Worksheet 6

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Problem 16

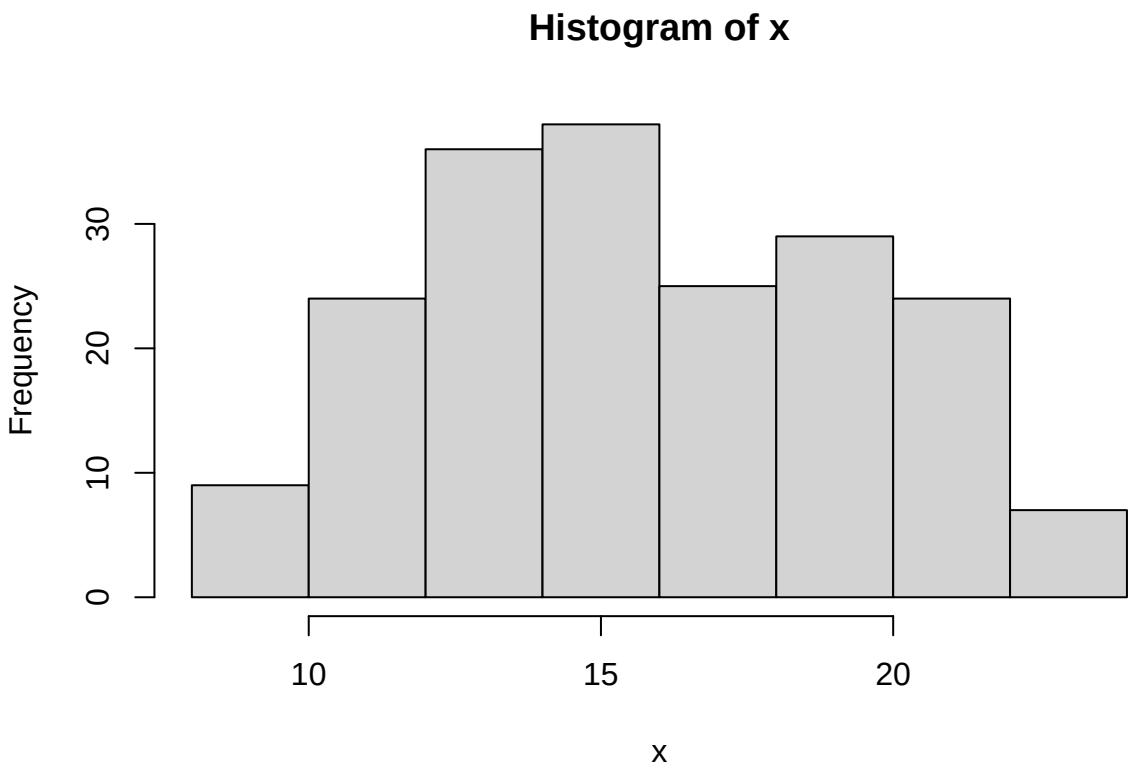
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
library(readr)
zurichtemp <- read_csv("http://user.math.uzh.ch/furrer/download/sta402mat924/zurichtemp.csv")
```

```
## Parsed with column specification:
## cols(
##   Year = col_double(),
##   Month = col_double(),
##   Day = col_double(),
##   Hour = col_double(),
##   Minute = col_double(),
##   Temperature = col_double()
## )
```

```
x <- zurichtemp$Temperature
hist(x)
```



Including Plots

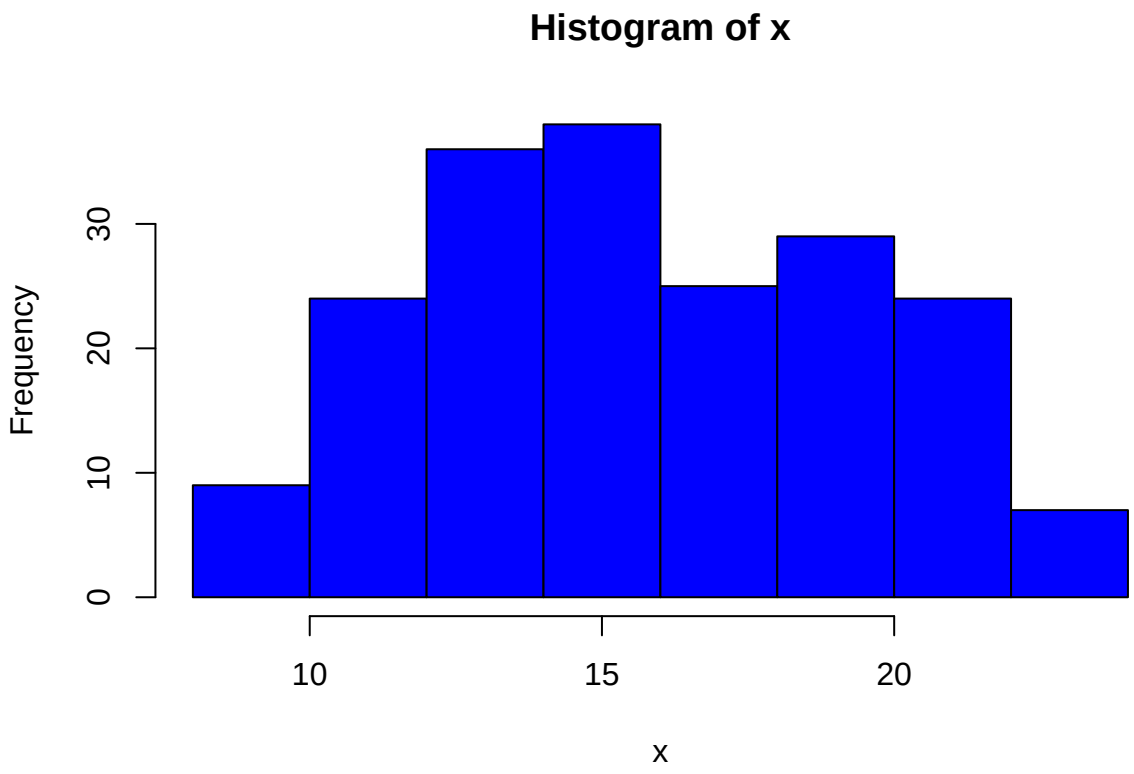
You can also embed plots, for example:

```
par_mu <- seq(-20, 20, length.out = 10000)
par_sd <- par_mu^2
likelihood <- numeric(length(par_mu))
start_par<- 15
my_likelihood <- function(par_mu) {
  sum(dnorm(x, mean = par_mu, sd = par_sd, log = TRUE))
}
opt <-optim(start_par, function(par_mu) {sum(dnorm(x, mean = par_mu, sd = par_sd, log = TRUE))},
            control = list(fnscale = -1), method = "BFGS",
            hessian = TRUE)
opt$par
```

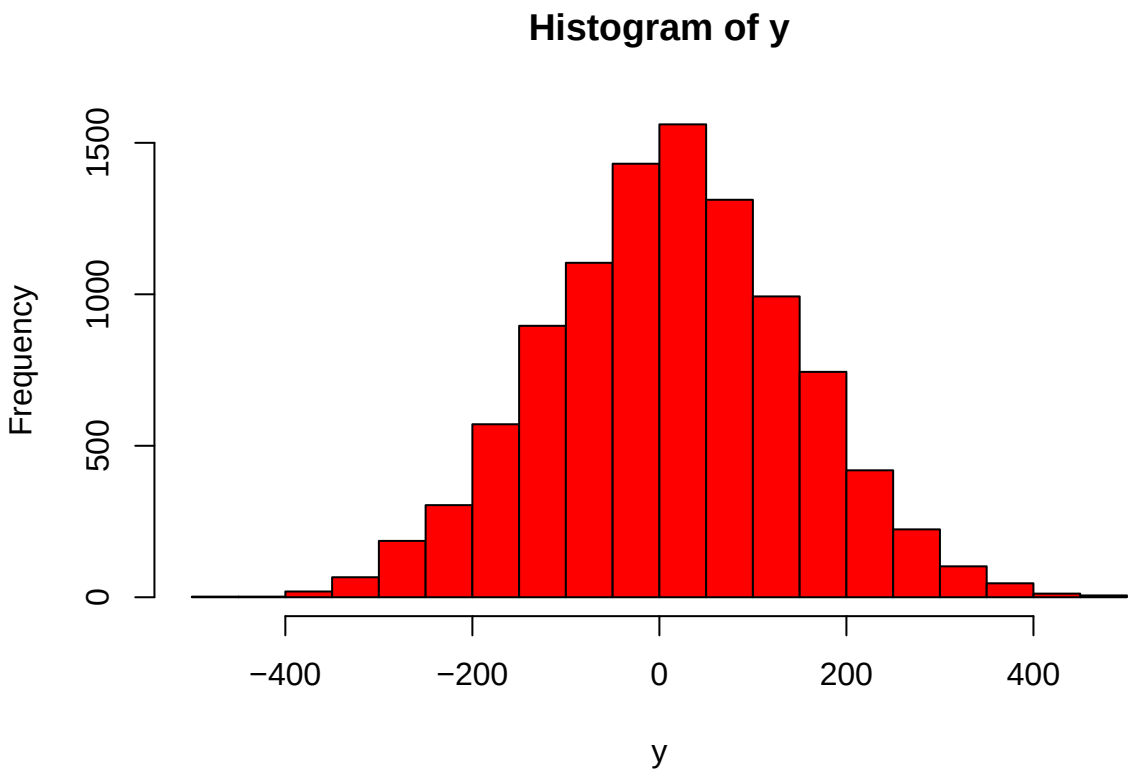
```
## [1] 11.60666
```

For some reason, it outputs value of 11.61, which can't be correct, but I don't see where is my mistake.

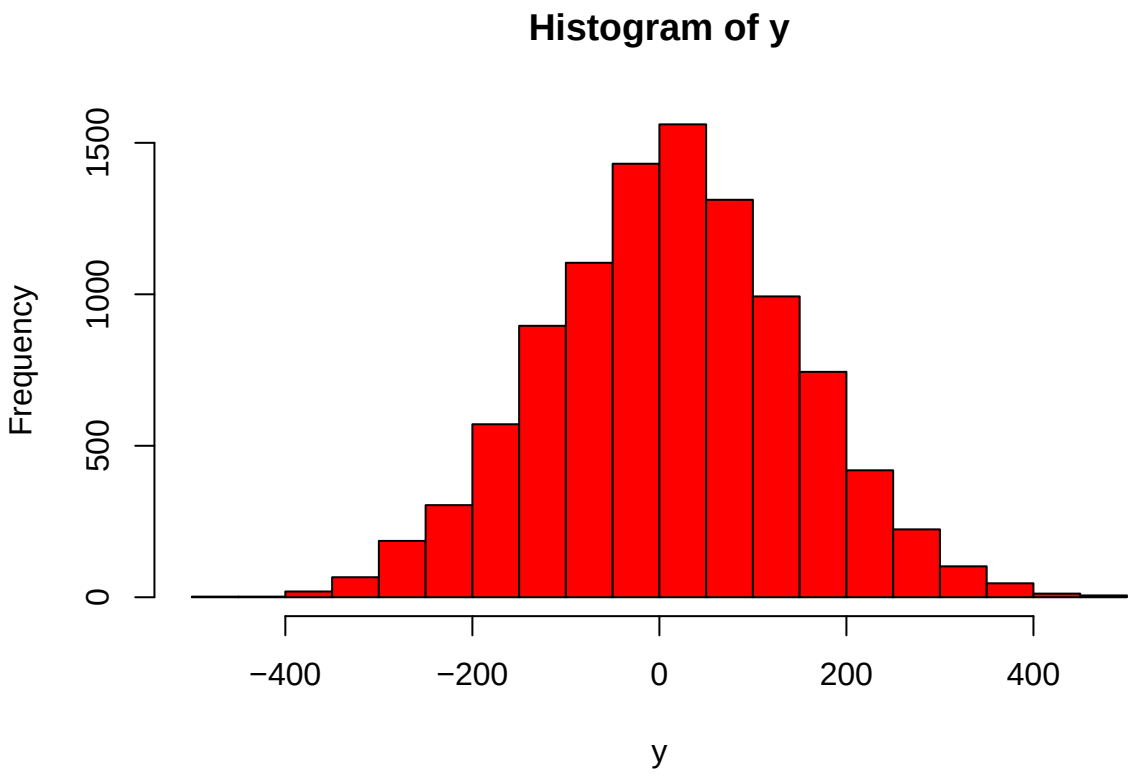
```
y <- rnorm(seq(0,100, length = 10000), opt$par, (opt$par)^2)
hy <- hist(y, plot = FALSE)
hx <- hist(x, plot = FALSE)
plot(hx, col = "blue")
```




```
plot(hy, col = "red")
```

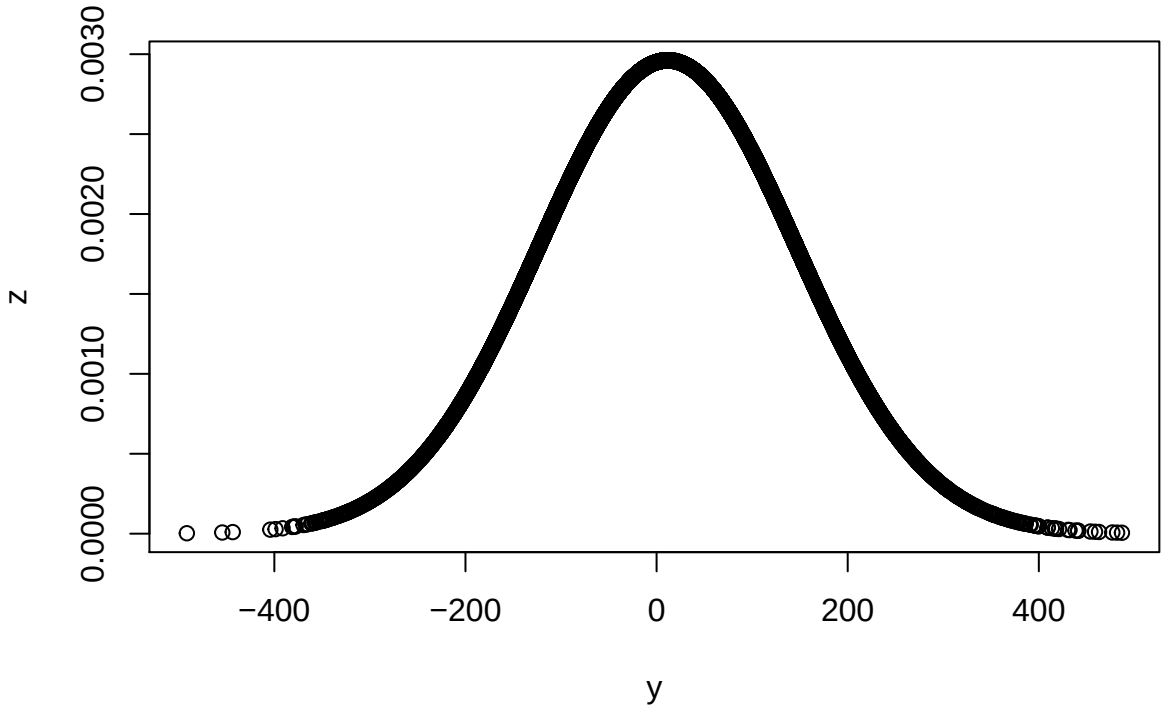



```
plot(hy, col = "red")
```

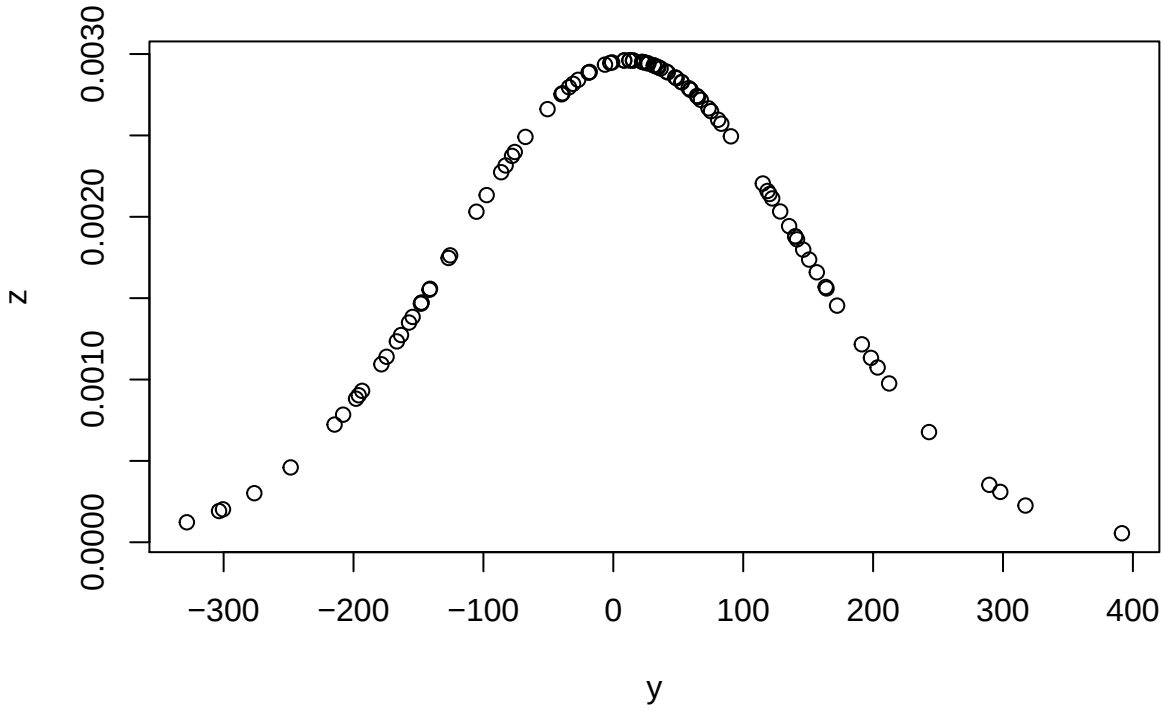



```
z<- dnorm(y, mean=11.60666, sd=134.715)
plot(y,z, add = TRUE)
```

```
## Warning in plot.window(...): "add" is not a graphical parameter

## Warning in plot.xy(xy, type, ...): "add" is not a graphical parameter

## Warning in axis(side = side, at = at, labels = labels, ...): "add" is not a
## graphical parameter

## Warning in axis(side = side, at = at, labels = labels, ...): "add" is not a
## graphical parameter

## Warning in box(...): "add" is not a graphical parameter

## Warning in title(...): "add" is not a graphical parameter
```




```
y <- rnorm(seq(0,100, length = 100), opt$par, (opt$par)^2)
z<- dnorm(y, mean=11.60666, sd=134.715)
plot(y,z)
```



d) Should be that the higher the n in c is, the smaller is the derivation at l(theta).