Mini-Assignment 1: An Introduction to R

Myles D. Garvey, Ph.D

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1. In the classic Newsvendor Model, the cost function of ordering Q units with a given demand of D units is defined as $G(Q, D) = (p - c)\max(D - Q, 0) + c\max(Q - D, 0)$. Create a function in R that will compute this cost with inputs of D, Q, p, c.

2. Use the previous function in a for loop that iterates from 1 to 100, with $p = 5$ and $c = 3$, as well as $D = 50$. Store the result in a vector (HINT: you can append values at the end of a vector by providing the vector name as the first input into the `c` function and the second input as the value you want to append. For example, suppose you want to append the number 5 to the vector `x<-c(1,4,2,4)`, then you would just do $x < -c(x, 5)$, which will result in a vector of 1 4 2 4 5).

3. Technically speaking, the newsvendor model is based on the expected value of the function you defined above. That is, we usually try to find a Q such that the function $C(Q) = E[(p - c)\max(D - Q, 0) + c\max(Q - D, 0)] = E[G(Q, D)]$ is minimized. In order to approximate the expected value of this function $G(Q, D)$, we can sample points for D based on how the random variable D is distributed. One we have sampled points, we can plug these into the equation $G(Q, D)$ for a given Q and simply use the `mean` function to find the mean. Create a function in R that will compute $C(Q) = E[(p - c)\max(D - Q, 0) + c\max(Q - D, 0)] = E[G(Q, D)]$.