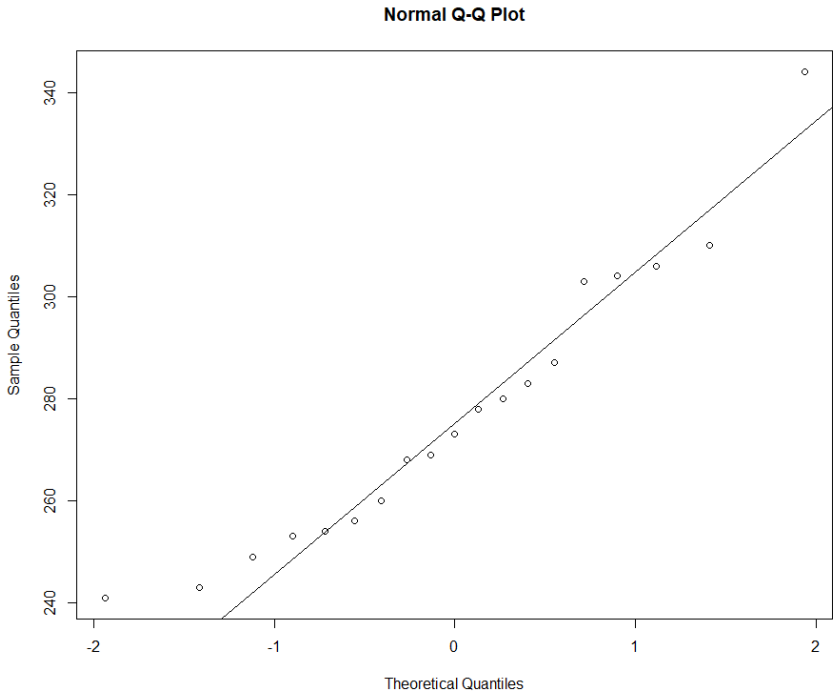
Kode oppg1 (a-c)

```r
init = c(249,254, 243, 268, 253, 269, 287, 241, 273, 306, 303, 280, 260, 256, 278, 344, 304, 283, 310)
#a
#finner estimert forventing, til de uavhengige og stokastiske veridene
n = length((init))
mu = 1/n * sum(init); mu #mean(init)

#finner forventingsrett estimert standardavvik.
S = sdinit = sqrt(1/(n-1)*sum((init - mu)^2));S#sd(init)

#finner 90% CI for mu
tCI = mu +c(1,-1)*qt(0.05,df=n-1)*(S/sqrt(n)); tCI

#b
#sigma estimeres til s
sigma = S

#finner 90% CI for sigma
chiCI = S*sqrt(18/qchisq(c(0.95,1-0.95), n-1));chiCI

#c
#plotter dataen for ? se om det er tilnemet en normallinjes
qqnorm(init)
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: anttall verdier i init, S: estimert standardavvik, sdinit = S, sigma = S = sdinit, 90% konfedensintervall for my.

Plot 1



Oppg2

```r
set.seed(11)
mu = 1
sigma = 1
n = 8
ant_setts = 1000
Clvl = 0.975 #konfidens nivaa

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  my
    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)
  }

  muCItinInterval= sum((simres[,3]<1)*(1<simres[,4]));
  sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
  c(muCItinInterval, sdxCIKJIinIntervall)
}
print(simulation(mu, sigma, n, ant_sets, Clvl))
#d

n = c(30,200)
for (i in n){
  print(simulation(mu, sigma, i, ant_sets, Clvl))
}
#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)

    muCIt = muhat +c(-1,1)*qt(Clvl,df=n-1)*sdx/sqrt(n) #CI for  my
    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)
  }

  muCItinInterval= sum((simres[,3]<1)*(1<simres[,4]));
  sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
  c(muCItinInterval, sdxCIKJIinIntervall)
}
exponent(mu, sigma, n, ant_sets, Clvl)
#f
n  = c(30,200)
for (i in n){
  print(exponent(mu, sigma, i, ant_sets, Clvl))
}
```

```
  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 nivaa
>
> 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  my
+     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)
+   }
+
+   muCItinInterval= sum((simres[,3]<1)*(1<simres[,4]));
+   sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
+   c(muCItinInterval, 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)
+
+     muCIt = muhat +c(-1,1)*qt(Clvl,df=n-1)*sdx/sqrt(n) #CI for  my
+     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)
+   }
+
+   muCItinInterval= sum((simres[,3]<1)*(1<simres[,4]));
+   sdxCIKJIinIntervall = sum((simres[,5]<1)*(1<simres[,6]));
+   c(muCItinInterval, sdxCIKJIinIntervall)
+ }
> exponent(mu, sigma, n, ant_sets, Clvl)
[1] 899 787
> #f
> n  = c(30,200)
> for (i in n){
+   print(exponent(mu, sigma, i, ant_sets, Clvl))
+ }
[1] 932 714
[1] 950 686
> View(exponent)
> View(exponent)
```