Confidence interval

1) The water works commission wishes to know the mean household usage of water by the residents of a small town. Suppose a sample of 1403 families is drawn from the town with mean=18 and assume that the standard deviation is 1.7. Construct a99% confidence interval for the mean number of gallons of water.

> xbar=18

> n=1403

> Z=qnorm(0.995)

> sigma=1.7

> round(c(xbar-Z\*sigma/sqrt(n),xbar+Z\*sigma/sqrt(n)),2)

[1] 17.88 18.12

3) A research scholar wants to know how many times per hour a certain strand of virus reproduces. Suppose a sample of 23 viruses is drawn and observed that the mean is 7.4. The sample yields the standard deviation of 1.8. Construct a 95% confidence interval for the mean number of reproductions per hour.

> n=23

> MEAN=7.4

> CT=qt(0.975,22)

> ST=1.8

> round(c(MEAN-CT\*ST/sqrt(n), MEAN+CT\*ST/sqrt(n)),2)

[1] 6.62 8.18

4) The data frame barley in in lattice package and contains the yield, variety, year and site, giving the barley yields(bushels/acre) in 1931 and 1932 for 10 varieties of barley grown at six sites.

a) Construct Normal Q-Q plot of the barley yield

> library(lattice)

> attach(barley)

> qqnorm(barley$yield)

> qqline(barley$yield)

b) Construct a 95% confidence interval for mu the mean barley yield in 1932.

> x=subset(barley,year==1932)

> mu<-mean(x$yield)

> CT<-qt(.975,22)

> ST<-sd(x$yield)

> round(c(mu-CT\*ST/sqrt(23), mu+CT\*ST/sqrt(23)),2)

[1] 27.71 35.82