

Stat135HW6

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```
data <- read.table(file = "/Users/Leomart/Desktop/Stat135/beeswax.txt",header = TRUE, sep = ",")
hydrocarbons = data$Hydrocarbon
mean(hydrocarbons)
```

```
## [1] 14.58
```

```
sd(hydrocarbons)
```

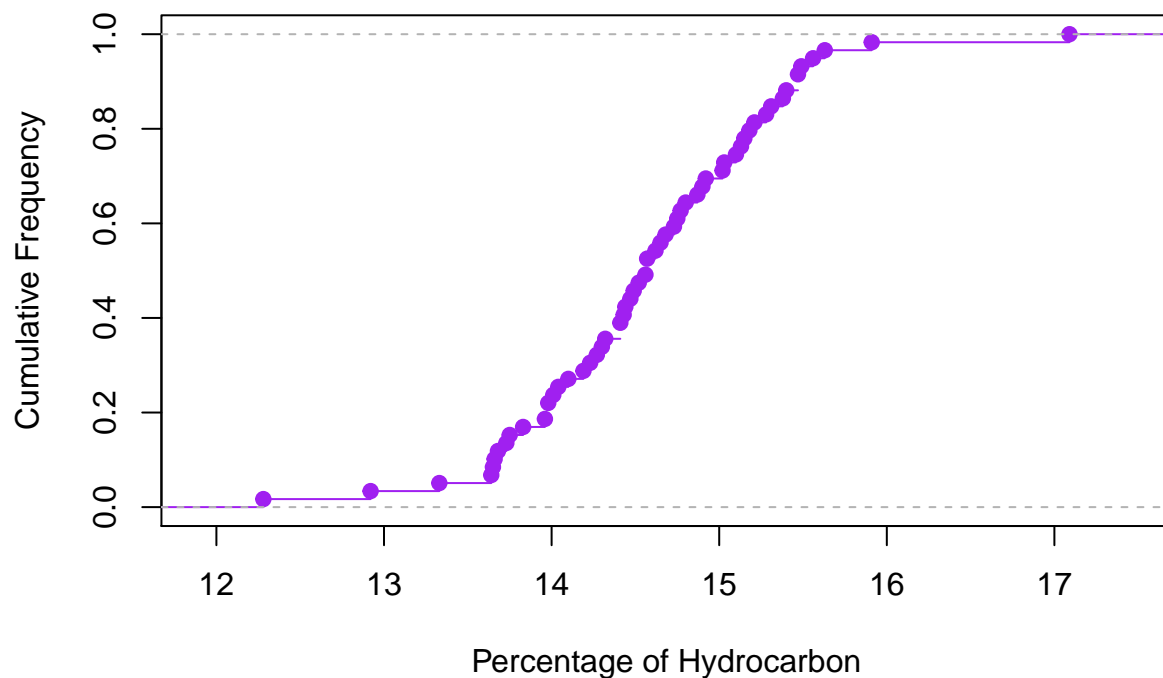
```
## [1] 0.7764197
```

```
# ECDF of Percentage of Hydrocarbon
```

```
ecdf_function = ecdf(hydrocarbons)
```

```
plot(ecdf_function, ylab = 'Cumulative Frequency', xlab = 'Percentage of Hydrocarbon', main = 'The ECDF
```

The ECDF of Percentages of Hydrocarbons



```
quantile(ecdf_function, prob = c(.90, .75, .50, .25, .10))
```

```
##      90%      75%      50%      25%      10%
## 15.470 15.115 14.570 14.070 13.676
```

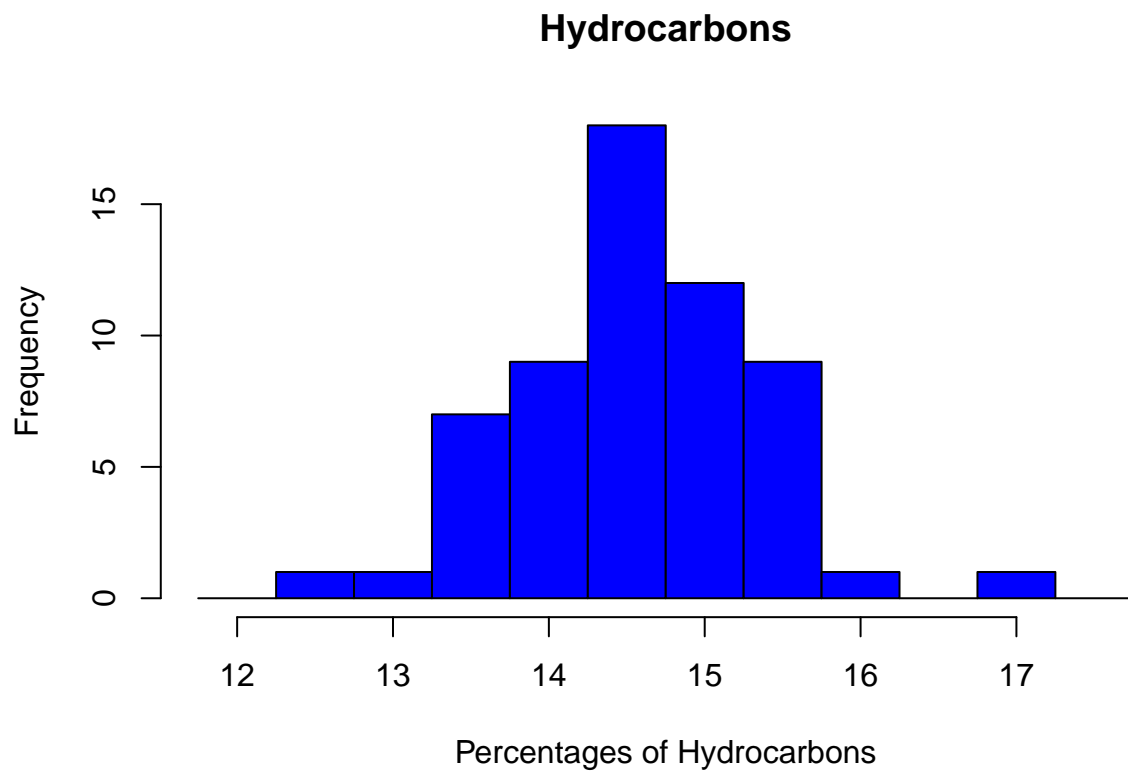
```
breaks = c()
```

```
for (i in 0:12){
```

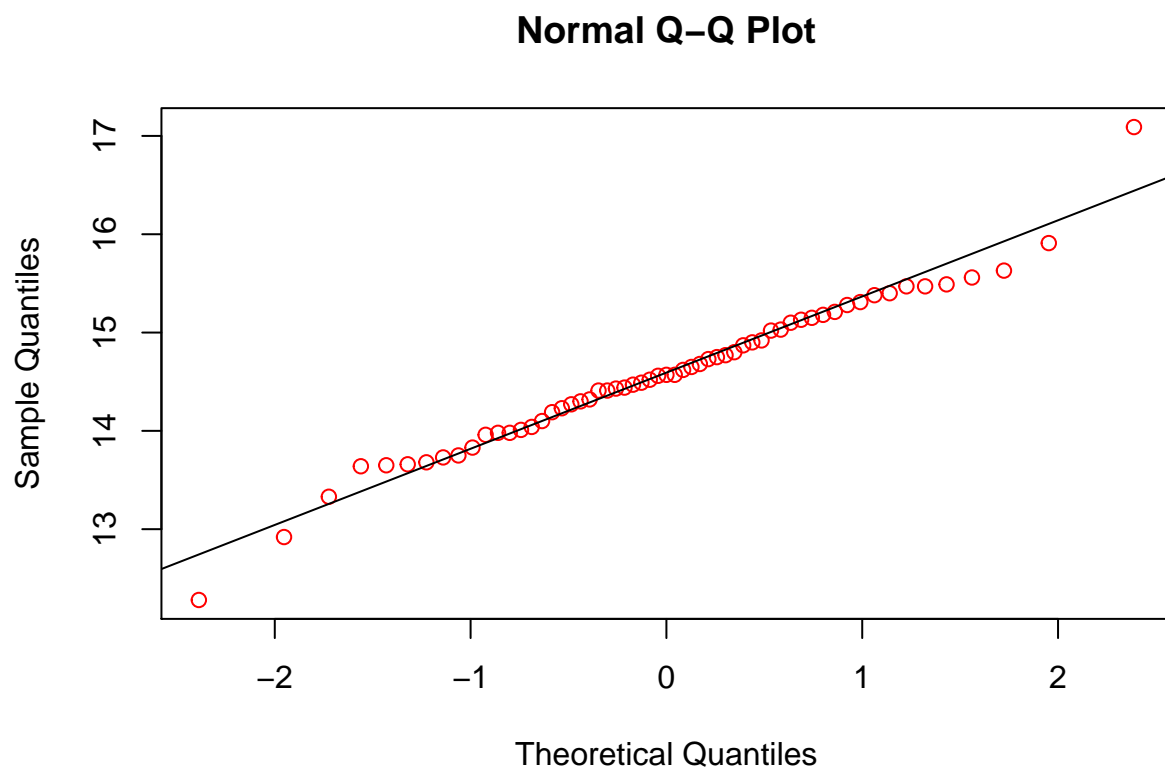
```
  breaks = c(breaks, 11.75 + 0.5*i)
```

```
}
```

```
hist(hydrocarbons, col = 'blue', main = 'Hydrocarbons', xlab = 'Percentages of Hydrocarbons', breaks = breaks)
```

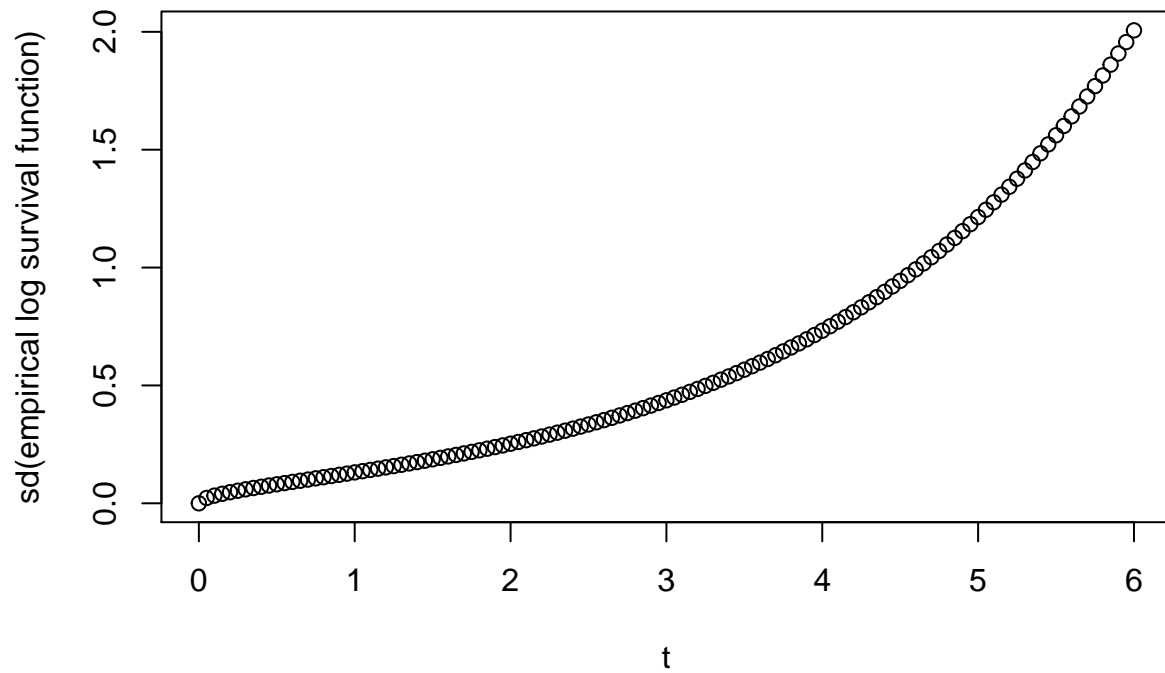


```
qqnorm(hydrocarbons, col = 'red')
qqline(hydrocarbons)
```

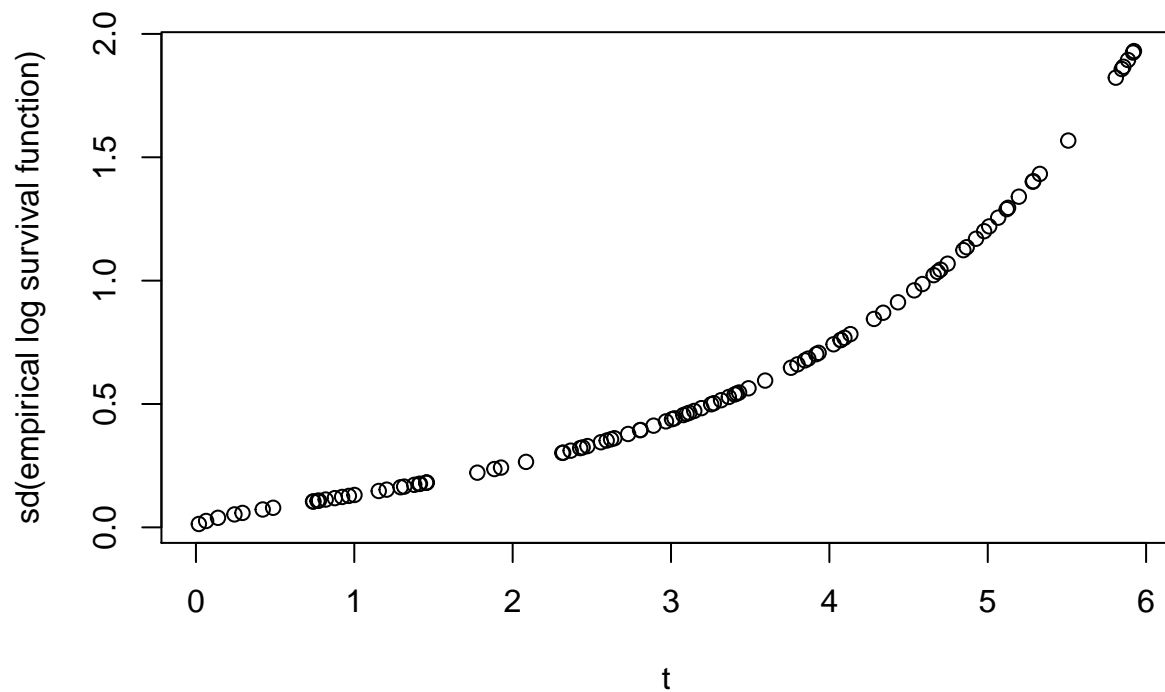


```
#8a
x = seq(0,6, by = 0.05)
```

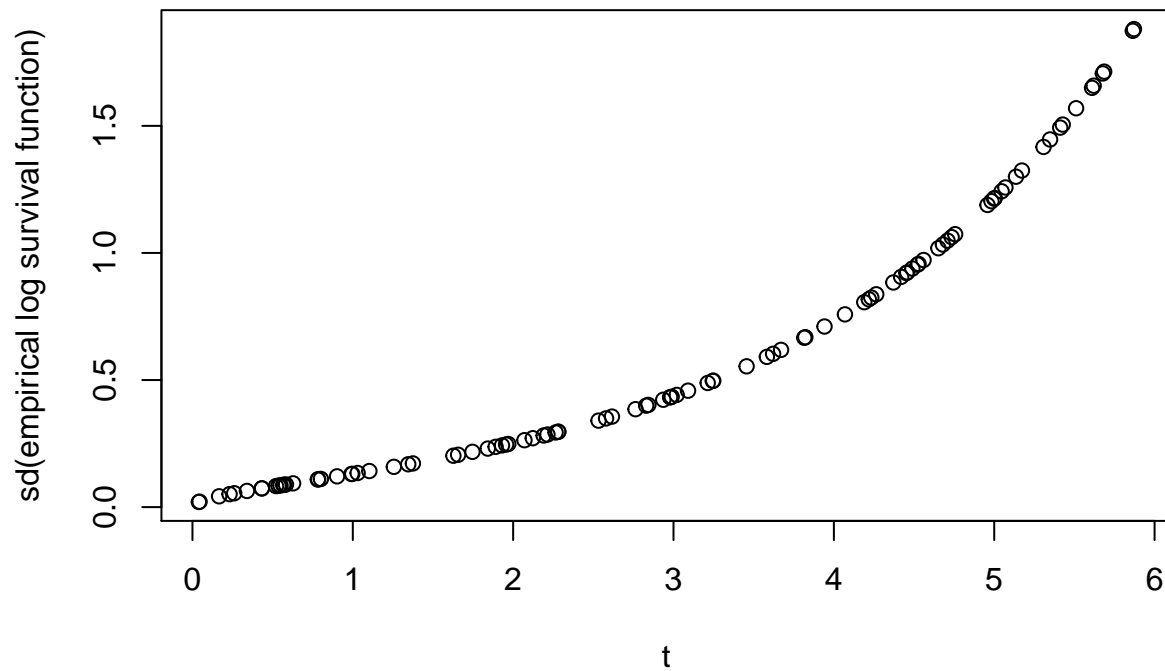
```
exp_Fn = pexp(x)
sd = sqrt((1/100) * (exp_Fn / (1 - exp_Fn)))
plot(x, sort(sd), ylab = "sd(empirical log survival function)", xlab = 't')
```



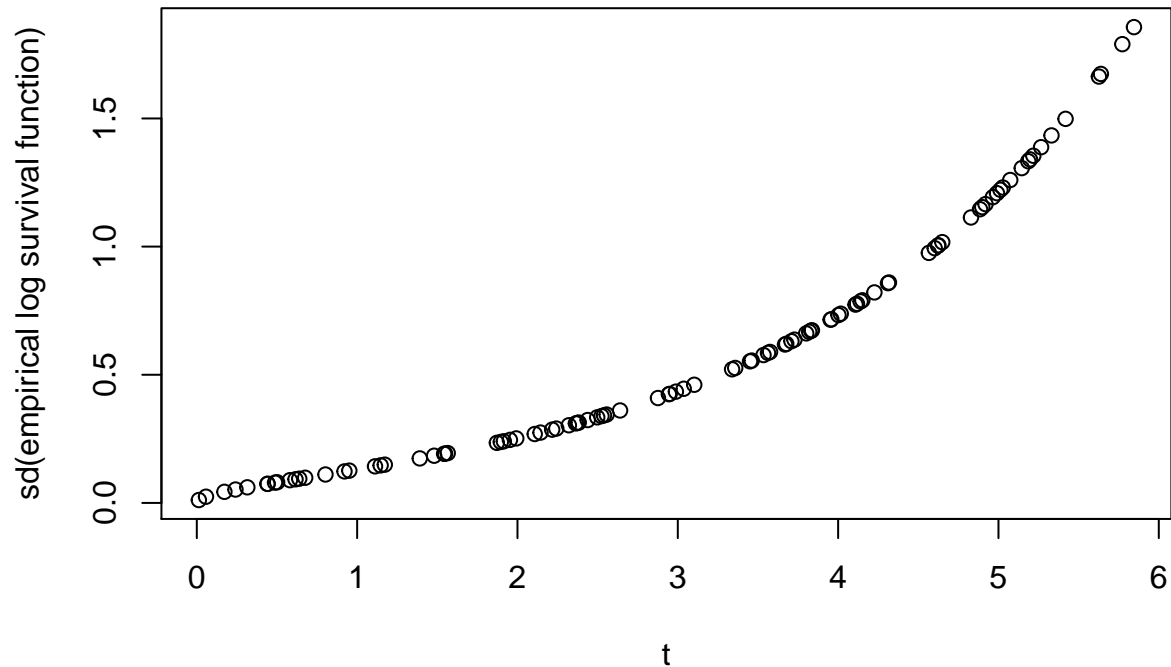
```
# 8b
sd_log = function(t){
  sqrt((exp(t)-1)/100)
}
t1 = runif(100, 0, 6)
plot(t1, sd_log(t1), xlab = 't', ylab = "sd(empirical log survival function)")
```



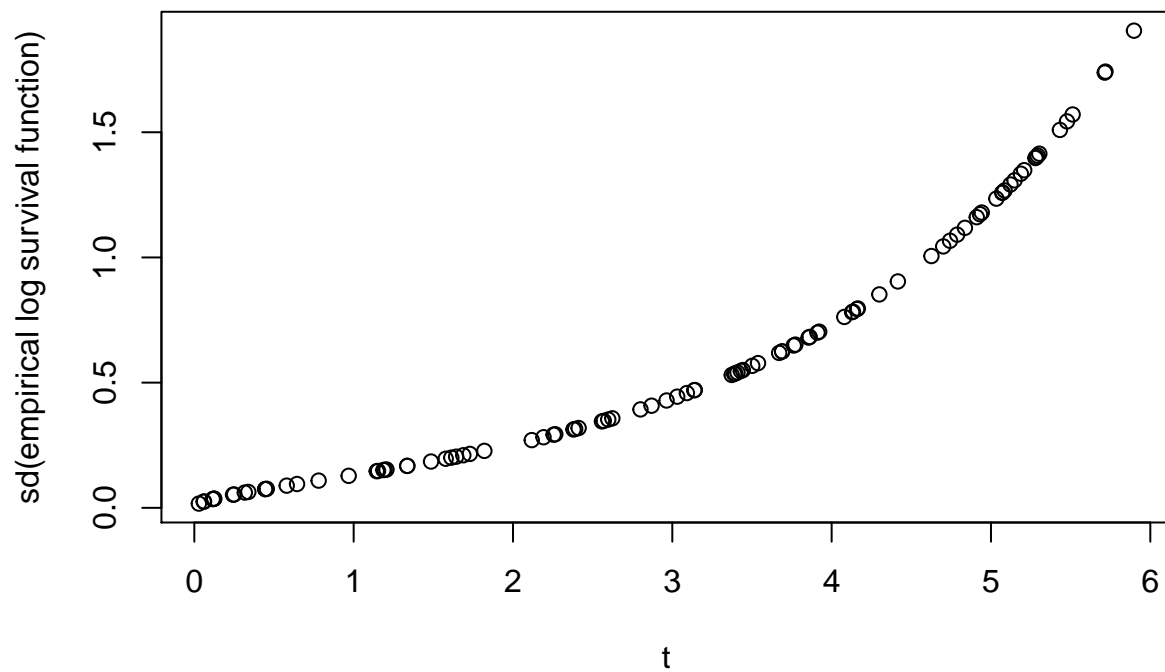
```
t2 = runif(100, 0, 6)
plot(t2, sd_log(t2), xlab = 't', ylab = "sd(empirical log survival function)")
```



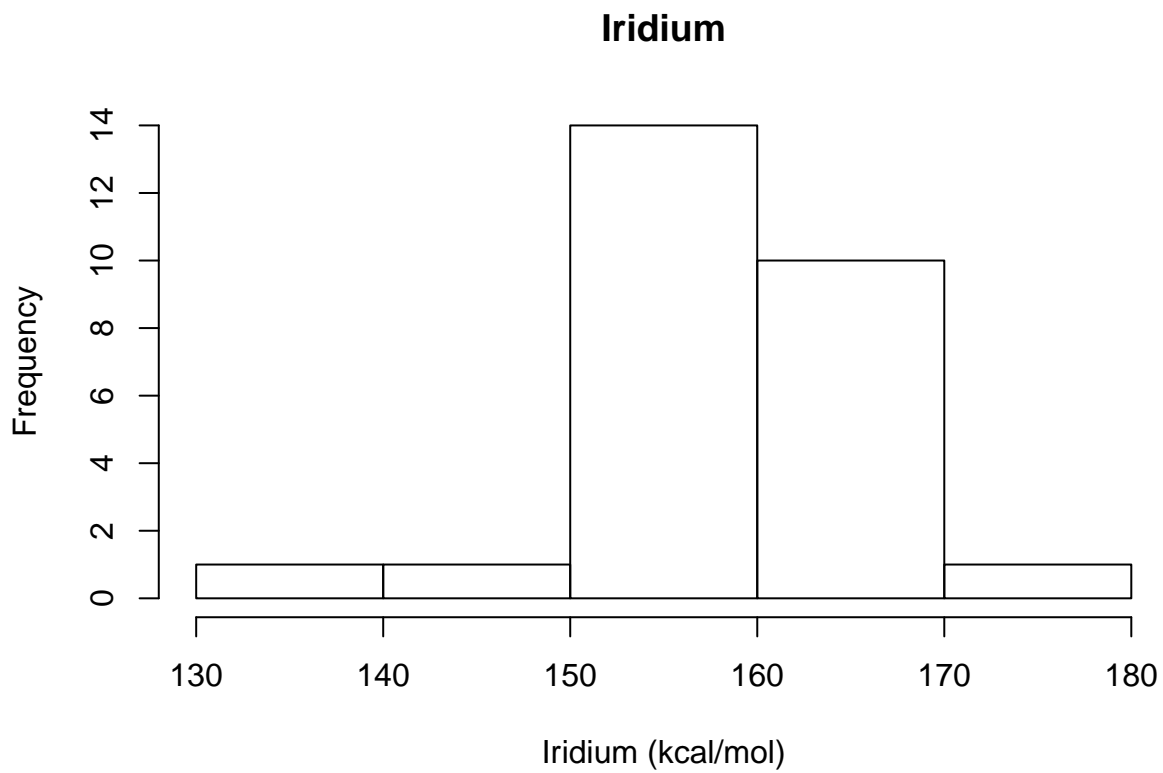
```
t3 = runif(100, 0, 6)
plot(t3, sd_log(t3), xlab = 't', ylab = "sd(empirical log survival function)")
```



```
t4 = runif(100, 0, 6)
plot(t4, sd_log(t4), xlab = 't', ylab = "sd(empirical log survival function)")
```



```
# 26
# Iridium
iridium <- read.table("/Users/Leomart/Desktop/Stat135/iridium.txt", header = FALSE)$V1
hist(iridium, xlab = "Iridium (kcal/mol)", main = "Iridium", breaks = 5)
```

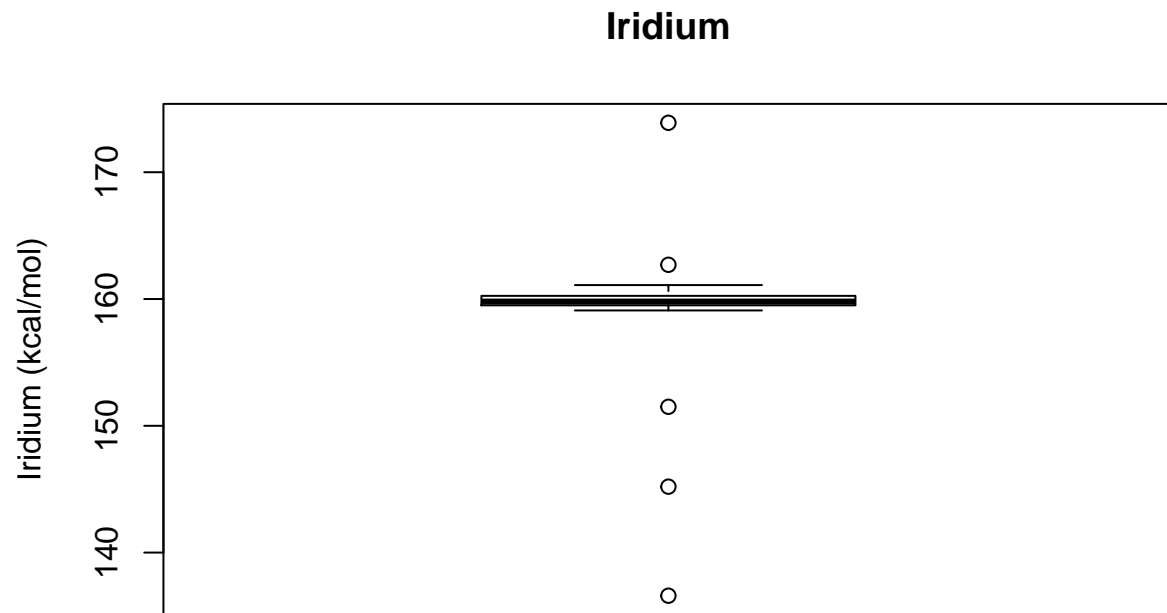


```
stem(iridium)

##
## The decimal point is 1 digit(s) to the right of the |
```

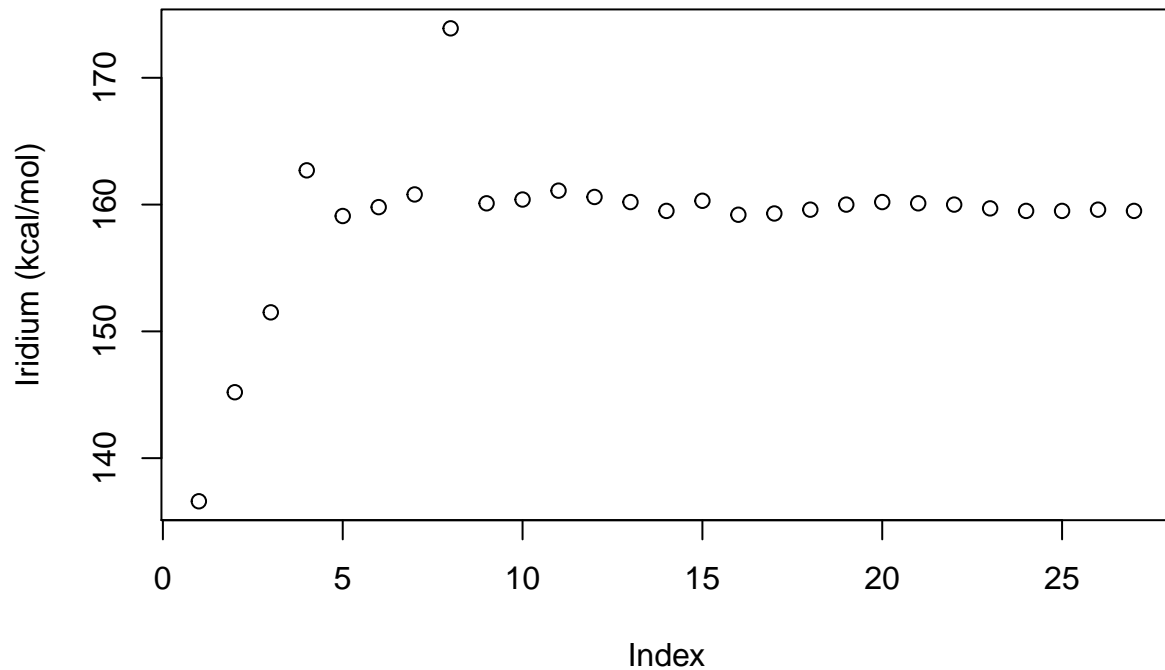
```
##
## 13 | 7
## 14 |
## 14 | 5
## 15 | 2
## 15 | 999
## 16 | 000000000000000001113
## 16 |
## 17 | 4
```

```
boxplot(iridium, ylab = "Iridium (kcal/mol)", main = "Iridium")
```



```
plot(iridium, ylab = "Iridium (kcal/mol)", main = "Iridium")
```

Iridium



```
mean(iridium)
```

```
## [1] 158.8148
```

```
sd(iridium)
```

```
## [1] 6.224561
```

```
median(iridium)
```

```
## [1] 159.8
```

```
sort_iridium = sort(iridium)
```

```
ten_percent_iridium = sort_iridium[2:26]
```

```
mean(ten_percent_iridium)
```

```
## [1] 159.1
```

```
median(ten_percent_iridium)
```

```
## [1] 159.8
```

```
twenty_percent_iridium = sort_iridium[5:23]
```

```
mean(twenty_percent_iridium)
```

```
## [1] 159.8474
```

```
median(twenty_percent_iridium)
```

```
## [1] 159.8
```

```
# i
```

```
iridium_means_10= c()
```

```
for (i in 0:1000){
```

```

mysample = sample(iridium, 27, replace = TRUE)
new_mean = mean(mysample[2:26])
iridium_means_10= c(iridium_means_10, new_mean)
}
mean(iridium_means_10)

## [1] 158.8372

sd(iridium_means_10)

## [1] 1.242516

iridium_means_20 = c()
for (i in 0:1000){
  mysample = sample(iridium, 27, replace = TRUE)
  new_mean = mean(mysample[5:23])
  iridium_means_20= c(iridium_means_20, new_mean)
}
mean(iridium_means_20)

## [1] 158.8507

sd(iridium_means_20)

## [1] 1.377859

# j
iridium_median= c()
for (i in 0:1000){
  mysample = sample(iridium, 27, replace = TRUE)
  new_median = median(mysample)
  iridium_median = c(iridium_median, new_median)
}
mean(iridium_median)

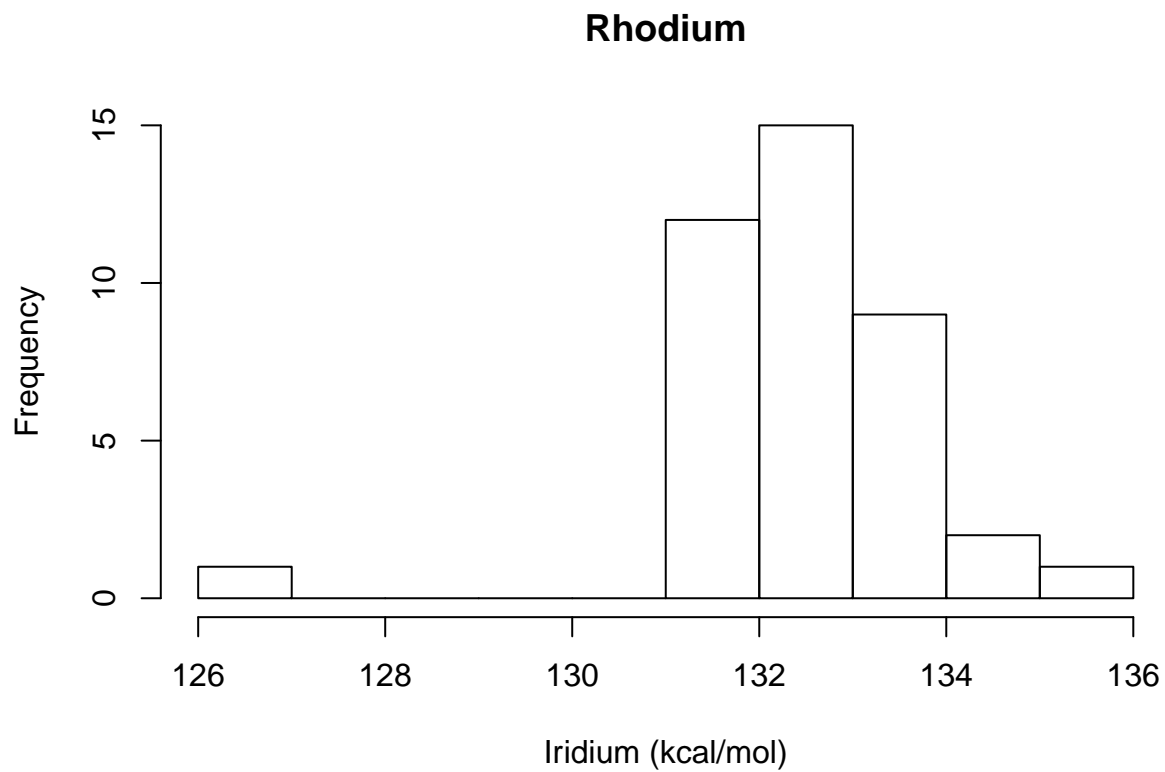
## [1] 159.8291

sd(iridium_median)

## [1] 0.2098667

# 26
# Rhodium
rhodium <- read.table("/Users/Leomart/Desktop/Stat135/rhodium.txt", header = FALSE )$V1
hist(rhodium, xlab = "Iridium (kcal/mol)", main = "Rhodium")

```

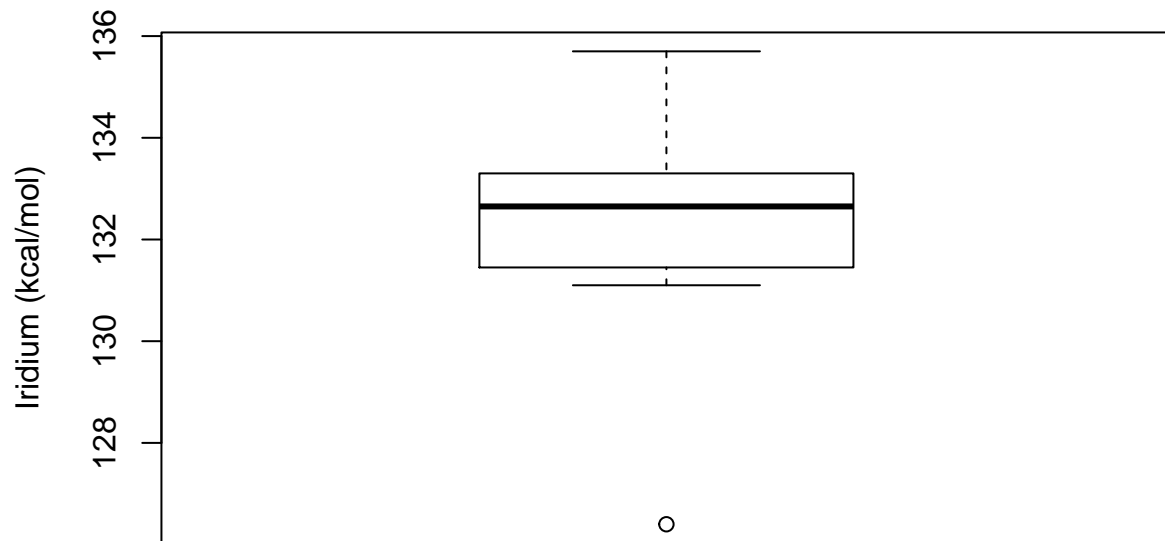



```
stem(rhodium)
```

```
##
## The decimal point is at the |
##
## 126 | 4
## 127 |
## 128 |
## 129 |
## 130 |
## 131 | 111112234569
## 132 | 123456677899
## 133 | 000333455558
## 134 | 12
## 135 | 7
```

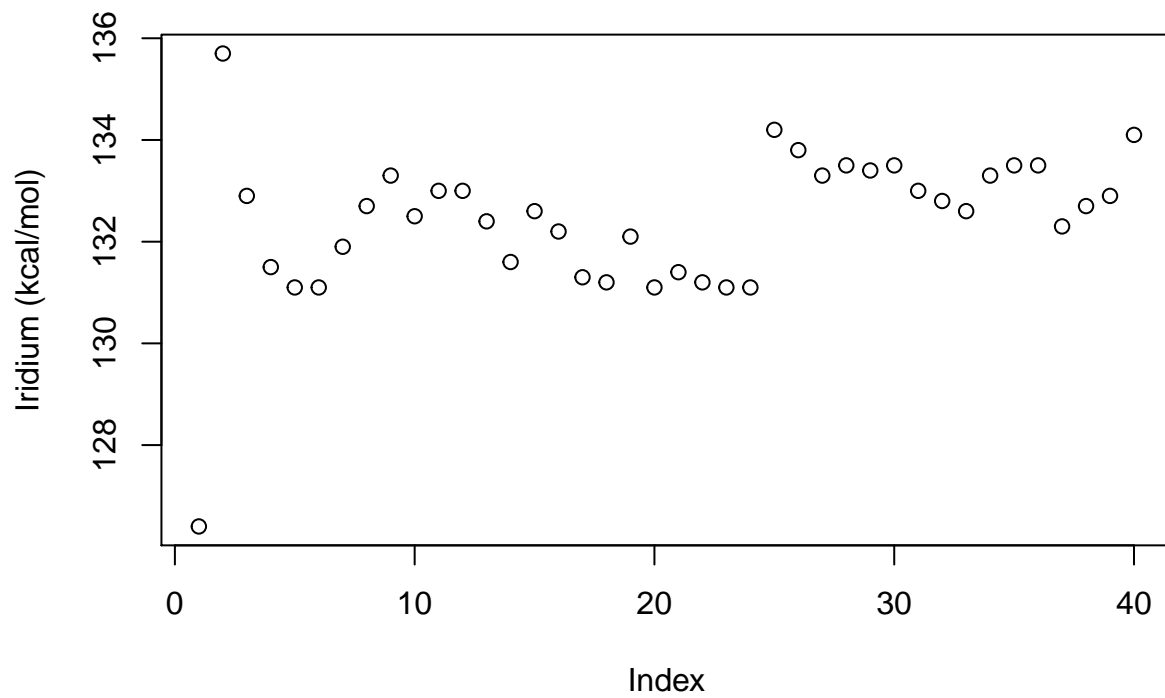
```
boxplot(rhodium, ylab = "Iridium (kcal/mol)", main = "Rhodium")
```

Rhodium



```
plot(rhodium, ylab = "Iridium (kcal/mol)", main = "Rhodium")
```

Rhodium



```
mean(rhodium)
```

```
## [1] 132.42
```

```
sd(rhodium)
```

```
## [1] 1.437805
```

```
median(rhodium)
```

```

## [1] 132.65
sort_rhodium = sort(rhodium)
ten_percent_rhodium = sort_rhodium[4:37]

mean(ten_percent_rhodium)

## [1] 132.4765
median(ten_percent_rhodium)

## [1] 132.65
twenty_percent_rhodium = sort_rhodium[8:33]
mean(twenty_percent_rhodium)

## [1] 132.5154
median(twenty_percent_rhodium)

## [1] 132.65
# i
rhodium_means_10= c()
for (i in 0:1000){
  mysample = sample(rhodium, 40, replace = TRUE)
  new_mean = mean(mysample[4:37])
  rhodium_means_10= c(rhodium_means_10, new_mean)
}
mean(rhodium_means_10)

## [1] 132.4213
sd(rhodium_means_10)

## [1] 0.2496104
rhodium_means_20 = c()
for (i in 0:1000){
  mysample = sample(rhodium, 40, replace = TRUE)
  new_mean = mean(mysample[8:33])
  rhodium_means_20= c(rhodium_means_20, new_mean)
}
mean(rhodium_means_20)

## [1] 132.4313
sd(rhodium_means_20)

## [1] 0.2743162
# j
rhodium_median= c()
for (i in 0:1000){
  mysample = sample(rhodium, 40, replace = TRUE)
  new_median = median(mysample)
  rhodium_median = c(rhodium_median, new_median)
}
mean(rhodium_median)

## [1] 132.6362

```

```
sd(rhodium_median)
```

```
## [1] 0.2204334
```