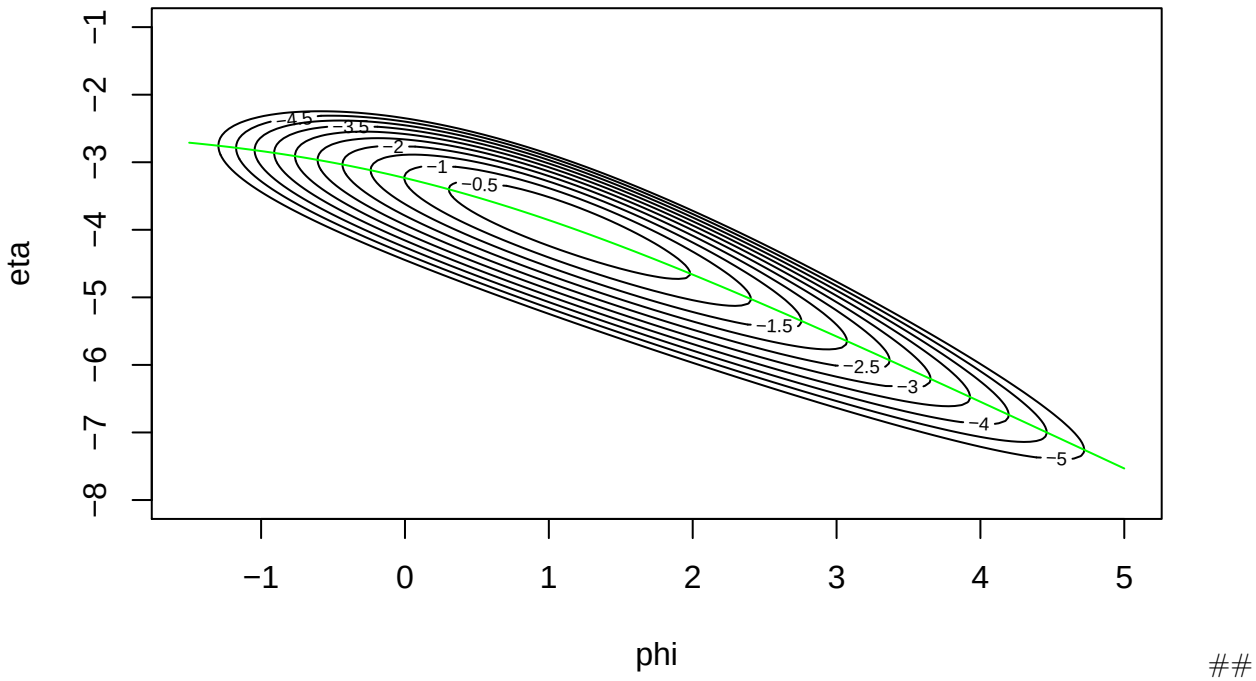
labb 10

Problem 18

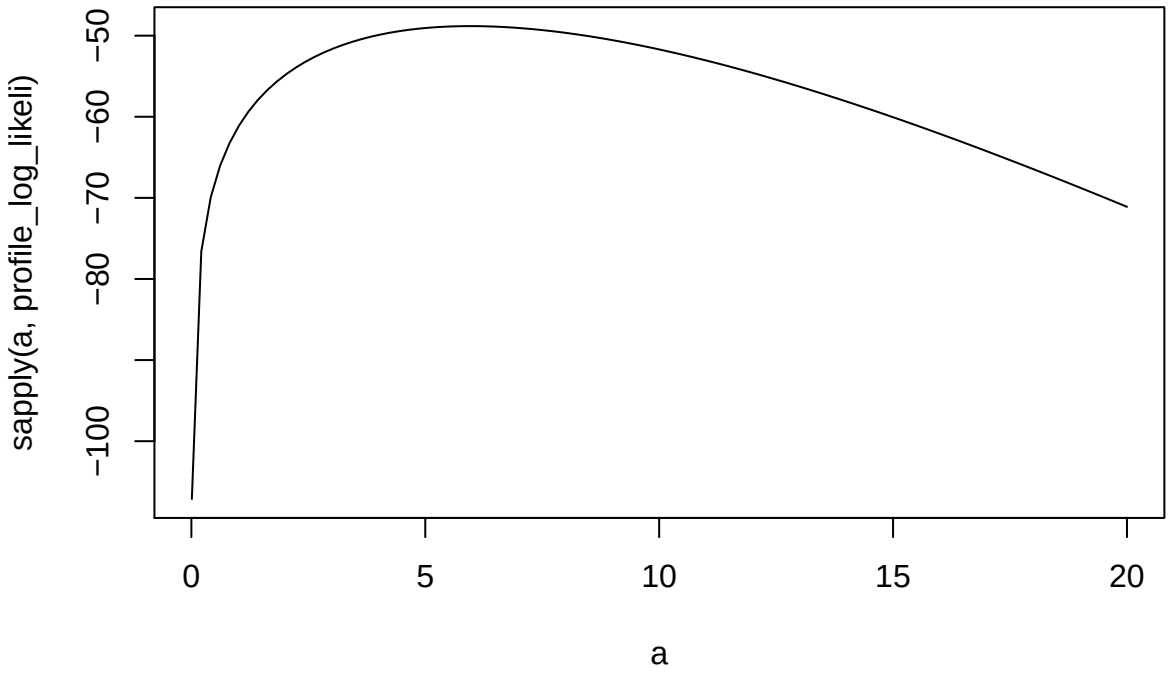
```
x1 = 6
n1 = 108
x2 = 2
n2 = 103

loglikeli <- function(x){
  x1*log(exp(x[1]+x[2])/(1+exp(x[1]+x[2]))) + (n1-x1)*log(1-exp(x[1]+x[2])/(1+exp(x[1]+x[2])))+ x2*log(
}

profile_log_likeli <- function(phi){

  optim(-4,function(eta) -loglikeli(c(phi,eta)), method="BFGS")$par
}
par = optim(c(1,4), function(x) -loglikeli(x))$par
max = loglikeli(par)

phi = seq(-1.5,5,length=150)
eta = seq(-8,-1,length=150)
grid = expand.grid(phi,eta)
z = apply(grid,1,function(x) loglikeli(x)-max)
z = array(z,c(150,150))
contour(phi,eta,z,levels=c(0,-0.5,-1,-1.5,-2,-2.5,-3,-3.5,-4,-4.5,-5),ylab="eta",xlab="phi")

lines(phi,sapply(phi,profile_log_likeli),type="l",col="green")
```



##

Problem 19

```
library(MASS)
X = c(225,175,198,189,189,130,162,135,119,162)
n = length(X)
a = seq(0.01,20,length=100)

profile_log_likeli <- function(a){
  n*log(a)-n*log(mean(X^a))+(a-1)*sum(log(X))-n

}
plot(a,sapply(a,profile_log_likeli),type="l")
```




```
profile_est = optim(5,function(a)-profile_log_likeli(a),method="BFGS")$par
ML_est = fitdistr(X,"weibull")$estimate

profile_est
```

```
## [1] 5.96112
```

```
ML_est[1]
```

```
##    shape
## 5.962144
```

We see that the two estimates of α are almost the same which also makes sense.