

## R PROGRAMMING and SIMULATION Day 1 EXERCISES

1. Give R assignment statements that set the variable `z` equal to each of the following expressions. Then test and evaluate each statement using the values `x = 123`, `a = 1.1`, and `b = 1.2`.
  - (a)  $x a^b$  ( $x$  raised to the power of  $a$  raised to the  $b^{\text{th}}$  power)
  - (b)  $(x a)^b$
  - (c)  $3x^3 + 2x^2 + 6x + 1$  (try to minimize the number of operations required)
  - (d) `z+1`
2. Give R expressions that return the following vectors and matrices. Use 'shortcut' functions and operators to create the vectors, try not to simply create each vector by combining the indicated values together with `c()`.
  - (a) (1,2,3,4,5,6,7,8,7,6,5,4,3,2,1)
  - (b) (1,2,2,3,3,3,4,4,4,4,5,5,5,5,5)
  - (c)  $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$
  - (d)  $\begin{pmatrix} 0 & 2 & 3 \\ 0 & 5 & 0 \\ 7 & 0 & 0 \end{pmatrix}$
3. Use R to produce a vector containing all integers from 1 to 100 that are not divisible by 2, 3, or 7.
4. Suppose that `queue <- c("Steve", "Russell", "Alison", "Liam")` and that `queue` represents a supermarket queue with Steve first in line. Use R to update that supermarket queue as successively representing the following events:
  - (a) Barry arrives.
  - (b) Steve is served.
  - (c) Pam talks her way to the front with one item.
  - (d) Barry gets impatient and leaves.
  - (e) Alison leaves. Do not assume where in the queue Alison is standing.
  - (f) Use the function `which()` to find the position of Russell in the queue.