141xp q1 modeling

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```
#run logit model for AHI

dataset <- read.csv("Jan to Mar15 2023.csv")
head(dataset)
```

```
##   Selected        RecordNo     Age  Recording.Date Gender.Male.Female. Height
## 1        0 XBDYM3BFZC0AQGB  6.7407  1/3/2023 21:08              female  116.5
## 2        0 XBDYM3BFZC0CIVD 31.9870  1/4/2023 21:22              female   62.0
## 3        0 XBDYM3BFZC0GFDS 21.8020  1/6/2023 22:49                male   67.0
## 4        0 XBDYM3BFZC0I5IJ  4.6271  1/7/2023 21:11                male   43.0
## 5        0 XBDYM3BFZC0K2BT  7.0775  1/8/2023 21:57                male   49.0
## 6        0 XBDYM3BFZC0NPI0 55.2130 1/10/2023 22:30              female   70.5
##   HeightUnit Weight WeightUnit    BMI ESS      AHI AHI.REM Apnea.Counts
## 1         cm     29         kg 21.367   0  1.01690  2.2222            0
## 2         in    120         lb 21.948 999  3.33330  8.0672            9
## 3         in    325         lb 50.903  12 12.92000  3.8532           14
## 4         in     53         lb 20.153   0  1.76710  3.4286            6
## 5         in     52         lb 15.227 999  0.86538  4.7059            2
## 6         in    335         lb 47.388  23  8.31890  3.2432            3
##   Apnea.Counts.REM Latency.to.Sleep.Onset Latency.to.REM Desats.LT.90
## 1                0                   6.0          160.5            0
## 2                3                  29.5          248.5           10
## 3                1                  20.5          123.0            8
## 4                0                  70.0          152.0            1
## 5                1                   3.5          223.5            4
## 6                1                   0.5          323.0           66
##   Desats.LT.80 Desats.LT.70 PLM.Total Sleep.Eff.Index Record.Type
## 1            0            0         0          80.546   PSG+TcCO2
## 2            0            0         0          89.362   PSG+TcCO2
## 3            0            0         0          85.606       Split
## 4            0            0         0          82.269   PSG+TcCO2
## 5            3            2         3          96.185   PSG+TcCO2
## 6            0            0        15          80.699        BPAP
##
## 1                                                    Possible sinus arrhythmia.  Sinus ra
## 2                              Possible accelerated junctional rhythm.  Inverted P waves noted w
## 3                                                          NSR with varying rate and po
## 4
## 5                                                                                NSR with
## 6 NSR with possible PVCs and PACs. Please review EKG in epoch# 19, 35, 52, 61, 78, 110, 155, 183, 220
##                            Sleep.Generic11. Sleep.Generic20. LEG1.Index
## 1                      Flat with 2 pillows.             None   0.084746
```

```
## 2                        Flat with 2 pillows.             N/A   0.000000
## 3                       Flat with one pillow.             N/A   0.000000
## 4                          Flat with 1 pillow            <NA>   0.000000
## 5                    HOB flat with one pillow.             N/A   0.216350
## 6 Leveled with one pillow and one body pillow             N/A  20.901000
##   LEG2.Index                              Scorer
## 1   0.084746                     Alfonso Padilla
## 2   0.000000                       Joy Nishihira
## 3   0.000000 Weiguang Zhong : Neurotronics, Inc.
## 4   0.000000 Weiguang Zhong : Neurotronics, Inc.
## 5   0.649040                     Alfonso Padilla
## 6  17.470000         Gabriela Ortiz : UCLA Sleep
```

```
#IF RECORD ID IS THE SAME, REMOVE DUPLICATE!!!!!!!!!
#DONT FORGET
dataset<-dataset[!duplicated(dataset$RecordNo),]
```

```
#load packages
#library(readxl)
#library(magrittr)
#install.packages("pastecs")
#library(pastecs)
#install.packages("gridExtra")
#library(gridExtra)
#library(ggplot2)
#library(dplyr)
#install.packages("DT")
#library(DT)
#library(MASS)
#install.packages("leaps")
#library(leaps)
#install.packages("glmnet")
library(glmnet)
```

```
## Loading required package: Matrix
```

```
## Loaded glmnet 4.1-7
```

```
#install.packages("PerformanceAnalytics")
#library(PerformanceAnalytics)
#install.packages("corrr")
#library(corrr)
#install.packages("tidyr")
#library(tidyr)
```

```
#remove useless vars
dataset<-dataset[,c(-1,-2,-4,-22,-23,-24,-25,-26,-29)]
head(dataset)
```

```
##       Age Gender.Male.Female. Height HeightUnit Weight WeightUnit    BMI ESS
## 1  6.7407              female  116.5         cm     29         kg 21.367   0
## 2 31.9870              female   62.0         in    120         lb 21.948 999
```

```
## 3 21.8020                male   67.0         in    325         lb 50.903  12
## 4  4.6271                male   43.0         in     53         lb 20.153   0
## 5  7.0775                male   49.0         in     52         lb 15.227 999
## 6 55.2130              female   70.5         in    335         lb 47.388  23
##        AHI AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 1  1.01690  2.2222            0                0                    6.0
## 2  3.33330  8.0672            9                3                   29.5
## 3 12.92000  3.8532           14                1                   20.5
## 4  1.76710  3.4286            6                0                   70.0
## 5  0.86538  4.7059            2                1                    3.5
## 6  8.31890  3.2432            3                1                    0.5
##   Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 1          160.5            0            0            0         0   0.084746
## 2          248.5           10            0            0         0   0.000000
## 3          123.0            8            0            0         0   0.000000
## 4          152.0            1            0            0         0   0.000000
## 5          223.5            4            3            2         3   0.216350
## 6          323.0           66            0            0        15  20.901000
##   LEG2.Index
## 1   0.084746
## 2   0.000000
## 3   0.000000
## 4   0.000000
## 5   0.649040
## 6  17.470000
```

```r
#FIX WEIGHT AND HEIGHT TO BE SAME BASIS
#weight
for(i in 1:nrow(dataset)){
  if(dataset[i,"WeightUnit"]=="kg"){
    weight_kg<-dataset[i,"Weight"]
    weight_kg<- weight_kg*2.20462262185
    dataset[i,"Weight"]<-weight_kg
    dataset[i, "WeightUnit"]<-"lb"
  }
}

#height
for(i in 1:nrow(dataset)){
  if(dataset[i,"HeightUnit"]=="cm"){
    height_cm<-dataset[i,"Height"]
    height_cm<- height_cm / 2.54
    dataset[i,"Height"]<-height_cm
    dataset[i, "HeightUnit"]<-"in"
  }
}

#make gender a binary variable
for(i in 1:nrow(dataset)){
  if(dataset[i,"Gender.Male.Female."]=="female"){
    #make female coded for 1
    dataset[i,"Gender.Male.Female."]<-1
  }
  else{
```

```
    #make male coded for 0
    dataset[i,"Gender.Male.Female."]<-0
  }
}



head(dataset)
```

```
##       Age Gender.Male.Female.   Height HeightUnit    Weight WeightUnit    BMI
## 1  6.7407                   1 45.86614         in  63.93406         lb 21.367
## 2 31.9870                   1 62.00000         in 120.00000         lb 21.948
## 3 21.8020                   0 67.00000         in 325.00000         lb 50.903
## 4  4.6271                   0 43.00000         in  53.00000         lb 20.153
## 5  7.0775                   0 49.00000         in  52.00000         lb 15.227
## 6 55.2130                   1 70.50000         in 335.00000         lb 47.388
##   ESS      AHI AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 1   0  1.01690  2.2222            0                0                    6.0
## 2 999  3.33330  8.0672            9                3                   29.5
## 3  12 12.92000  3.8532           14                1                   20.5
## 4   0  1.76710  3.4286            6                0                   70.0
## 5 999  0.86538  4.7059            2                1                    3.5
## 6  23  8.31890  3.2432            3                1                    0.5
##   Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 1          160.5            0            0            0         0   0.084746
## 2          248.5           10            0            0         0   0.000000
## 3          123.0            8            0            0         0   0.000000
## 4          152.0            1            0            0         0   0.000000
## 5          223.5            4            3            2         3   0.216350
## 6          323.0           66            0            0        15  20.901000
##   LEG2.Index
## 1   0.084746
## 2   0.000000
## 3   0.000000
## 4   0.000000
## 5   0.649040
## 6  17.470000
```

```
#remove NAs
dataset<- na.omit(dataset)

#split 80/20 training/testing
set.seed(12345)
test_i<-sample(1:nrow(dataset), (nrow(dataset)*(0.2)), replace=F)
training<-dataset[-test_i,]
testing<-dataset[test_i,]

#assign y var
y<-dataset$AHI
head(y)
```

```
## [1]  1.01690  3.33330 12.92000  1.76710  0.86538  8.31890
```

```
length(y)
```

```
## [1] 400
```

```
#make the AHI var into a binary outcome var
for(i in 1:length(y)){
  if(y[i]>30){
    #make AHI of 30 & above coded for 1
    #one indicates abnormal AHI
    y[i]<-1
  }
  else{
    #make AHI of below 30 coded for 0
    #zero indicates abnormal AHI
    y[i]<-0
  }
}


head(y)
```

```
## [1] 0 0 0 0 0 0
```

```
#remove y var from predictors list
x<-dataset[,-9]
head(x)
```

```
##       Age Gender.Male.Female.   Height HeightUnit    Weight WeightUnit    BMI
## 1  6.7407                   1 45.86614         in  63.93406         lb 21.367
## 2 31.9870                   1 62.00000         in 120.00000         lb 21.948
## 3 21.8020                   0 67.00000         in 325.00000         lb 50.903
## 4  4.6271                   0 43.00000         in  53.00000         lb 20.153
## 5  7.0775                   0 49.00000         in  52.00000         lb 15.227
## 6 55.2130                   1 70.50000         in 335.00000         lb 47.388
##   ESS AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 1   0  2.2222            0                0                    6.0
## 2 999  8.0672            9                3                   29.5
## 3  12  3.8532           14                1                   20.5
## 4   0  3.4286            6                0                   70.0
## 5 999  4.7059            2                1                    3.5
## 6  23  3.2432            3                1                    0.5
##   Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 1          160.5            0            0            0         0   0.084746
## 2          248.5           10            0            0         0   0.000000
## 3          123.0            8            0            0         0   0.000000
## 4          152.0            1            0            0         0   0.000000
## 5          223.5            4            3            2         3   0.216350
## 6          323.0           66            0            0        15  20.901000
##   LEG2.Index
## 1   0.084746
## 2   0.000000
## 3   0.000000
```

```
## 4   0.000000
## 5   0.649040
## 6  17.470000
```

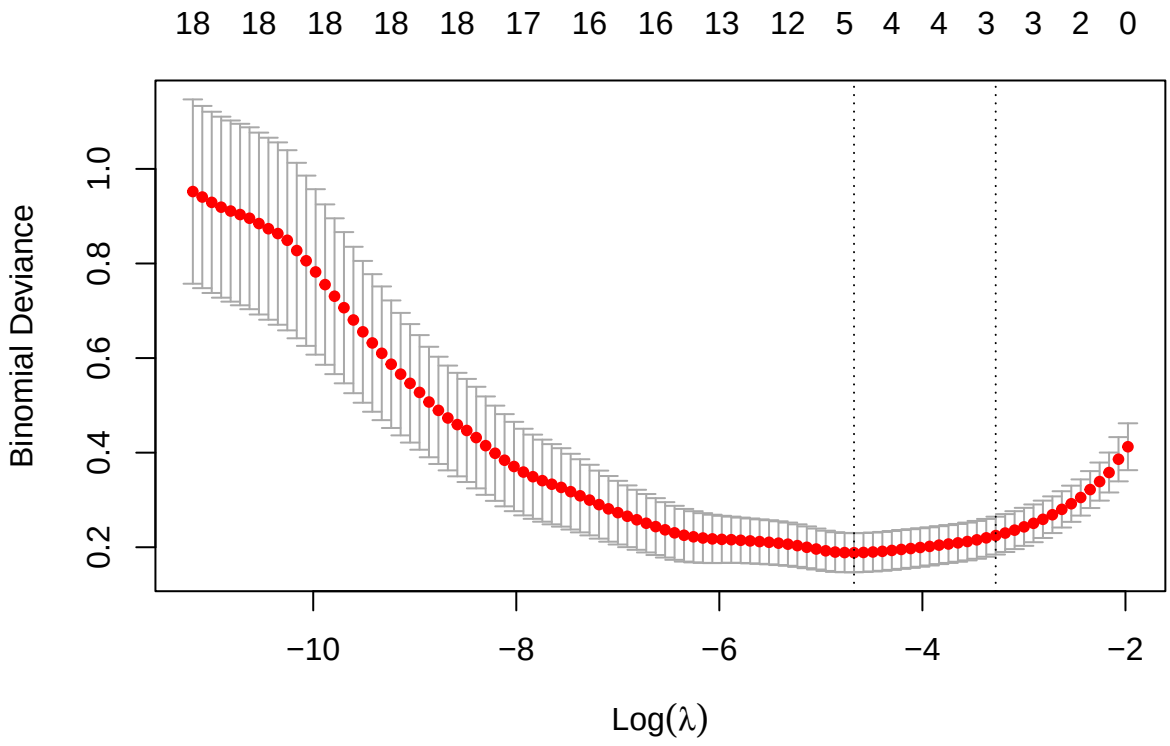
```
x<-data.matrix(x)

#run lasso regression
cv_model <- cv.glmnet(x=x, y=y, family = "binomial", alpha = 1)

best_lambda <- cv_model$lambda.min
best_lambda
```

```
## [1] 0.009341045
```

```
plot(cv_model)
```




```
best_model <-glmnet(x,y,alpha=1,lambda=best_lambda,family=binomial)
coef(best_model)
```

```
## 20 x 1 sparse Matrix of class "dgCMatrix"
##                                    s0
## (Intercept)            -5.375357225
## Age                     .
## Gender.Male.Female.     .
```

```
## Height                   .
## HeightUnit               .
## Weight                   .
## WeightUnit               .
## BMI                      .
## ESS                      .
## AHI.REM                  0.035833053
## Apnea.Counts             0.019438905
## Apnea.Counts.REM         .
## Latency.to.Sleep.Onset   .
## Latency.to.REM           0.001665326
## Desats.LT.90             0.019580822
## Desats.LT.80             .
## Desats.LT.70            -0.088601169
## PLM.Total                .
## LEG1.Index               .
## LEG2.Index               .
```

```
#assign y var
y.test<-testing$AHI
head(y.test)
```

```
## [1] 0.0000 5.3282 2.0896 6.3736 4.9315 1.4795
```

```
length(y.test)
```

```
## [1] 80
```

```
#remove y var from predictors list
x.train<-testing[,-9]
head(x.train)
```

```
##         Age Gender.Male.Female. Height HeightUnit Weight WeightUnit    BMI ESS
## 142 31.3270                   1  66.00         in    125         lb 20.176   2
## 51   6.8256                   0  47.24         in     50         lb 15.753   0
## 208 28.1570                   1  63.00         in    170         lb 30.114   7
## 218 60.6010                   0  72.00         in    225         lb 30.516   4
## 220 65.4880                   1  62.00         in    150         lb 27.436   8
## 152 64.7790                   0  72.00         in    210         lb 28.481   9
##     AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset Latency.to.REM
## 142  0.0000            0                0                   24.5          183.5
## 51  12.4140           16                7                   42.0           91.0
## 208  4.6154            0                0                    1.5           67.0
## 218 18.9470            1                0                   13.0          129.0
## 220  6.8571            0                0                    4.5           87.0
## 152  4.4681            2                0                    0.0           38.0
##     Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index LEG2.Index
## 142            0            0            0         3    1.28460     1.7380
## 51             5            0            0         0    0.00000     0.0000
## 208            1            0            0         0    2.01490     2.7612
## 218           16            0            0         1    1.09890     2.5275
## 220            0            0            0         7    9.04110     9.2877
## 152            4            0            0         8    0.65753     1.3151
```

```r
x.train<-data.matrix(x.train)

new<-x.train
y_predicted <- predict(best_model, s = best_lambda, newx = new)

#find SST and SSE
sst <- sum((y.test - mean(y.test))^2)
sse <- sum((y_predicted - y.test)^2)

#find R-Squared
rsq <- 1 - sse/sst
rsq
```

```
## [1] -0.9771527
```

```r
logit_data<-dataset
for(i in 1:nrow(logit_data)){
  if(logit_data[i,"AHI"]>30){
    #make AHI of 30 & above coded for 1
    #one indicates abnormal AHI
    logit_data[i,"AHI"]<-1
  }
  else{
    #zero indicates abnormal AHI
    logit_data[i,"AHI"]<-0
  }
}

mod.logit <- glm(AHI~AHI.REM+Apnea.Counts+Latency.to.REM+Desats.LT.90+Desats.LT.70, data = logit_data, f
print(summary(mod.logit))
```

```
##
## Call:
## glm(formula = AHI ~ AHI.REM + Apnea.Counts + Latency.to.REM +
##     Desats.LT.90 + Desats.LT.70, family = "binomial", data = logit_data)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -2.13615  -0.12778  -0.07778  -0.05669   2.72940
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -7.277474   1.162164  -6.262 3.80e-10 ***
## AHI.REM         0.045761   0.013895   3.293  0.00099 ***
## Apnea.Counts    0.025994   0.009446   2.752  0.00592 **
## Latency.to.REM  0.006182   0.003845   1.608  0.10785
## Desats.LT.90    0.031256   0.007407   4.220 2.44e-05 ***
## Desats.LT.70   -0.199332   0.072074  -2.766  0.00568 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
```

```
##
##     Null deviance: 164.65  on 399  degrees of freedom
## Residual deviance:  54.12  on 394  degrees of freedom
## AIC: 66.12
##
## Number of Fisher Scoring iterations: 8
```

```
#run glm model
head(training)
```

```
##       Age Gender.Male.Female.   Height HeightUnit    Weight WeightUnit    BMI
## 1  6.7407                   1 45.86614         in  63.93406         lb 21.367
## 2 31.9870                   1 62.00000         in 120.00000         lb 21.948
## 3 21.8020                   0 67.00000         in 325.00000         lb 50.903
## 4  4.6271                   0 43.00000         in  53.00000         lb 20.153
## 6 55.2130                   1 70.50000         in 335.00000         lb 47.388
## 8 16.1700                   0 61.00000         in  83.00000         lb 15.683
##   ESS     AHI AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 1   0  1.0169  2.2222            0                0                    6.0
## 2 999  3.3333  8.0672            9                3                   29.5
## 3  12 12.9200  3.8532           14                1                   20.5
## 4   0  1.7671  3.4286            6                0                   70.0
## 6  23  8.3189  3.2432            3                1                    0.5
## 8   0  1.8426  4.4444            0                0                   85.5
##   Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 1          160.5            0            0            0         0   0.084746
## 2          248.5           10            0            0         0   0.000000
## 3          123.0            8            0            0         0   0.000000
## 4          152.0            1            0            0         0   0.000000
## 6          323.0           66            0            0        15  20.901000
## 8          204.0            3            0            0         1   2.188100
##   LEG2.Index
## 1   0.084746
## 2   0.000000
## 3   0.000000
## 4   0.000000
## 6  17.470000
## 8   1.957800
```

```
head(testing)
```

```
##         Age Gender.Male.Female. Height HeightUnit Weight WeightUnit    BMI ESS
## 142 31.3270                   1  66.00         in    125         lb 20.176   2
## 51   6.8256                   0  47.24         in     50         lb 15.753   0
## 208 28.1570                   1  63.00         in    170         lb 30.114   7
## 218 60.6010                   0  72.00         in    225         lb 30.516   4
## 220 65.4880                   1  62.00         in    150         lb 27.436   8
## 152 64.7790                   0  72.00         in    210         lb 28.481   9
##        AHI AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 142 0.0000  0.0000            0                0                   24.5
## 51  5.3282 12.4140           16                7                   42.0
## 208 2.0896  4.6154            0                0                    1.5
## 218 6.3736 18.9470            1                0                   13.0
```

```
## 220 4.9315  6.8571            0                0                    4.5
## 152 1.4795  4.4681            2                0                    0.0
##     Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 142          183.5            0            0            0         3    1.28460
## 51            91.0            5            0            0         0    0.00000
## 208           67.0            1            0            0         0    2.01490
## 218          129.0           16            0            0         1    1.09890
## 220           87.0            0            0            0         7    9.04110
## 152           38.0            4            0            0         8    0.65753
##     LEG2.Index
## 142     1.7380
## 51      0.0000
## 208     2.7612
## 218     2.5275
## 220     9.2877
## 152     1.3151
```

```
#make the AHI var into a binary outcome var
for(i in 1:nrow(training)){
  if(training[i,"AHI"]>30){
    #make AHI of 30 & above coded for 1
    #one indicates abnormal AHI
    training[i,"AHI"]<-1
  }
  else{
    #make AHI of below 30 coded for 0
    #zero indicates abnormal AHI
    training[i,"AHI"]<-0
  }
}
head(training)
```

```
##       Age Gender.Male.Female.   Height HeightUnit    Weight WeightUnit    BMI
## 1  6.7407                   1 45.86614         in  63.93406         lb 21.367
## 2 31.9870                   1 62.00000         in 120.00000         lb 21.948
## 3 21.8020                   0 67.00000         in 325.00000         lb 50.903
## 4  4.6271                   0 43.00000         in  53.00000         lb 20.153
## 6 55.2130                   1 70.50000         in 335.00000         lb 47.388
## 8 16.1700                   0 61.00000         in  83.00000         lb 15.683
##   ESS AHI AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 1   0   0  2.2222            0                0                    6.0
## 2 999   0  8.0672            9                3                   29.5
## 3  12   0  3.8532           14                1                   20.5
## 4   0   0  3.4286            6                0                   70.0
## 6  23   0  3.2432            3                1                    0.5
## 8   0   0  4.4444            0                0                   85.5
##   Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 1          160.5            0            0            0         0   0.084746
## 2          248.5           10            0            0         0   0.000000
## 3          123.0            8            0            0         0   0.000000
## 4          152.0            1            0            0         0   0.000000
## 6          323.0           66            0            0        15  20.901000
## 8          204.0            3            0            0         1   2.188100
##   LEG2.Index
```

```
## 1   0.084746
## 2   0.000000
## 3   0.000000
## 4   0.000000
## 6  17.470000
## 8   1.957800
```

```
#make the AHI var into a binary outcome var
for(i in 1:nrow(testing)){
  if(testing[i,"AHI"]>30){
    #make AHI of 30 & above coded for 1
    #one indicates abnormal AHI
    testing[i,"AHI"]<-1
  }
  else{
    #make AHI of below 30 coded for 0
    #zero indicates abnormal AHI
    testing[i,"AHI"]<-0
  }
}
head(testing)
```

```
##         Age Gender.Male.Female. Height HeightUnit Weight WeightUnit    BMI ESS
## 142 31.3270                   1  66.00         in    125         lb 20.176   2
## 51   6.8256                   0  47.24         in     50         lb 15.753   0
## 208 28.1570                   1  63.00         in    170         lb 30.114   7
## 218 60.6010                   0  72.00         in    225         lb 30.516   4
## 220 65.4880                   1  62.00         in    150         lb 27.436   8
## 152 64.7790                   0  72.00         in    210         lb 28.481   9
##     AHI AHI.REM Apnea.Counts Apnea.Counts.REM Latency.to.Sleep.Onset
## 142   0  0.0000            0                0                   24.5
## 51    0 12.4140           16                7                   42.0
## 208   0  4.6154            0                0                    1.5
## 218   0 18.9470            1                0                   13.0
## 220   0  6.8571            0                0                    4.5
## 152   0  4.4681            2                0                    0.0
##     Latency.to.REM Desats.LT.90 Desats.LT.80 Desats.LT.70 PLM.Total LEG1.Index
## 142          183.5            0            0            0         3    1.28460
## 51            91.0            5            0            0         0    0.00000
## 208           67.0            1            0            0         0    2.01490
## 218          129.0           16            0            0         1    1.09890
## 220           87.0            0            0            0         7    9.04110
## 152           38.0            4            0            0         8    0.65753
##     LEG2.Index
## 142     1.7380
## 51      0.0000
## 208     2.7612
## 218     2.5275
## 220     9.2877
## 152     1.3151
```

```
#assign y var
```

```r
testing.y<-testing$AHI
#head(testing.y)
#length(y)

#remove y var from predictors list
testing.x<-testing[,-9]
#head(testing.x)


mod.logit <- glm(factor(AHI)~AHI.REM+Apnea.Counts+Latency.to.REM+Desats.LT.90+Desats.LT.70, data = trai
print(summary(mod.logit))
```

```
##
## Call:
## glm(formula = factor(AHI) ~ AHI.REM + Apnea.Counts + Latency.to.REM +
##     Desats.LT.90 + Desats.LT.70, family = "binomial", data = training)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -1.44847  -0.05361  -0.02727  -0.01413   2.93912
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -11.194471   2.625531  -4.264 2.01e-05 ***
## AHI.REM          0.068457   0.025395   2.696 0.007024 **
## Apnea.Counts     0.018872   0.011362   1.661 0.096705 .
## Latency.to.REM   0.016244   0.006158   2.638 0.008339 **
## Desats.LT.90     0.041957   0.012282   3.416 0.000636 ***
## Desats.LT.70    -0.257562   0.101386  -2.540 0.011072 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 114.998  on 319  degrees of freedom
## Residual deviance:  24.254  on 314  degrees of freedom
## AIC: 36.254
##
## Number of Fisher Scoring iterations: 9
```

```r
pred.y <- predict(mod.logit,newdata = testing.x, type = "response")
pred.y <- ifelse(pred.y > 30, 1, 0)
table(pred.y,testing.y)
```

```
##       testing.y
## pred.y  0  1
##      0 73  7
```

```r
1-mean(pred.y != testing.y) # Accuracy rate
```

```
## [1] 0.9125
```

```r
pred_df<-data.frame(data=pred.y)

# b.
summary(mod.logit)
```

```
##
## Call:
## glm(formula = factor(AHI) ~ AHI.REM + Apnea.Counts + Latency.to.REM +
##     Desats.LT.90 + Desats.LT.70, family = "binomial", data = training)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -1.44847  -0.05361  -0.02727  -0.01413   2.93912
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -11.194471   2.625531  -4.264 2.01e-05 ***
## AHI.REM          0.068457   0.025395   2.696 0.007024 **
## Apnea.Counts     0.018872   0.011362   1.661 0.096705 .
## Latency.to.REM   0.016244   0.006158   2.638 0.008339 **
## Desats.LT.90     0.041957   0.012282   3.416 0.000636 ***
## Desats.LT.70    -0.257562   0.101386  -2.540 0.011072 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 114.998  on 319  degrees of freedom
## Residual deviance:  24.254  on 314  degrees of freedom
## AIC: 36.254
##
## Number of Fisher Scoring iterations: 9
```

```r
#c.
#head(print(training))
pred_y_train <- mod.logit$fitted.values
pred_y_train <- ifelse(pred_y_train > 30, 1,0)
table(pred_y_train,training$AHI)
```

```
##
## pred_y_train   0   1
##            0 306  14
```

```r
1-mean(pred_y_train != training$AHI) # Accuracy rate
```

```
## [1] 0.95625
```

```r
#pred_df<-data.frame(data=pred_y_train)
```