1. One possible operational definition of presidential power is the legal status to appoint cabinet members or justices. Along these lines, one might describe the extent to which a president uses power or possesses power by looking at the successfulness of appointments. Specifically, this could be

$$\frac{\text{\# failed appointments}}{\text{\# total appointment attempts}}.$$

   Another operational definition is the number of bills successfully vetoed out of all successful and overridden vetos. All of these operational definitions (or rules for measuring) give way to some sense of how powerful a president is. From the view point of specificity, the above operational definitions fail to measure certain important aspects of presidential power. For example, the first operational definition ignores a president's power to dissolve parliament, which is another important dimension that measures presidential power. Likewise, the third operational definition of neglects all possible expressions of presidential power that are not expressly legislative. Surely not all the executive's power is legislative in nature.

   From the view point of objectivity, it is not always true that these proposed operational definitions can be used and repeated by any number of people. Consider the second operational definition; one could argue that the measure of failed appointments over all total appointment attempts uses too strict a definition for "failed". In other words, if a president advocates the nomination of one of his presumptive appointtees and this presumptive appointee is withdrawn by the president before he steps foot on the Senate floor, this would not actually be a failed appointment attempt. However, it is as much an indicator of presidential power and is in the spirit of the operational definition. Yet, this allows for subjectivity in determining what cases are actually the important ones (i.e. only official appointment attempts or all appointment attempts, formal or otherwise).

2. Consider an example where the legislative body can easily override a president's veto. Then, a president has less incentive to use his veto power as it can be over-turned easily. In political settings where the override is easy, the president may systematically use fewer vetos even though he might be as powerful as another president, all else equal. This is systematic error.

   Any time one speaks of a researcher making stray marks in his notes which accidentally lead him to believe that President Bush was powerful, when, in fact, his research indicated the opposite would be an example of random error.

3. (a) mean = 17, IQR = 5

      For a mean equal to 17, it is easiest to use four data points that are symmetric around 17. Then, to get the IQR, one has to spread out the two endpoints of the data far enough. To get an IQR of 5, the first quartile must be 2.5 below 17, and the third quartile must be 2.5 above 17, meaning that the IQR will run from 14.5 to 19.5. To find the end points, the average of 17 and some number must be 14.5 and the average of 17 and some other number must be 19.5, i.e., $\frac{X_0+17}{2} = 14.5$ and $\frac{X_n+17}{2} = 19.5$. Solving these equations shows that the lower number is 12 and the higher one is 22. We now have a set of four numbers that satisfies the given conditions, namely (12, 17, 17, 22).

To check whether these results are correct, we can quickly compute the mean, which is $(12+17+17+22)/4 = 17$, as required. Likewise, as the 1st quartile must be the average of 12 and 17 (=14.5) and the 3rd quartile must be the average of 17 and 22 (=19.5), the IQR is $19.5 - 14.5 = 5$.

(b) mode = 27, median = 27

The simplest solution is probably $(27, 27, 27, 27)$, but other sets, such as $(-123, 27, 27, 99)$ or $(0, 27, 27, 10000)$ work, as well. In fact, any set $(a, 27, 27, b)$, with $a \leq 27$ and $b \geq 27$, works.

(c) mean = 3, maximum = 3

There is only one possible solution here, (3,3,3,3). As the mean has to be 3, all other values have to be equal to 3, as well, as one could not "make up" for any value smaller than 3 and still meet the requirement maximum = 3.

(d) mean = median = mode = 0

All sets of the form (a,0,0,b), with $a \leq 0$, $b \geq 0$ and $-a = b$ work, e.g., (-10,0,0,10) and (-33,0,0,33). Because of the requirement mode = 0, the two values in the middle cannot be chosen freely; they have to be equal to 0.

4. Chapter 3 Review Exercises

(2)

(a) On average, given these numbers, one could expect there to be more one year olds than seventy one year olds (as $7/5 > 6/10$). However, one can't know for sure.

(b) On average, given these numbers, one could expect there to be more twenty one year olds than sixty one year olds. However, one can't know for sure.

(c) There are more people age 0–4 than 65–69. The first group comprises all individuals in the first category (remember the intervals do not include the right endpoint, thus the 0–5 category contains children who have not yet turned 5), while the second comprises about half of the people in the penultimate category.

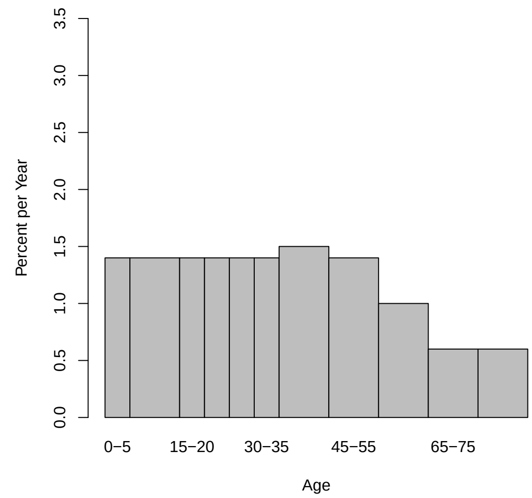

Figure 1: Histogram of Ages in US (2004)

(d) There are approximately 50% of all people above the age 35 in this distribution. There are 51% of all people above 35. There are 49% of all people below 35.

(7) In general, one would suppose that individuals dying of natural causes tend to be older. Also, the more people dying of natural causes who are old, the fewer of them that can die of trauma.
This logic suggests that since most natural deaths are among older individuals, the left-skewed distribution [i.e. *Figure (i)*] is the natural death distribution. The right-skewed distribution [i.e. *Figure (ii)*] is the trauma distribution.

(8) (a) True. While the heights of the bars are not necessarily equal as pictured, if one adjusts for the differences in the size of the income range for each group (i.e. makes a true histogram), one will see that the areas of these bars on a histogram would be equal.

(b) False. While the heights of the two relevant bars are equal, if one adjusts for the dollar range covered by each category, the height of the bar for the 50-75 group will decrease. Thus, the illusion of equality will no longer be there. This problem does not occur in actual histograms.

(c) False, this is not a histogram. The width of the bars does not reflect the actual dollar ranges of incomes, so the x-axis does not have a fixed scale. In a histogram, the area of each bar reflects the proportion in each category. In this figure, the height is reflecting that.

(12) False. While the histogram clearly shows that riots were more likely to be observed when the weather was warm (say, between 75 and 95 degrees), with a marked drop at temperatures above 100 degrees, this does not tell us anything about causation. One plausible explanation for the pattern we see in the histogram is that many riots took place in the southern U.S., where temperatures are generally higher than in the North. Yet the riots were concentrated in the South not because the weather was warm, but because racial tensions were especially pronounced in those geographic areas. Also, there simply are not too many places in the U.S. that witness temperatures above 100 degrees for long periods every year. Thus, it is unlikely that– when compared to the rest of the U.S. – there will be many riots in the few areas that do have extreme heat. Given the above possible explanation, the observed pattern of temperature and frequency of riots may therefore well be entirely spurious.