STAT 540: Homework 1

1. Create a regularly-spaced sequence of 11 values from 0 to $\pi$ using first `length`, and then by. R has a function for $\pi$ named, curiously enough, `pi`; use that rather than a numerical approximation.

2. Load the data set `airquality`. What type of object is it? Does it have default names/row names? Identify each of the variables in `airquality`; what types of objects are they? Create a data frame consisting of the last 3 variables in `airquality` (Graduate students should do this by excluding variables rather than including variables). Attach to the data frame, and display the 11th component for the third variable; now detach the data frame and display the 11th component again (`Do not use the matrix notation [11,3] to display the component`).

3. For each part below, give a single R command to complete the goal. Do not use `c()`.
   
   (a) Create a vector called `seqvec` that repeats the sequence 1 through 6 five times. (Grad students: work with the sequence 1, 3, 6, 10, 15, 21 instead)
   
   (b) Create a 5-row, 6-column matrix from `seqvec`; each row should contain the sequence `seqvec`.
   
   (c) Complete the two tasks above in a single step.

4. The Fire Response data on the website simulates the response time (in minutes) for tractor units to reach fires on non-federal lands in South Carolina. The districts are row names. The variables include the readiness level of each district (1=low, 2=medium, 3=high), the elapsed time to contact the dispatch office, the elapsed time for the dispatcher to contact a tractor unit, and the elapsed time for a tractor unit to reach the scene of a fire. Graduate students should use the Fire Response Grad data set.
   
   (a) Read in the data set as a data frame; you may need `row.names=NA` to read it in. (Grad students–make sure to read in both . and NA as missing value codes using `na.strings`)
   
   (b) Change the name of the District column so that it reads correctly as “District”.
   
   (c) Extract rows 4, 11, 12, and 15—the rows for the Midlands and save them in a data frame called Midlands (We’ll soon learn a more efficient way of doing this). Display the new data frame.