# Hw2

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```
x_list <- seq(from=-100, to=100, by=0.1)

integrand <- function(x) {exp(-abs(x))}
integ <- function(x){
  integrate(integrand, lower = -x, upper = x^2)$value
}

#for
start_time1 <- Sys.time()

sum_integ <- 0
for(x in x_list){
  sum_integ <- sum_integ + integ(x)
}

end_time1 <- Sys.time()
elapsed_time1 <- as.numeric(difftime(time1=end_time1,
                                     time2=start_time1,
                                     units = "secs"))
cat("elapsed time using for loop : ",sprintf("%.3f",elapsed_time1),"sec",sep="")
```

```
## elapsed time using for loop : 0.160sec
```

```
#sapply
start_time2 <- Sys.time()

sum(sapply(x_list, integ))
```

```
## [1] 1341.272
```

```
end_time2 <- Sys.time()
elapsed_time2 <- as.numeric(difftime(time1=end_time2,
                                     time2=start_time2,
                                     units = "secs"))
cat("elapsed time using sapply : ",sprintf("%.3f",elapsed_time2),"sec",sep="")
```

```
## elapsed time using sapply : 0.097sec
```

Above are two ways to measure the time for calculating sum of integrals of given function 'integrand'. The elapsed time using for loop is longer than the elapsed time using sapply function.