rm(list=ls())

#1

x=c(3,4.7,8.3,9.3,9.9,11,12.3,12.5,12.6,15.9,16.7,18.8,18.8,18.9,21.7,21.9,22.8,24.2,25.8,30.6,36.2,39.8,44.3,46.8,46.8,58.1,62.3,70.6,71.1,71.3,83.2,83.6,99.5,111.2)

y=c(0.971,0.979,0.982,0.971,0.957,0.961,0.956,0.972,0.889,0.961,0.982,0.975,0.942,0.932,0.908,0.970,0.985,0.933,0.858,0.987,0.958,0.909,0.859,0.863,0.811,0.877,0.798,0.855,0.788,0.821,0.830,0.718,0.642,0.658)

df <-data.frame(x,y)

tom.lm<-lm(y~x, data = df)

par(mfrow=c(2,2))

plot(x,y)

lines(y,tom.lm$fitted.values,col=2)

lines(x,tom.lm$fitted.values,col=2)

abline(tom.lm,col=3)

#2

print(y^2)

sum(y^2)

print(x)

sum(x)

print(x^2)

sum(x^2)

print(x\*y^2)

print(x\*y)

sum(x\*y^2)

sum(x\*y)

#3

df<-data.frame(x,y)

peanut.lm<-lm(y~x,data=df)

coef(peanut.lm)

summary(peanut.lm)

par(mfrow=c(2,2))

plot(x,y)

lines(y,peanut.lm$fitted.values,col=2)

lines(x,peanut.lm$fitted.values,col=2)

abline(peanut.lm,col=3)

#4

residuals<-resid(peanut.lm)

round(residuals,digits=3)

plot(residuals)

#5

anova(peanut.lm)

summary(peanut.lm)

#6

summary(peanut.lm)

confint(peanut.lm)

#7

fitted(peanuts.lm)

predict(peanut.lm,newdata=data.frame(x))

residuals(peanut.lm)

peanutsummary<-summary(peanut.lm)

peanut$sigma

new<-data.frame(x)

predict(peanut.lm,newdata=new, interval='confidence')

library(HH)

ci.plot(peanut.lm)

anova(peanut.lm)

peanutsummary$r.squared

sqrt(peanutsummary$r.squared)

#we choose the principal square root because the slope of the regression line is positive

#8

anova(peanut.lm)

#Here we see that the F statistic is 96.18 with a p-value very close to zero. The conclusion: there is very strong evidence that H0 : 1 = 0 is false, that is, there is strong evidence that H0:B1=0 is false, that is there is strong evidence that B1≠0. Moreover, we conclude that the regression relationship between dist and speed is significant.