Homework 5

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1. Previously we created this data frame:

temp <- c(35, 88, 42, 84, 81, 30) city <- c(“Beijing”, “Lagos”, “Paris”, “Rio de Janeiro”, “San Juan”, “Toronto”) city\_temps <- data.frame(name=city, temperature=temp)

Remake the data frame using the code above, but add a line that converts the temperature from fahrenheit to celsius. The conversion is C = 5/9 \* (F-32)

temp <- c(35, 88, 42, 84, 81, 30)  
city <- c("Beijing", "Lagos", "Paris", "Rio de Janeiro", "San Juan", "Toronto")  
newtemp <- 5/9\*(temp-32)  
city\_temps <- data.frame(name=city, temperature=newtemp)  
city\_temps

## name temperature  
## 1 Beijing 1.666667  
## 2 Lagos 31.111111  
## 3 Paris 5.555556  
## 4 Rio de Janeiro 28.888889  
## 5 San Juan 27.222222  
## 6 Toronto -1.111111

1. What is the following sum 1 + 1/2^2 + 1/3^3 + …+ 1/100^2? Hint: thanks to Euler, we know it should be close to pi^2/6

n <- 1:100  
q <- 1/n^2  
sum(q)

## [1] 1.634984

1. Compute the per 100,000 murder rate for each state and store it in the object murder\_rate. Then compute the average murder rate for the US using the function mean. What is the average?

library(dslabs)

## Warning: package 'dslabs' was built under R version 4.0.5

data(murders)  
str(murders)

## 'data.frame': 51 obs. of 5 variables:  
## $ state : chr "Alabama" "Alaska" "Arizona" "Arkansas" ...  
## $ abb : chr "AL" "AK" "AZ" "AR" ...  
## $ region : Factor w/ 4 levels "Northeast","South",..: 2 4 4 2 4 4 1 2 2 2 ...  
## $ population: num 4779736 710231 6392017 2915918 37253956 ...  
## $ total : num 135 19 232 93 1257 ...

murders$total/100000

## [1] 0.00135 0.00019 0.00232 0.00093 0.01257 0.00065 0.00097 0.00038 0.00099  
## [10] 0.00669 0.00376 0.00007 0.00012 0.00364 0.00142 0.00021 0.00063 0.00116  
## [19] 0.00351 0.00011 0.00293 0.00118 0.00413 0.00053 0.00120 0.00321 0.00012  
## [28] 0.00032 0.00084 0.00005 0.00246 0.00067 0.00517 0.00286 0.00004 0.00310  
## [37] 0.00111 0.00036 0.00457 0.00016 0.00207 0.00008 0.00219 0.00805 0.00022  
## [46] 0.00002 0.00250 0.00093 0.00027 0.00097 0.00005

murder\_rate <- murders$total/murders$population\*100000  
mean(murder\_rate)

## [1] 2.779125