# GETTING STARTED EXERCISES

Here is a collection of basic 'number-crunching' exercises that are typical of statistical tasks performed in R every day. Try to do them all in the accompanying exercise R script file (see exercise folder for session 1).

**(Normal percentiles).** The qnorm function returns the percentiles (quantiles) of a normal distribution. Use the qnorm function to find the $95^{th}$ percentile of the standard normal distribution. Then, use the qnorm function to find the quartiles of the standard normal distribution (the quartiles are the 25*th*, 50*th*, and 75*th* percentiles). Note that you can use c(.25, .5, .75) as the first argument to qnorm.

**(Chi-square density curve).** Use the curve function to display the graph of the $\chi 2(1)$ density. The chi-square density function is dchisq.

**(Gamma densities).** Use the curve function to display the graph of the gamma density with shape parameter 1 and rate parameter 1. Then use the curve function with add=TRUE to display the graphs of the gamma density with shape parameter *k* and rate 1 for k = 2, 3, all in the same graphics window. The gamma density function is dgamma. Consult the help file ?dgamma to see how to specify the parameters.

**(Binomial probabilities).** Let *X* be the number of "ones" obtained in 12 rolls of a fair die. Then *X* has a Binomial($n$ = 12,$p$ = 1/3) distribution. Compute a table of binomial probabilities for $x$=0,1, . . . ,12 by two methods:

a. Use the probability density formula

$$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$$

and vectorized arithmetic in R. Use 0:12 for the sequence of *x* values and the `choose()` function to compute the binomial coefficients (n over k)

b. Use the dbinom function provided in R and compare your results using both methods.

**(Binomial CDF).** Let *X* be the number of "ones" obtained in 12 rolls of a fair die. Then *X* has a Binomial($n$ = 12,$p$ = 1/3) distribution. Compute a table of cumulative binomial probabilities (the CDF) for $x$ = 0,1, . . . ,12 by two methods: (1) using cumsum and the result of the previous exercise, and (2) using the pbinom function. What is $P(X > 7)$?

**(Presidents' heights).** Refer to the data on the heights of the United States Presidents compared with their main opponent in the presidential election. Create a scatterplot of the loser's height versus the winner's height using the plot function.