#2.a

library("ISLR")

lm.fit <- lm(mpg ~ horsepower, data = Auto)

summary(lm.fit)

#2.a.iv

predict(lm.fit, data.frame(horsepower = c(85)), interval ="confidence")

predict(lm.fit, data.frame(horsepower = c(85)), interval ="confidence")

#2.b

attach(Auto)

plot(mpg~horsepower, main =" MPG vs Horsepower", xlab = " Horsepower", ylab ="MPG")

abline(coef = coef(lm.fit), col ="red")

detach(Auto)

#2.c

par(mfrow=c(2,2))

plot(lm.fit)

#3.a

library("ISLR")

pairs(Auto)

cor(Auto[, names(Auto) !="name"])

#3.b

model = lm(mpg ~. -name, data = Auto)

summary(model)

#3.c

par(mfrow = c(2,2))

plot(model)

#3.d

model = lm(mpg ~.-name+displacement:weight, data = Auto)

summary(model)

#3.e

model = lm(mpg ~.-name+displacement:cylinders+displacement:weight+acceleration:horsepower, data=Auto)

summary(model)

#3.f

model = lm(mpg ~.-name+displacement:cylinders+displacement:weight+year:origin+acceleration:horsepower, data=Auto)

summary(model)

#3.g

model = lm(mpg ~.-name-cylinders-acceleration+year:origin+displacement:weight+

displacement:weight+acceleration:horsepower+acceleration:weight, data=Auto)

summary(model)

#4.a

**library**("ISLR")

head(Carseats)

str(Carseats)

lm.fit = lm(Sales ~ Price+Urban+US, data= Carseats)

summary(lm.fit)

#4.d

lm.fit2 = lm(Sales ~ Price+US, data= Carseats)

summary(lm.fit2)

#4.g

confint(lm.fit2)

#4.h

par(mfrow=c(2,2))

plot(lm.fit2)

#5.a

set.seed(1)

x=rnorm(100)

y=2\*x+rnorm(100)

slr<-lm(y~x+0)

summary(slr)

#5.b

revslr<-lm(x~y+0)

summary(revslr)

#5.d

n=length(x)

t=sqrt(n - 1)\*(x %\*% y)/sqrt(sum(x^2) \* sum(y^2) - (x %\*% y)^2)

as.numeric(t)

#5.f

revslr1<-lm(x~y)

summary(revslr1)