

Kode oppg1 (a-c)

```

1 init = c(249,254, 243, 268, 253, 269, 287, 241, 273, 306, 303, 280, 260, 256, 278, 344, 304, 283, 310)
2 #a
3 #finner estimert forventning, til de uavhengige og stokastiske veridene
4 n = length((init))
5 mu = 1/n * sum(init); mu #mean(init)
6
7 #finner forventingsrett estimert standardavvik.
8 s = sdinit = sqrt(1/(n-1)*sum((init - mu)^2));s#sd(init)
9
10 #finner 90% CI for mu
11 tCI = mu +c(1,-1)*qt(0.05,df=n-1)*(s/sqrt(n)); tCI
12
13 #b
14 #sigma estimeres til s
15 sigma = s
16
17 #finner 90% CI for sigma
18 chiCI = s*sqrt(18/qchisq(c(0.95,1-0.95), n-1));chiCI
19
20 #c
21 #plotter dataen for ? se om det er tilnemet en normallinjes
22 qqnorm(init)
23 qqline(init)

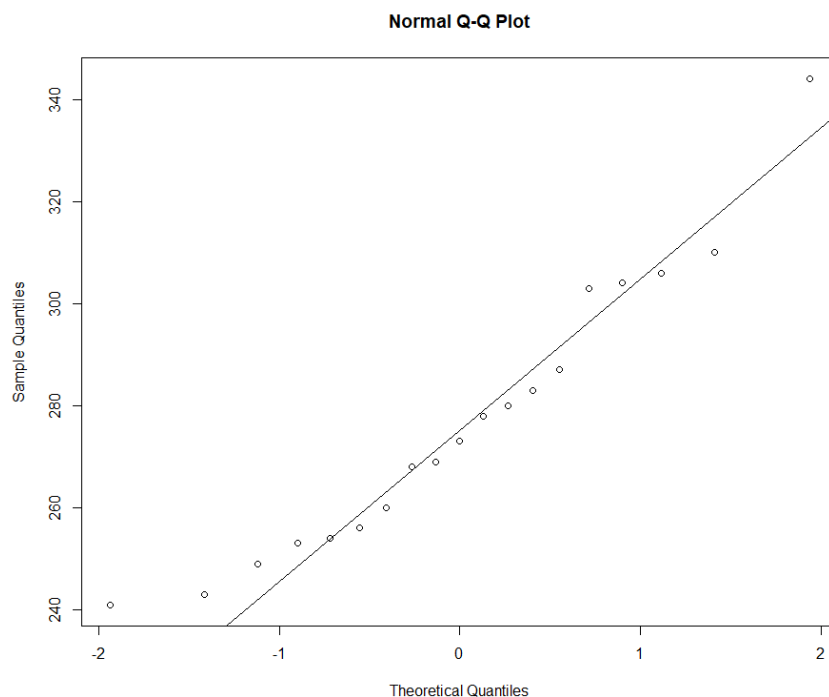
```

Values

chiCI	num [1:2] 21.4 37.5
init	num [1:19] 249 254 243 268 253 269 287 241 273 306 ...
mu	276.894736842105
n	19L
S	27.0819635281124
sdinit	27.0819635281124
sigma	27.0819635281124
tCI	num [1:2] 266 288

chiCI: 90% konfedensintervall for sigma, init: inndaten, mu: Gjennomsnitt, n: antall verdier i init, S: estimert standardavvik, sdinit = S, sigma = S = sdinit, 90% konfedensintervall for my.

Plot 1



Oppg2

```

1  set.seed(11)
2  mu = 1
3  sigma = 1
4  n = 8
5  ant_setts = 1000
6  Clvl = 0.975 #konfidens nivåa
7
8  simulation <- function(mu, sigma, n, ant_sets, Clvl){
9    simres=numeric(0)
10   for (i in 1:ant_sets) {
11     x=rnorm(n,mu,sigma)
12     muhat=mean(x)
13     sdx=sd(x)
14
15     muCIt = muhat +c(-1,1)*qt(Clvl,df=n-1)*sdx/sqrt(n) #CI for mu
16     sdxCIKJI = sdx*sqrt((n-1)/qchisq(c(Clvl,1-Clvl), n-1))#CI for sigma
17
18     nyres = c(muhat,sdx, muCIt,sdxCIKJI)
19     simres=rbind(simres,nyres)
20   }
21
22   muCItinIntervall= sum((simres[,3]<1)*(1<simres[,4]));
23   sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
24   c(muCItinIntervall, sdxCIKJIinIntervall)
25 }
26 print(simulation(mu, sigma, n, ant_sets, Clvl))
27 #d
28
29 n = c(30,200)
30 for (i in n){
31   print(simulation(mu, sigma, i, ant_sets, Clvl))
32 }
33 #e
34 n = 8
35 my = 1
36 sigma= 1
37 exponent <- function(mu, sigma, n, ant_sets, Clvl){
38   simres=numeric(0)
39   for (i in 1:ant_sets) {
40     x=rexp(n,rate=1)
41     muhat=mean(x)
42     sdx=sd(x)
43
44     muCIt = muhat +c(-1,1)*qt(Clvl,df=n-1)*sdx/sqrt(n) #CI for mu
45     sdxCIKJI = sdx*sqrt((n-1)/qchisq(c(Clvl,1-Clvl), n-1))#CI for sigma
46
47     nyres = c(muhat,sdx, muCIt,sdxCIKJI)
48     simres=rbind(simres,nyres)
49   }
50
51   muCItinIntervall= sum((simres[,3]<1)*(1<simres[,4]));
52   sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
53   c(muCItinIntervall, sdxCIKJIinIntervall)
54 }
55 exponent(mu, sigma, n, ant_sets, Clvl)
56 #f
57 n = c(30,200)
58 for (i in n){
59   print(exponent(mu, sigma, i, ant_sets, Clvl))
60 }

```

ant_setts	1000
Clvl	0.975
i	200
mu	1
my	1
n	num [1:2] 30 200
sigma	1
Functions	
exponent	function (mu, sigma, n, ant_sets, Clvl)
simulation	function (mu, sigma, n, ant_sets, Clvl)

Kjøreeksempel

```
> set.seed(11)
> mu = 1
> sigma = 1
> n = 8
> ant_setts = 1000
> Clvl = 0.975 #konfidens nivå
>
> simulation <- function(mu, sigma, n, ant_sets, Clvl){
+   simres=numeric(0)
+   for (i in 1:ant_setts) {
+     x=rnorm(n,mu,sigma)
+     muhat=mean(x)
+     sdx=sd(x)
+
+     muCIt = muhat +c(-1,1)*qt(Clvl,df=n-1)*sdx/sqrt(n) #CI for mu
+     sdxCIKJI = sdx*sqrt((n-1)/qchisq(c(Clvl,1-Clvl), n-1))#CI for sigma
+
+     nyres = c(muhat,sdx, muCIt,sdxCIKJI)
+     simres=rbind(simres,nyres)
+   }
+
+   muCItinIntervall= sum((simres[,3]<1)*(1<simres[,4]));
+   sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
+   c(muCItinIntervall, sdxCIKJIinIntervall)
+ }
> print(simulation(mu, sigma, n, ant_sets, Clvl))
[1] 940 952
> #d
>
> n = c(30,200)
> for (i in n){
+   print(simulation(mu, sigma, i, ant_sets, Clvl))
+ }
[1] 946 942
[1] 960 955
> #e
> n = 8
> my = 1
> sigma= 1
> exponent <- function(mu, sigma, n, ant_sets, Clvl){
```

```

+   simres=numeric(0)
+   for (i in 1:ant_setts) {
+     x=rexp(n,rate=1)
+     muhat=mean(x)
+     sdx=sd(x)
+
+     muCIit = muhat +c(-1,1)*qt(Clvl,df=n-1)*sdx/sqrt(n) #CI for mu
+     sdxCIKJI = sdx*sqrt((n-1)/qchisq(c(Clvl,1-Clvl), n-1))#CI for sigma
+
+     nyres = c(muhat,sdx, muCIit,sdxCIKJI)
+     simres=rbind(simres,nyres)
+   }
+
+   muCIitinInterval= sum((simres[,3]<1)*(1<simres[,4]));
+   sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
+   c(muCIitinInterval, sdxCIKJIinIntervall)
+ }
> exponent(mu, sigma, n, ant_setts, Clvl)
[1] 899 787
> #f
> n = c(30,200)
> for (i in n){
+   print(exponent(mu, sigma, i, ant_setts, Clvl))
+ }
[1] 932 714
[1] 950 686
> view(exponent)
> view(exponent)

```