Exercise 5

Exercise 5: Basic programming in R (optional)

Read Chapter 7 to help you complete the questions in this exercise.

1. Create a function to calculate the area of a circle. Test the function by finding the area of a circle with a diameter of 3.4 cm. Can you use it on a vector of data?

2. Write a function to convert farenheit to centegrade (oC = (oF - 32) x 5/9). Get your function to print out your result in the following format: "Farenheit : *value of oF* is equivalent to *value oC* centigrade."

3. Create a vector of normally distributed data, of length 100, mean 35 and standard deviation of 15. Write a function to calculate the mean, median, and range of the vector, print these values out with appropriate labels. Also get the function to plot a histogram (as a proportion) of the values and add a density curve.

4. Write a function to calculate the median value of a vector of numbers (yes I know there's a `median()` function already but this is fun!). Be careful with vectors of an even sample size, as you will have to take the average of the two central numbers (hint: use modulo %%2 to determine whether the vector is an odd or an even size). Test your function on vectors with both odd and even sample sizes.

5. You are a population ecologist for the day and wish to investigate the properties of the Ricker model. The Ricker model is defined as:

$$N_{t+1} = N_t exp\left[r\left(1 - \frac{N_t}{K}\right)\right]$$

5. (cont) Where N_t is the population size at time t, r is the population growth rate and K is the carrying capacity. Write a function to simulate this model so you can conveniently determine the effect of changing r and the initial population size N0. K is often set to 100 by default, but you want the option of being able to change this with your function. So, you will need a function with the following arguments; nzero which sets the initial population size, r which will determine the population growth rate, time which sets how long the simulation will run for and K which we will initially set to 100 by default.

End of Exercise 5