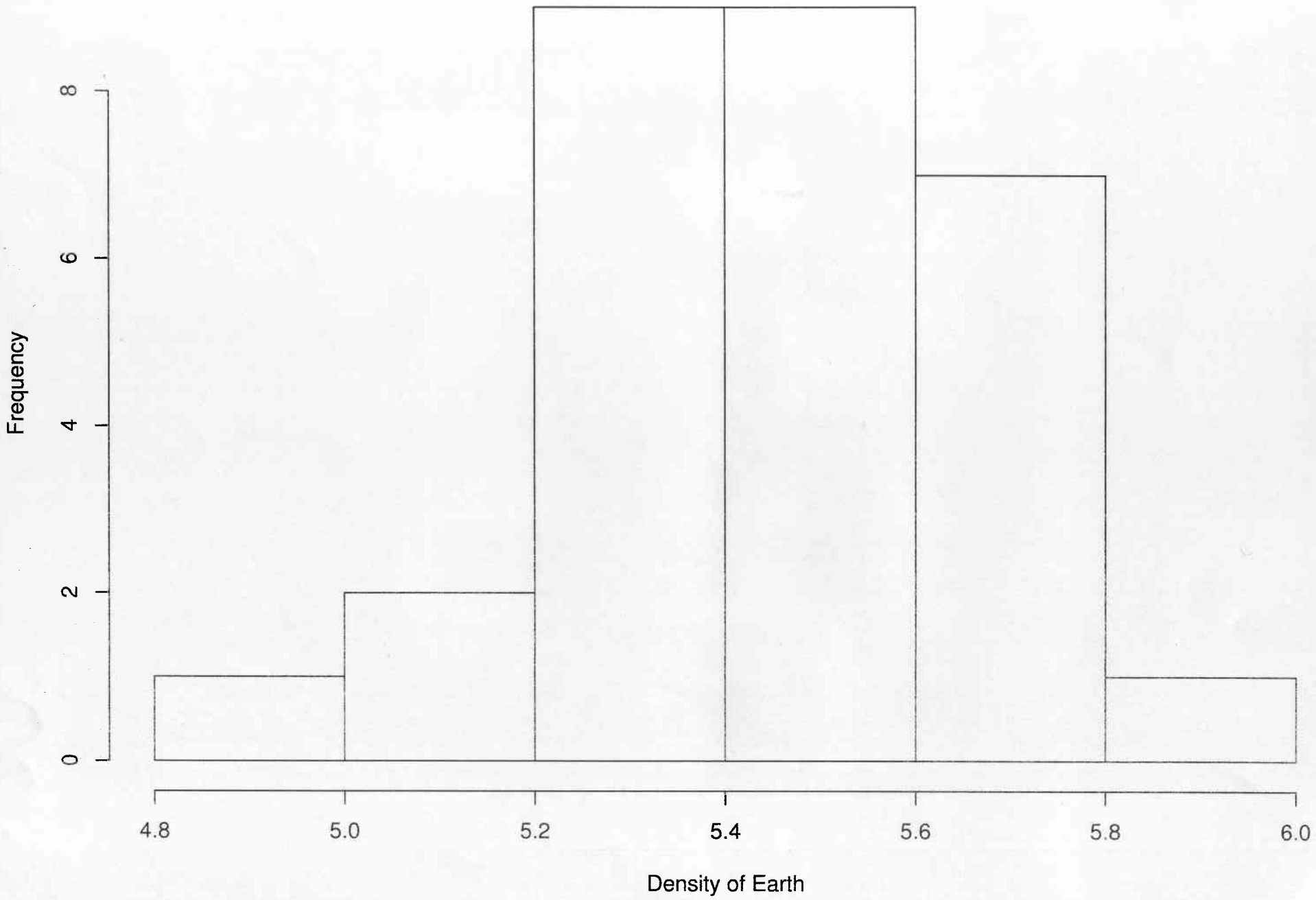
```
10 |
10 | 9
11 | 0
11 |
12 | 1 3 4 4
12 | 6 7 7 8 8 9
13 | 0 0 1 2 4
13 | 5 5 5 6 6 7 8 9 9 9 9
14 | 1 1 2 2 2 3 4 4 4 4
14 | 5 7 8 9
15 | 2 4 4
15 | 7 8 9 9 9
```

The spread out plot is preferred. It makes it much easier to see that Montana and Wyoming are outliers.

Problem 1.27

(Histogram attached)

The histogram is fairly symmetric, with mode and center at about 5.5. This is the value we should use to estimate the density of the earth.


Histogram of Density of Earth
Frequency
0
2
4
6
8
4.8
5.0
5.2
5.4
5.6
5.8
6.0
Density of Earth

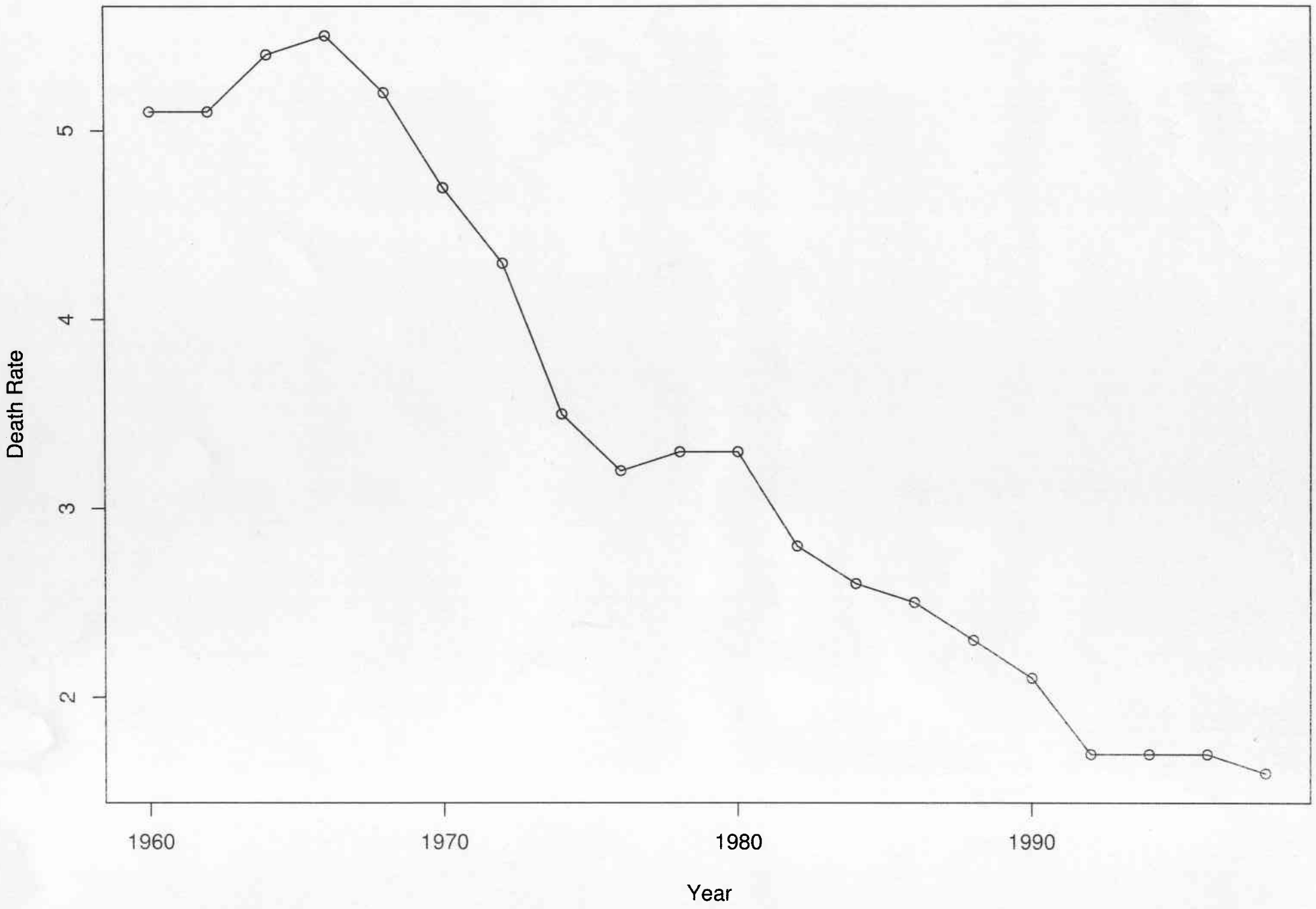
Problem 1.38

(Time plot attached)

(a) The overall trend in the plot is a decrease in death rate over this time period, this could potentially be explained by stricter safety requirements and better roads.

(b) There is a decrease visible over this time period (1974–mid 1980's) but it does not seem to differ much from the general trend before or after. In addition, because death rates continued decreasing after it is not clear that the decrease in speed limit was responsible.

(c) It would not be particularly sensible to histogram these values because you would lose (not be able to see) the trend over time is for the death rate to decrease.


Time plot of US Motor Vehicle Death Rate
Death Rate
2
3
4
5
1960
1970
1980
1990
Year