## Learning outcomes: Chapters 1–3

- 1. You should know some of the basic operators in R: Multiply (e.g. 3\*8), powers (e.g. 2\*\*3), exponential (e.g. exp(3)), modulo (e.g. 5%%2) and assign (e.g. x=5)
- 2. You should be able to identify, and give examples of, some of the basic data "types" in R: e.g. "doubles", "logicals/booleans", "characters", "infinity" and "NA"
- 3. You should know how to create vectors in R using the concatenate function (e.g. x=c(3,1,2,7))
- 4. You should know how to use R to test for certain data types (e.g. is.double or is.character)
- 5. You should be familiar with the following useful R functions: length, rev, sort, sum, unique, seq, dim
- 6. You should know how to use R to extract elements from vectors (e.g. y=x[2:7])
- 7. You should know the basic relational operators in R: =, !=, >, <, <=, >=, &, |
- 8. Given some sample data, you should know how to find the mean, the median, the mode; and the range, inter-quartile range and standard deviation. You should also know that the mean and standard deviation can be distorted by outliers.
- 9. For the sample variance, you should be able to show that

$$\sum_{i=1}^{n} (x_i - \bar{x})^2 = \sum_{i=1}^{n} x_i^2 - n\bar{x}^2.$$

 You should know the basic R commands for finding summary statistics: mean, sd, var, quantile, range, summary