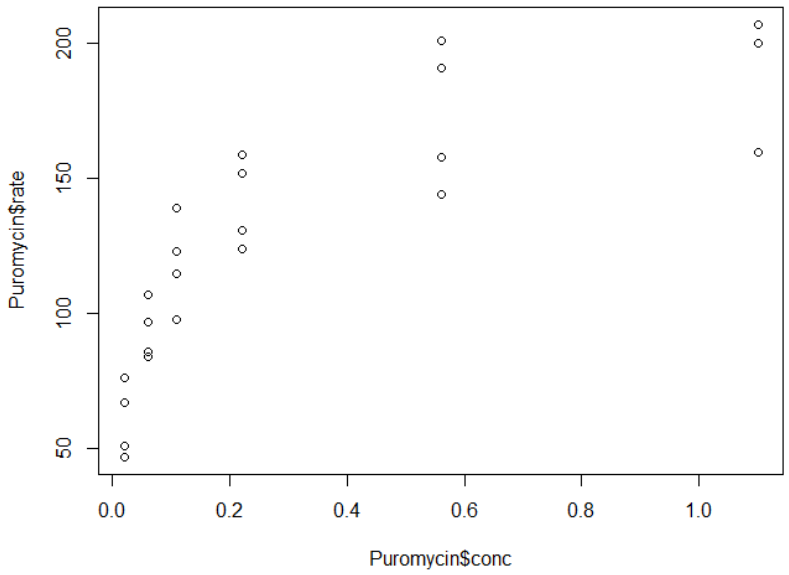
Arun Sangar

Hyunwook Park

CPSC 375

Homework 2

1.



a.

b.

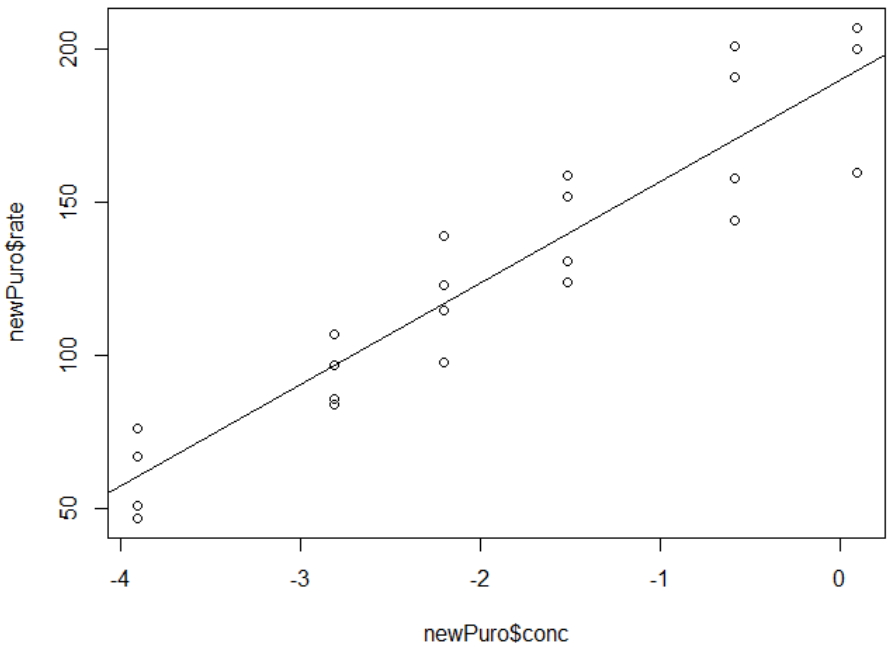
i. 0.741216

ii.
```
> m <- lm(rate~conc,data=Puromycin)
> residuals <- residuals(m)
> sse <- sum(residuals^2)
> mean <- mean(Puromycin$rate)
> residuals2 <- Puromycin$rate - mean
> ssr <- sum(residuals2^2)
> sst <- ssr + sse
> rsq <- ssr/sst
```

c.

i. 0.8888592

ii. Yes, a higher value means it is a more accurate model.



iii.

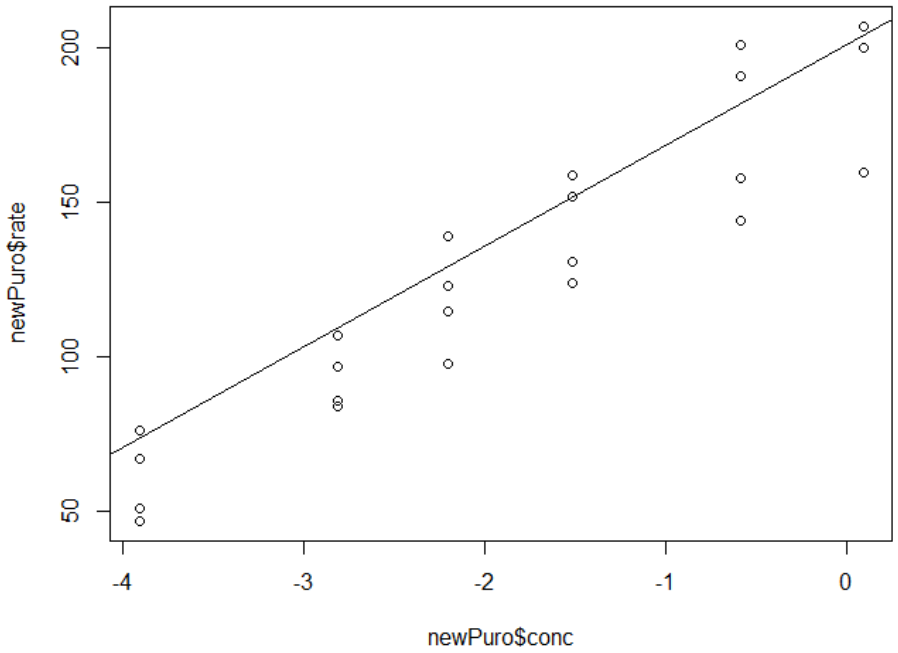
iv.
```
> newPuro <- Puromycin
> newPuro$conc <- log(Puromycin$conc)
> m <- lm(rate~conc,data=newPuro)
> residuals <- residuals(m)
> sse <- sum(residuals^2)
> mean <- mean(newPuro$rate)
> residuals2 <- newPuro$rate - mean
> ssr <- sum(residuals2^2)
> sst <- ssr + sse
> rsq <- ssr/sst

> plot(newPuro$conc,newPuro$rate)
> coeffs <- coef(m)
> abline(coeffs[1], coeffs[2])
```

d.

i. 0.9504869

ii. Yes, again it is higher therefore better.



iii.

iv.
```
> newPuro <- Puromycin
> newPuro$conc <- log(Puromycin$conc)
> m <- lm(rate~conc+state,data=newPuro)
> residuals <- residuals(m)
> sse <- sum(residuals^2)
> mean <- mean(newPuro$rate)
> residuals2 <- newPuro$rate - mean
> ssr <- sum(residuals2^2)
> sst <- ssr + sse
> rsq <- ssr/sst

> plot(newPuro$conc,newPuro$rate)
> coeffs <- coef(m)
> abline(coeffs[1],coeffs[2])
```

2.

a.

i. `> mydata <- read.csv("C:\\Users\\aruns\\Desktop\\baseball.csv")`

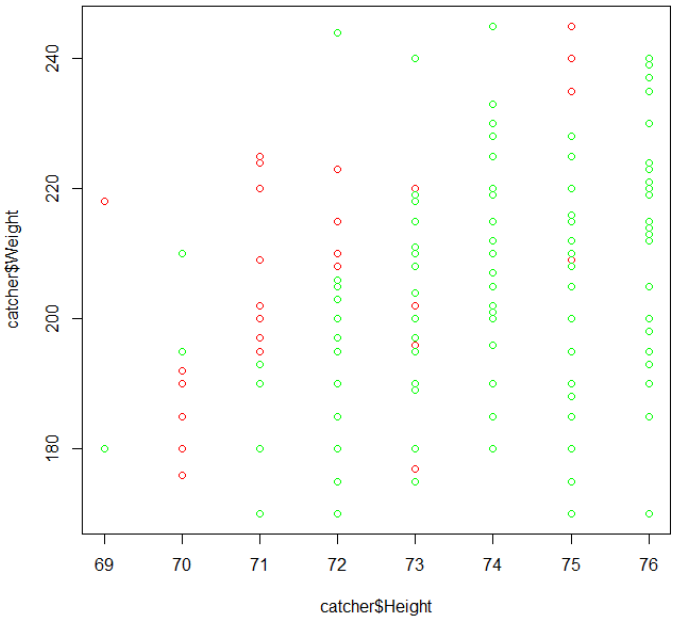
ii.
```
> subdata <- subset(mydata,
mydata$Position=="Catcher"|mydata$Position=="Starting_Pitcher")
```

iii. `> subdata <- droplevels(subdata)`

iv. `> subdata <- subdata[order(subdata$Name),]`

v.
```
> nrow(subdata)
> subdata[296,]
```

b.



i.

ii. No, linear regression would not give a good model because the height variable seems to be categorical. To add to this, the weight values vary greatly for each height value, using a linear model would not accurately represent that.

iii. > catcher <- subset(subdata,subdata$Position=="Catcher")
> pitcher <- subset(subdata,subdata$Position=="Starting_Pitcher")
> plot(catcher$Height,catcher$Weight,col="Red")
> points(pitcher$Height,pitcher$Weight,col="Green")

c.

i. Error rate: 2/6 or 33.3%

ii. > trainindex <- 1:290
> testindex <- 291:296
> traindata <- subdata[trainindex,4:5]
> testdata <- subdata[testindex,4:5]
> trainlabels <- subdata[trainindex,3]
> testlabals <- subdata[testindex,3]
> predicted <- knn(test=testdata,train=traindata,cl=trainlabels,k=1)
> table(testlabels,predicted)

d.

i. Error rate: 0/6 or 0%

ii. > predicted <- knn(test=testdata,train=traindata,cl=trainlabels,k=3)
> table(testlabels,predicted)

e.

i. Error rate: 2/6 or 33.3%

ii. Considering these observations, when k = 3 there is a 0% error rate, which suggests that 3 would be the best value for k.

iii. > predicted <- knn(test=testdata,train=traindata,cl=trainlabels,k=25)
> table(testlabels,predicted)

f.

i. Error rate: 1/6 or 16.7%
ii. No, the error rate does not always decrease with larger number of parameters. This is because the additional parameters may not be related to the dependent variable.
iii.
```
> trainindex <- 1:290
> testindex <- 291:296
> traindata <- subdata[trainindex,4:6]
> testdata <- subdata[testindex,4:6]
> trainlabels <- subdata[trainindex,3]
> testlabels <- subdata[testindex,3]
> predicted <- knn(test=testdata,train=traindata,cl=trainlabels,k=1)
> table(testlabels,predicted)
```