1.2.7 Problems

1.4 Use R as you would a calculator to find numeric answers to the following:

1. 1+2(3+4)
2. 4^3+3^{2+1}
3. $\sqrt{(4+3)(2+1)}$
4. $\left(\frac{1+2}{3+4}\right)^2$

1.5 Rewrite these R expressions as math expressions, using parentheses to show the order in which R performs the computations:

1. 2+3–4
2. 2+3*4
3. 2/3/4
4. 2^3^4

1.6 Enter the following data into a variable p with c ()

2 3 5 7 11 13 17 19

Use length() to check its length.

1.7 You recorded your car's mileage at your last eight fill-ups as

65311 65624 65908 66219 66499 66821 67145 67447

Enter these numbers into the variable gas. Use the function diff () on the data. What does it give? Interpret what both of these commands return: mean (gas) and mean(diff (gas)).

1.8 Let our small data set be

2 5 4 10 8

1. Enter this data into a data vector x.
2. Find the square of each number.
3. Subtract 6 from each number.
4. Subtract 9 from each number and then square the answers.

Use the vectorization of functions to do so.

1.9 The asking price of used MINI Coopers varies from seller to seller. An online classifieds listing has these values in thousands:

15.9 21.4 19.9 21.9 20.0 16.5 17.9 17.5

1. What is the smallest amount? The largest?
2. Find the average amount.

3. Find the differences of the largest and smallest amounts from the mean.

Enter in the data and apply one of R's functions to find answers to the above questions.

1.10 The monthly sales figures of Hummer H2 vehicles in the United States during 2002 were

[Jan] 2700 2600 3050 2900 3000 2500 2600 3000 2800
[Oct] 3200 2800 3400

(according to a graphic from the *New York Times*). Enter this data into a variable H2. Use cumsum() to find the cumulative total of sales for 2002. What was the total number sold? Using diff (), find the month with the greatest increase from the previous month, and the month with the greatest decrease from the previous month.

1.11 Four successive National Health and Examination surveys showed the average amount of calories consumed by a 20-to-29-year-old male to be 2,450, 2,439, 2,866, and 2,618 (http://www.cdc.gov). The percentage of calories from fat was 37%, 36.2%, 34%, and 32.1%. The percentage from carbohydrates was 42.2%, 43.1%, 48.1%, and 50%. Is the average number of fat calories going up or going down? Is this consistent with the fact that over the same time frame (1971 to 2000) the prevalence of obesity in the United States increased
from 14.5% to 30.9%?

1.12 Create the following sequences:

1. "a" , "a" , "a" , "a", "a".
2. 1, 3, …, 99 (the odd numbers in [1, 100])
3. 1, 1, 1, 2, 2, 2, 3, 3, 3
4. 1, 1, 1, 2, 2, 3
5. 1, 2, 3, 4, 5, 4, 3, 2, 1

using :, seq(), or rep() as appropriate.

1.13 Store the following data sets into a variable any way you can:

1. 1, 2, 3, 5, 8, 13, 21, 34 (the Fibonacci series)
2. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 (positive integers)
3. 1/1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10 (reciprocals)
4. 1, 8, 27, 64, 125, 216 (the cubes)
5. 1964, 1965, …, 2003 (some years)
6. 14, 18, 23, 28, 34, 42, 50, 59, 66, 72, 79, 86, 96, 103, 110 (stops on New York's No. 9 subway)
7. 0, 25, 50, 75, 100, …, 975, 1000 (0 to 1000 by 25s)

Use c() only when : or seq() will not work.