1. Download R from the Comprehensive R Archive Network and install it on your computer. Use the `help` function to learn about the commands `plot`, `seq`, `par`, `lines`, `legend`, `rnorm`, `hist`, `paste`, `image`, `heatmap`, and `boxplot`. Why did we choose this list of functions for you to learn about?

2. Plot \( \sin(x) \) on the interval \( 0 \leq x \leq 3\pi \). Label the axes with something meaningful.

3. Plot both \( \sin(x) \) and \( \cos(x) \) for \( 0 \leq x \leq 3\pi \) on the same axes. Use colors or line styles to distinguish the two curves. Include a figure legend that explains how to tell which curve is which.

4. Generate a random normal vector containing 1000 elements.
   
   (a) Plot the data.
   
   (b) Plot the data after first sorting it in increasing order.

   (c) Plot a histogram of the data.

   (d) Plot a histogram of the data with 70 bars.

5. Generate two random normal vectors \( x \) and \( y \), each containing 100 elements.

   (a) Compute the correlation coefficient between \( x \) and \( y \).

   (b) Plot \( y \) as a function of \( x \), and add the correlation coefficient to the plot (as a legend, a label, or a text string).

   (c) Perform a \( t \)-test comparing \( x \) and \( y \). What are the \( t \)-statistic and the \( p \)-value?

   (d) Let \( z = y + 1 \). Repeat parts (a) and (c) using \( z \) instead of \( y \).

   (e) Let \( z = y + k \) for a constant \( k \) of your choice. Repeat parts (a) and (c) using \( z \) instead of \( y \). How large should you choose \( k \) to ensure that the \( p \)-value is smaller than 0.05?

   (f) Repeat part (e) when \( x \) and \( y \) contain only 25 elements.

6. Generate a random normal matrix with 100 rows and 50 columns.

   (a) Draw an image of the matrix. Change the axes so they indicate the correct row and column numbers.

   (b) Experiment with the color options and redraw the image using a non-default color map.

   (c) Draw a heatmap of the matrix.

   (d) Convert the matrix into a data.frame, and draw a boxplot of the data.frame.

7. Read the R help documentation on `library`, which explains how to use the extra tools available in R libraries. Load the `lattice` package and work through the examples in the help page for `wireframe` and `cloud`.