

With1.6

```
library(gdata)
library(MASS)
library(ggplot2)
library("ggthemes")
library("GGally")
library("extracat")
library(hdrcde)
library(KernSmooth)
library("ggplot2")
library("gridExtra")
library("vcd")
library(class)
library(sqldf)
```

```
## Warning in doTryCatch(return(expr), name, parentenv, handler):      '/Library/Frameworks/R.framework/R
## dlopen(/Library/Frameworks/R.framework/Resources/modules//R_X11.so, 6): Library not loaded: /opt/X11/
##   Referenced from: /Library/Frameworks/R.framework/Resources/modules//R_X11.so
##   Reason: image not found
```

```
library(cccrm)
```

First, read the data and modify into categories

```
set.seed(40001)
df = read.xls ("data1.xlsx", sheet = 1, header = TRUE, na.strings=c("NA", "<NA>", "", "*", "unclear"))
#head(df)
#df[,6]
df[,6]<-as.numeric(as.character(df[,6]))
```

```
## Warning:      NA
```

```
data_2<-df
data_2<-df[complete.cases(df), ]
df<-df[complete.cases(df), ]
colnames(data_2)<-c('C1', 'C2', 'C3', 'C4', 'EC1', 'EC2', 'EC3')
##
head(data_2)
```

```
##   C1 C2 C3  C4  EC1  EC2  EC3
## 1 60  0 30 1.50 -1.02 -6.10 1.57
## 3 80  0 40 1.33  0.71  4.12 1.66
## 4 60  0 60 1.00  3.20  5.60 2.26
## 5 60  0 20 1.50 -2.50 -2.30 1.40
## 6 40  0 30 1.00  0.16 -1.29 1.53
## 7 90  1 40 1.50  0.15  0.50 1.50
```

```
data_2[,1][df[,1]<100]<-0
data_2[,2][df[,2]==0]<-0
data_2[,3][df[,3]<40]<-0
data_2[,4][df[,4]<1.6]<-0
data_2[,5][df[,5]<2.0]<-0
data_2[,6][df[,6]<2.0]<-0
data_2[,7][df[,7]<1.6]<-0
##
```

```

data_2[,1][df[,1]>=100]<-1
data_2[,2][df[,2]!=0]<-1
data_2[,3][df[,3]>=40]<-1
data_2[,4][df[,4]>=1.6]<-1
data_2[,5][df[,5]>=2.0]<-1
data_2[,6][df[,6]>=2.0]<-1
data_2[,7][df[,7]>=1.6]<-1
##
C1<-data_2[,1]
C2<-data_2[,2]
C3<-data_2[,3]
C4<-data_2[,4]
EC1<-data_2[,5]
EC2<-data_2[,6]
EC3<-data_2[,7]
##
head(data_2)

##   C1 C2 C3 C4 EC1 EC2 EC3
## 1  0  0  0  0  0  0  0
## 3  0  0  1  0  0  1  1
## 4  0  0  1  0  1  1  1
## 5  0  0  0  0  0  0  0
## 6  0  0  0  0  0  0  0
## 7  0  1  1  0  0  0  0

```

Therefore, the datas are divided into binary format.

```
library(fmsb)
```

```

##
## Attaching package: 'fmsb'

## The following object is masked from 'package:vcd':
##
##   oddsratio

CEC11<-Kappa.test(C1,EC1,conf.level = 0.90)
CEC21<-Kappa.test(C2,EC1,conf.level = 0.90)
CEC31<-Kappa.test(C3,EC1,conf.level = 0.90)
CEC41<-Kappa.test(C4,EC1,conf.level = 0.90)
CEC12<-Kappa.test(C1,EC2,conf.level = 0.90)
CEC22<-Kappa.test(C2,EC2,conf.level = 0.90)
CEC32<-Kappa.test(C3,EC2,conf.level = 0.90)
CEC42<-Kappa.test(C4,EC2,conf.level = 0.90)
CEC13<-Kappa.test(C1,EC3,conf.level = 0.90)
CEC23<-Kappa.test(C2,EC3,conf.level = 0.90)
CEC33<-Kappa.test(C3,EC3,conf.level = 0.90)
CEC43<-Kappa.test(C4,EC3,conf.level = 0.90)
Kappa_values<-c(CEC11$Result$estimate,CEC21$Result$estimate,CEC31$Result$estimate,
                CEC12$Result$estimate,CEC22$Result$estimate,CEC32$Result$estimate,CEC42$Result$estimate,
                CEC13$Result$estimate,CEC23$Result$estimate,CEC33$Result$estimate,CEC43$Result$estimate)
pvalues<-c(CEC11$Result$p.value,CEC21$Result$p.value,CEC31$Result$p.value,CEC41$Result$p.value,
           CEC12$Result$p.value,CEC22$Result$p.value,CEC32$Result$p.value,CEC42$Result$p.value,
           CEC13$Result$p.value,CEC23$Result$p.value,CEC33$Result$p.value,CEC43$Result$p.value)
Judgements<-c(CEC11$Judgement,CEC21$Judgement,CEC31$Judgement,CEC41$Judgement,

```

```

      CEC12$Judgement,CEC22$Judgement,CEC32$Judgement,CEC42$Judgement,
      CEC13$Judgement,CEC23$Judgement,CEC33$Judgement,CEC43$Judgement)
results_cp<-cbind(Kappa_values,pvalues,Judgements)
rownames(results_cp)<-c('C1&EC1','C2&EC1','C3&EC1','C4&EC1',
                        'C1&EC2','C2&EC2','C3&EC2','C4&EC2',
                        'C1&EC3','C2&EC3','C3&EC3','C4&EC3')
C1_C2_EC1<-Kappa.test(C1*C2,EC1,conf.level = 0.90)
C1_C3_EC1<-Kappa.test(C1*C3,EC1,conf.level = 0.90)
C1_C4_EC1<-Kappa.test(C1*C4,EC1,conf.level = 0.90)
C2_C3_EC1<-Kappa.test(C2*C3,EC1,conf.level = 0.90)
C2_C4_EC1<-Kappa.test(C2*C4,EC1,conf.level = 0.90)
C3_C4_EC1<-Kappa.test(C3*C4,EC1,conf.level = 0.90)
#
C1_C2_EC2<-Kappa.test(C1*C2,EC2,conf.level = 0.90)
C1_C3_EC2<-Kappa.test(C1*C3,EC2,conf.level = 0.90)
C1_C4_EC2<-Kappa.test(C1*C4,EC2,conf.level = 0.90)
C2_C3_EC2<-Kappa.test(C2*C3,EC2,conf.level = 0.90)
C2_C4_EC2<-Kappa.test(C2*C4,EC2,conf.level = 0.90)
C3_C4_EC2<-Kappa.test(C3*C4,EC2,conf.level = 0.90)
#
C1_C2_EC3<-Kappa.test(C1*C2,EC3,conf.level = 0.90)
C1_C3_EC3<-Kappa.test(C1*C3,EC3,conf.level = 0.90)
C1_C4_EC3<-Kappa.test(C1*C4,EC3,conf.level = 0.90)
C2_C3_EC3<-Kappa.test(C2*C3,EC3,conf.level = 0.90)
C2_C4_EC3<-Kappa.test(C2*C4,EC3,conf.level = 0.90)
C3_C4_EC3<-Kappa.test(C3*C4,EC3,conf.level = 0.90)
#
Kappa_values.2<-c(C1_C2_EC1$Result$estimate,C1_C3_EC1$Result$estimate,C1_C4_EC1$Result$estimate,C2_C3_EC1$Result$estimate,
                  C1_C2_EC2$Result$estimate,C1_C3_EC2$Result$estimate,C1_C4_EC2$Result$estimate,C2_C3_EC2$Result$estimate,
                  C1_C2_EC3$Result$estimate,C1_C3_EC3$Result$estimate,C1_C4_EC3$Result$estimate,C2_C3_EC3$Result$estimate)
pvalues.2<-c(C1_C2_EC1$Result$p.value,C1_C3_EC1$Result$p.value,C1_C4_EC1$Result$p.value,C2_C3_EC1$Result$p.value,
             C1_C2_EC2$Result$p.value,C1_C3_EC2$Result$p.value,C1_C4_EC2$Result$p.value,C2_C3_EC2$Result$p.value,
             C1_C2_EC3$Result$p.value,C1_C3_EC3$Result$p.value,C1_C4_EC3$Result$p.value,C2_C3_EC3$Result$p.value)
Judgements.2<-c(C1_C2_EC1$Judgement,C1_C3_EC1$Judgement,C1_C4_EC1$Judgement,C2_C3_EC1$Judgement,C2_C4_EC1$Judgement,
                C1_C2_EC2$Judgement,C1_C3_EC2$Judgement,C1_C4_EC2$Judgement,C2_C3_EC2$Judgement,C2_C4_EC2$Judgement,
                C1_C2_EC3$Judgement,C1_C3_EC3$Judgement,C1_C4_EC3$Judgement,C2_C3_EC3$Judgement,C2_C4_EC3$Judgement)
results_cp.2<-cbind(Kappa_values.2,pvalues.2,Judgements.2)
rownames(results_cp.2)<-c('C1_C2&EC1','C1_C3&EC1','C1_C4&EC1','C2_C3&EC1','C2_C4&EC1','C3_C4&EC1',
                        'C1_C2&EC2','C1_C3&EC2','C1_C4&EC2','C2_C3&EC2','C2_C4&EC2','C3_C4&EC2',
                        'C1_C2&EC3','C1_C3&EC3','C1_C4&EC3','C2_C3&EC3','C2_C4&EC3','C3_C4&EC3')
#write.table(results_cp.2, "/Users/hemu/Desktop/re_2_results18.txt", sep="\t")
##3 combinations
C1_C2_C3_EC1<-Kappa.test(C1*C2*C3,EC1,conf.level = 0.90)
C1_C2_C4_EC1<-Kappa.test(C1*C2*C4,EC1,conf.level = 0.90)
C1_C3_C4_EC1<-Kappa.test(C1*C3*C4,EC1,conf.level = 0.90)
C2_C3_C4_EC1<-Kappa.test(C2*C3*C4,EC1,conf.level = 0.90)
C1_C2_C3_EC2<-Kappa.test(C1*C2*C3,EC2,conf.level = 0.90)
C1_C2_C4_EC2<-Kappa.test(C1*C2*C4,EC2,conf.level = 0.90)
C1_C3_C4_EC2<-Kappa.test(C1*C3*C4,EC2,conf.level = 0.90)
C2_C3_C4_EC2<-Kappa.test(C2*C3*C4,EC2,conf.level = 0.90)
C1_C2_C3_EC3<-Kappa.test(C1*C2*C3,EC3,conf.level = 0.90)

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C1_C2_C4_EC3<-Kappa.test(C1*C2*C4,EC3,conf.level = 0.90)
C1_C3_C4_EC3<-Kappa.test(C1*C3*C4,EC3,conf.level = 0.90)
C2_C3_C4_EC3<-Kappa.test(C2*C3*C4,EC3,conf.level = 0.90)
Kappa_values.3<-c(C1_C2_C3_EC1$Result$estimate,C1_C2_C4_EC1$Result$estimate,C1_C3_C4_EC1$Result$estimate,
                  C1_C2_C3_EC2$Result$estimate,C1_C2_C4_EC2$Result$estimate,C1_C3_C4_EC2$Result$estimate,
                  C1_C2_C3_EC3$Result$estimate,C1_C2_C4_EC3$Result$estimate,C1_C3_C4_EC3$Result$estimate)
pvalues.3<-c(C1_C2_C3_EC1$Result$p.value,C1_C2_C4_EC1$Result$p.value,C1_C3_C4_EC1$Result$p.value,C2_C3_C4_EC1$Result$p.value,
              C1_C2_C3_EC2$Result$p.value,C1_C2_C4_EC2$Result$p.value,C1_C3_C4_EC2$Result$p.value,C2_C3_C4_EC2$Result$p.value,
              C1_C2_C3_EC3$Result$p.value,C1_C2_C4_EC3$Result$p.value,C1_C3_C4_EC3$Result$p.value,C2_C3_C4_EC3$Result$p.value)
Judgements.3<-c(C1_C2_C3_EC1$Judgement,C1_C2_C4_EC1$Judgement,C1_C3_C4_EC1$Judgement,C2_C3_C4_EC1$Judgement,
                 C1_C2_C3_EC2$Judgement,C1_C2_C4_EC2$Judgement,C1_C3_C4_EC2$Judgement,C2_C3_C4_EC2$Judgement,
                 C1_C2_C3_EC3$Judgement,C1_C2_C4_EC3$Judgement,C1_C3_C4_EC3$Judgement,C2_C3_C4_EC3$Judgement)
results_cp.3<-cbind(Kappa_values.3,pvalues.3,Judgements.3)
rownames(results_cp.3)<-c('C1_C2_C3&EC1','C1_C2_C4&EC1','C1_C3_C4&EC1','C2_C3_C4&EC1','C1_C2_C3&EC2','C1_C2_C4&EC2','C1_C3_C4&EC2','C2_C3_C4&EC2','C1_C2_C3&EC3','C1_C2_C4&EC3','C1_C3_C4&EC3','C2_C3_C4&EC3','C1_C2_C3&EC3','C1_C2_C4&EC3','C1_C3_C4&EC3')
##

C1_EC1_EC2<-Kappa.test(C1,EC1*EC2,conf.level = 0.90)
C1_EC1_EC3<-Kappa.test(C1,EC1*EC3,conf.level = 0.90)
C1_EC2_EC3<-Kappa.test(C1,EC2*EC3,conf.level = 0.90)
C2_EC1_EC2<-Kappa.test(C2,EC1*EC2,conf.level = 0.90)
C2_EC1_EC3<-Kappa.test(C2,EC1*EC3,conf.level = 0.90)
C2_EC2_EC3<-Kappa.test(C2,EC2*EC3,conf.level = 0.90)
C3_EC1_EC2<-Kappa.test(C3,EC1*EC2,conf.level = 0.90)
C3_EC1_EC3<-Kappa.test(C3,EC1*EC3,conf.level = 0.90)
C3_EC2_EC3<-Kappa.test(C3,EC2*EC3,conf.level = 0.90)
C4_EC1_EC2<-Kappa.test(C4,EC1*EC2,conf.level = 0.90)
C4_EC1_EC3<-Kappa.test(C4,EC1*EC3,conf.level = 0.90)
C4_EC2_EC3<-Kappa.test(C4,EC2*EC3,conf.level = 0.90)
Kappa_values.4<-c(C1_EC1_EC2$Result$estimate,C1_EC1_EC3$Result$estimate,C1_EC2_EC3$Result$estimate,
                  C2_EC1_EC2$Result$estimate,C2_EC1_EC3$Result$estimate,C2_EC2_EC3$Result$estimate,
                  C3_EC1_EC2$Result$estimate,C3_EC1_EC3$Result$estimate,C3_EC2_EC3$Result$estimate,
                  C4_EC1_EC2$Result$estimate,C4_EC1_EC3$Result$estimate,C4_EC2_EC3$Result$estimate)
pvalues.4<-c(C1_EC1_EC2$Result$p.value,C1_EC1_EC3$Result$p.value,C1_EC2_EC3$Result$p.value,
              C2_EC1_EC2$Result$p.value,C2_EC1_EC3$Result$p.value,C2_EC2_EC3$Result$p.value,
              C3_EC1_EC2$Result$p.value,C3_EC1_EC3$Result$p.value,C3_EC2_EC3$Result$p.value,
              C4_EC1_EC2$Result$p.value,C4_EC1_EC3$Result$p.value,C4_EC2_EC3$Result$p.value)
Judgements.4<-c(C1_EC1_EC2$Judgement,C1_EC1_EC3$Judgement,C1_EC2_EC3$Judgement,
                 C2_EC1_EC2$Judgement,C2_EC1_EC3$Judgement,C2_EC2_EC3$Judgement,
                 C3_EC1_EC2$Judgement,C3_EC1_EC3$Judgement,C3_EC2_EC3$Judgement,
                 C4_EC1_EC2$Judgement,C4_EC1_EC3$Judgement,C4_EC2_EC3$Judgement)
results_cp.4<-cbind(Kappa_values.4,pvalues.4,Judgements.4)
rownames(results_cp.4)<-c('C1&EC1_EC2','C1&EC1_EC3','C1&EC2_EC3',
                        'C2&EC1_EC2','C2&EC1_EC3','C2&EC2_EC3',
                        'C3&EC1_EC2','C3&EC1_EC3','C3&EC2_EC3',
                        'C4&EC1_EC2','C4&EC1_EC3','C4&EC2_EC3')
C1_EC1_EC2_EC3<-Kappa.test(C1,EC1*EC2*EC3,conf.level = 0.90)
C2_EC1_EC2_EC3<-Kappa.test(C2,EC1*EC2*EC3,conf.level = 0.90)
C3_EC1_EC2_EC3<-Kappa.test(C3,EC1*EC2*EC3,conf.level = 0.90)
C4_EC1_EC2_EC3<-Kappa.test(C4,EC1*EC2*EC3,conf.level = 0.90)
Kappa_values.5<-c(C1_EC1_EC2_EC3$Result$estimate,C2_EC1_EC2_EC3$Result$estimate,
                  C3_EC1_EC2_EC3$Result$estimate,C4_EC1_EC2_EC3$Result$estimate)
pvalues.5<-c(C1_EC1_EC2_EC3$Result$p.value,C2_EC1_EC2_EC3$Result$p.value,
              C3_EC1_EC2_EC3$Result$p.value,C4_EC1_EC2_EC3$Result$p.value)

```

```

Judgements.5<-c(C1_EC1_EC2_EC3$Judgement,C2_EC1_EC2_EC3$Judgement,
                C3_EC1_EC2_EC3$Judgement,C4_EC1_EC2_EC3$Judgement)
results_cp.5<-cbind(Kappa_values.5,pvalues.5,Judgements.5)
rownames(results_cp.5)<-c('C1&EC1_EC2_EC3','C2&EC1_EC2_EC3','C3&EC1_EC2_EC3','C4&EC1_EC2_EC3')
##
C1_C2_C3_C4_EC1_EC2_EC3<-Kappa.test(C1*C2*C3*C4,EC1*EC2*EC3,conf.level = 0.90)
Kappa_values.6<-c(C1_C2_C3_C4_EC1_EC2_EC3$Result$estimate)
pvalues.6<-c(C1_C2_C3_C4_EC1_EC2_EC3$Result$p.value)
Judgements.6<-c(C1_C2_C3_C4_EC1_EC2_EC3$Judgement)
results_cp.6<-cbind(Kappa_values.6,pvalues.6,Judgements.6)
rownames(results_cp.6)<-c('C1_C2_C3_C4&EC1_EC2_EC3')
##
cbresults<-rbind(results_cp,results_cp.2,results_cp.3,results_cp.4,results_cp.5,results_cp.6)
colnames(cbresults)<-c('Kappa_values','pvalues','Judgements')
cbresults

```

| ## | Kappa_values | pvalues |
|-----------------|------------------------|----------------------|
| ## C1&EC1 | "0.0915515409139215" | "0.086236116907047" |
| ## C2&EC1 | "0.0927958833619214" | "0.0947056182528914" |
| ## C3&EC1 | "0.106129164952694" | "0.0382428027248299" |
| ## C4&EC1 | "0.0971671163307415" | "0.0343144250518543" |
| ## C1&EC2 | "0.0481964416280767" | "0.257156180729936" |
| ## C2&EC2 | "-0.0220916092419942" | "0.609813831354921" |
| ## C3&EC2 | "0.137807606263982" | "0.0155087236200574" |
| ## C4&EC2 | "0.047183098591549" | "0.196948834313463" |
| ## C1&EC3 | "0.0247499073731013" | "0.31115872844219" |
| ## C2&EC3 | "0.0662908680947013" | "0.0963508933009044" |
| ## C3&EC3 | "-0.0152885443583117" | "0.622961330793225" |
| ## C4&EC3 | "-0.0159644617199973" | "0.63216558099716" |
| ## C1_C2&EC1 | "0.0670348314980542" | "0.196358420725198" |
| ## C1_C3&EC1 | "0.00643116786280171" | "0.465788440834035" |
| ## C1_C4&EC1 | "0.0717759517021637" | "0.15118497211517" |
| ## C2_C3&EC1 | "0.0592734225621409" | "0.220920380164853" |
| ## C2_C4&EC1 | "0.0388732024427087" | "0.308532762122575" |
| ## C3_C4&EC1 | "0.0614111376069574" | "0.189401963187765" |
| ## C1_C2&EC2 | "-0.0403010952763562" | "0.670210833731205" |
| ## C1_C3&EC2 | "0.0994165427296654" | "0.123078984158666" |
| ## C1_C4&EC2 | "0.0745829244357211" | "0.168101846661537" |
| ## C2_C3&EC2 | "-0.019461260309593" | "0.586324168862563" |
| ## C2_C4&EC2 | "-0.00928305014504686" | "0.540919653451397" |
| ## C3_C4&EC2 | "0.126311289420895" | "0.0522994750783627" |
| ## C1_C2&EC3 | "0.0362064306944069" | "0.243579047135683" |
| ## C1_C3&EC3 | "0.00984319560489894" | "0.424323349874286" |
| ## C1_C4&EC3 | "0.0242478670857656" | "0.316218545465158" |
| ## C2_C3&EC3 | "0.0498827869797469" | "0.168279538434992" |
| ## C2_C4&EC3 | "0.0430596210137115" | "0.203850569801143" |
| ## C3_C4&EC3 | "0.000524246395806047" | "0.495877244084578" |
| ## C1_C2_C3&EC1 | "0.0327987584066219" | "0.341512604159997" |
| ## C1_C2_C4&EC1 | "0.0247770069375625" | "0.378155150511409" |
| ## C1_C3_C4&EC1 | "0.000447914000511487" | "0.497661317097694" |
| ## C2_C3_C4&EC1 | "0.0118786047789069" | "0.441040211660881" |
| ## C1_C2_C3&EC2 | "-0.0122098483832015" | "0.551289471331964" |
| ## C1_C2_C4&EC2 | "-0.0195317666769537" | "0.582404675177318" |
| ## C1_C3_C4&EC2 | "0.107985336308575" | "0.110275549519501" |

| | | |
|----------------------------|-----------------------|----------------------|
| ## C2_C3_C4&EC2 | "0.00595026642983958" | "0.474841746229216" |
| ## C1_C2_C3&EC3 | "0.0305183459522423" | "0.280055237841078" |
| ## C1_C2_C4&EC3 | "0.0224091807854846" | "0.334179467458987" |
| ## C1_C3_C4&EC3 | "0.00950993174323173" | "0.427179309034931" |
| ## C2_C3_C4&EC3 | "0.0360052766353689" | "0.245764413010168" |
| ## C1&EC1_EC2 | "0.00439407955596707" | "0.479698479251195" |
| ## C1&EC1_EC3 | "0.115339348764221" | "0.0684013022795533" |
| ## C1&EC2_EC3 | "0.0185212298682278" | "0.412228114841814" |
| ## C2&EC1_EC2 | "0.00136836343732865" | "0.494305116178753" |
| ## C2&EC1_EC3 | "0.0562195661797258" | "0.251450684204202" |
| ## C2&EC2_EC3 | "-0.0171355498721229" | "0.573923699745733" |
| ## C3&EC1_EC2 | "0.0702472293265129" | "0.159228306425296" |
| ## C3&EC1_EC3 | "0.145833333333334" | "0.0134422208384067" |
| ## C3&EC2_EC3 | "0.0961379081717217" | "0.0818179369330275" |
| ## C4&EC1_EC2 | "0.0701591511936338" | "0.114621704449421" |
| ## C4&EC1_EC3 | "0.0948997716315657" | "0.0459231686424771" |
| ## C4&EC2_EC3 | "0.00737218635491197" | "0.449194888780799" |
| ## C1&EC1_EC2_EC3 | "0.0347533632286994" | "0.353714921953989" |
| ## C2&EC1_EC2_EC3 | "-0.0308720560152771" | "0.615671893105962" |
| ## C3&EC1_EC2_EC3 | "0.102731054440224" | "0.0807255174147591" |
| ## C4&EC1_EC2_EC3 | "0.0668271851717245" | "0.131195058526265" |
| ## C1_C2_C3_C4&EC1_EC2_EC3 | "-0.0234600716514504" | "0.557405783302795" |
| ## | Judgements | |
| ## C1&EC1 | "Slight agreement" | |
| ## C2&EC1 | "Slight agreement" | |
| ## C3&EC1 | "Slight agreement" | |
| ## C4&EC1 | "Slight agreement" | |
| ## C1&EC2 | "Slight agreement" | |
| ## C2&EC2 | "No agreement" | |
| ## C3&EC2 | "Slight agreement" | |
| ## C4&EC2 | "Slight agreement" | |
| ## C1&EC3 | "Slight agreement" | |
| ## C2&EC3 | "Slight agreement" | |
| ## C3&EC3 | "No agreement" | |
| ## C4&EC3 | "No agreement" | |
| ## C1_C2&EC1 | "Slight agreement" | |
| ## C1_C3&EC1 | "Slight agreement" | |
| ## C1_C4&EC1 | "Slight agreement" | |
| ## C2_C3&EC1 | "Slight agreement" | |
| ## C2_C4&EC1 | "Slight agreement" | |
| ## C3_C4&EC1 | "Slight agreement" | |
| ## C1_C2&EC2 | "No agreement" | |
| ## C1_C3&EC2 | "Slight agreement" | |
| ## C1_C4&EC2 | "Slight agreement" | |
| ## C2_C3&EC2 | "No agreement" | |
| ## C2_C4&EC2 | "No agreement" | |
| ## C3_C4&EC2 | "Slight agreement" | |
| ## C1_C2&EC3 | "Slight agreement" | |
| ## C1_C3&EC3 | "Slight agreement" | |
| ## C1_C4&EC3 | "Slight agreement" | |
| ## C2_C3&EC3 | "Slight agreement" | |
| ## C2_C4&EC3 | "Slight agreement" | |
| ## C3_C4&EC3 | "Slight agreement" | |
| ## C1_C2_C3&EC1 | "Slight agreement" | |

```

## C1_C2_C4&EC1      "Slight agreement"
## C1_C3_C4&EC1      "Slight agreement"
## C2_C3_C4&EC1      "Slight agreement"
## C1_C2_C3&EC2      "No agreement"
## C1_C2_C4&EC2      "No agreement"
## C1_C3_C4&EC2      "Slight agreement"
## C2_C3_C4&EC2      "Slight agreement"
## C1_C2_C3&EC3      "Slight agreement"
## C1_C2_C4&EC3      "Slight agreement"
## C1_C3_C4&EC3      "Slight agreement"
## C2_C3_C4&EC3      "Slight agreement"
## C1&EC1_EC2        "Slight agreement"
## C1&EC1_EC3        "Slight agreement"
## C1&EC2_EC3        "Slight agreement"
## C2&EC1_EC2        "Slight agreement"
## C2&EC1_EC3        "Slight agreement"
## C2&EC2_EC3        "No agreement"
## C3&EC1_EC2        "Slight agreement"
## C3&EC1_EC3        "Slight agreement"
## C3&EC2_EC3        "Slight agreement"
## C4&EC1_EC2        "Slight agreement"
## C4&EC1_EC3        "Slight agreement"
## C4&EC2_EC3        "Slight agreement"
## C1&EC1_EC2_EC3    "Slight agreement"
## C2&EC1_EC2_EC3    "No agreement"
## C3&EC1_EC2_EC3    "Slight agreement"
## C4&EC1_EC2_EC3    "Slight agreement"
## C1_C2_C3_C4&EC1_EC2_EC3 "No agreement"

```

```

library(caret)
library(precrec)

```

```

###C1
t_C1_EC1<-table(C1,EC1)
confusionMatrix(t_C1_EC1)

```

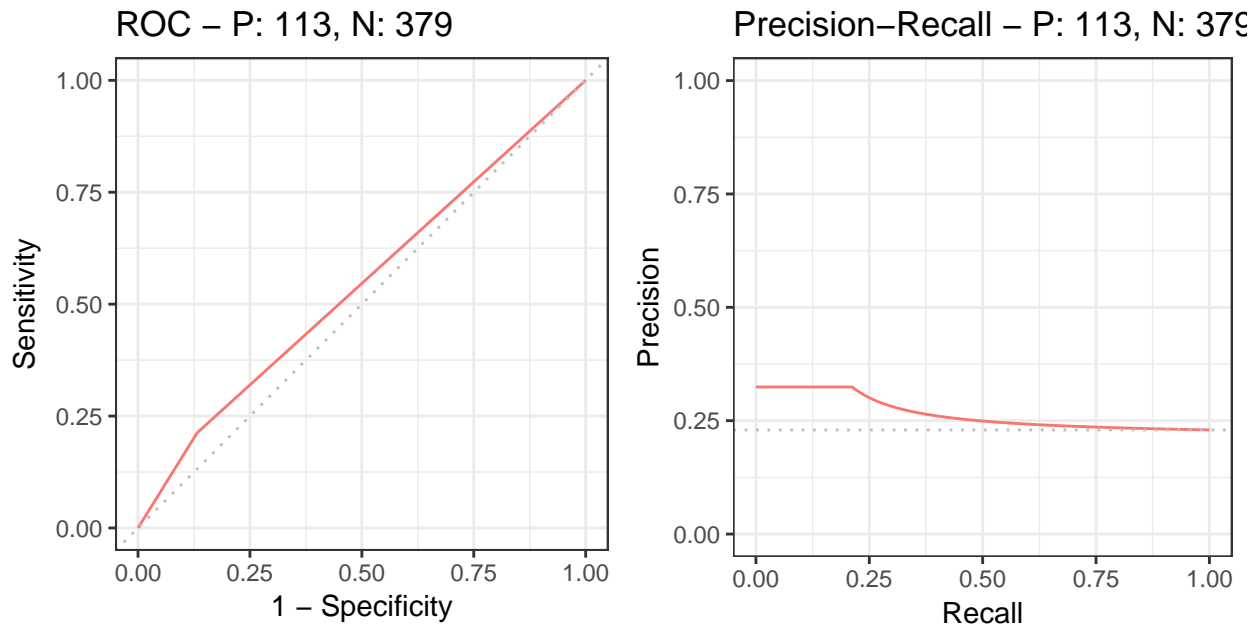
```

## Confusion Matrix and Statistics
##
##      EC1
## C1      0      1
##      0 329   89
##      1  50   24
##
##              Accuracy : 0.7175
##              95% CI   : (0.6755, 0.7569)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.997279
##
##              Kappa   : 0.0916
##  Mcnemar's Test P-Value : 0.001268
##
##              Sensitivity : 0.8681
##              Specificity : 0.2124
##              Pos Pred Value : 0.7871
##              Neg Pred Value : 0.3243

```

```
##           Prevalence : 0.7703
##           Detection Rate : 0.6687
##           Detection Prevalence : 0.8496
##           Balanced Accuracy : 0.5402
##
##           'Positive' Class : 0
##
```

```
sscurves11<- evalmod(scores = C1, labels = EC1)
autoplot(sscurves11)
```



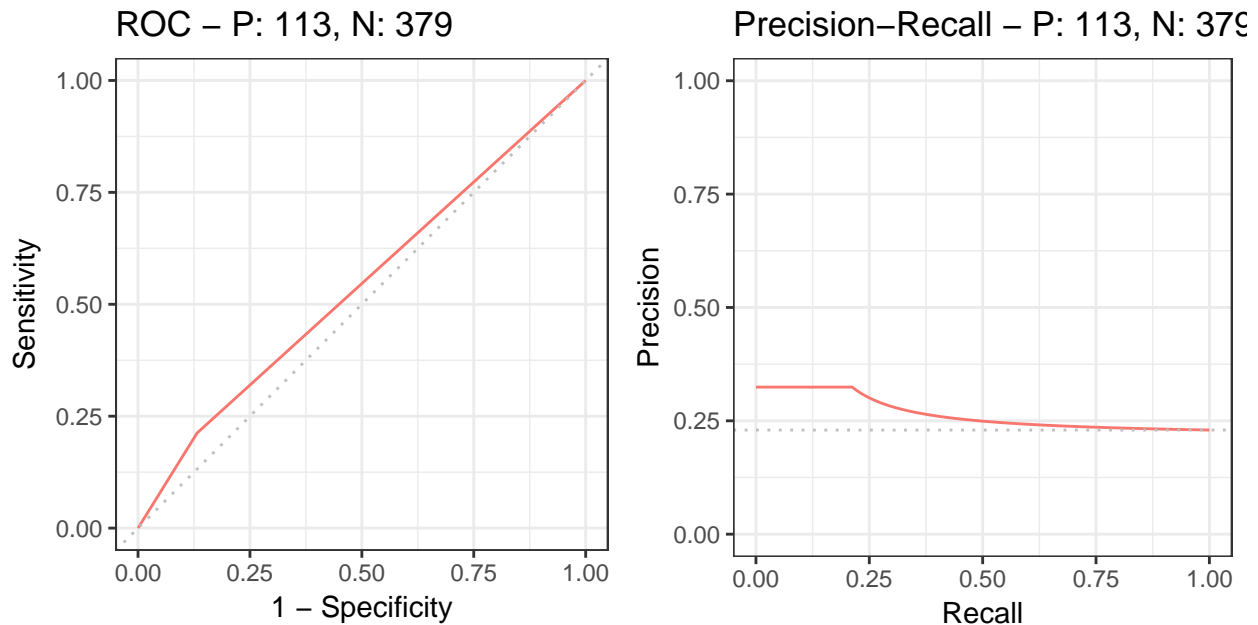
```
#####
t_C1_EC2<-table(C1,EC2)
confusionMatrix(t_C1_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
## C1    0    1
##  0 349   69
##  1   58   16
##
##              Accuracy : 0.7419
##              95% CI : (0.7008, 0.78)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 1.0000
##
##              Kappa : 0.0482
##  Mcnemar's Test P-Value : 0.3749
##
##              Sensitivity : 0.8575
##              Specificity : 0.1882
##      Pos Pred Value : 0.8349
##      Neg Pred Value : 0.2162
##              Prevalence : 0.8272
```



```
##          Detection Rate : 0.7093
##    Detection Prevalence : 0.8496
##          Balanced Accuracy : 0.5229
##
##          'Positive' Class : 0
##
```

```
sscurves12<- evalmod(scores = C1, labels = c(EC1))
autoplot(sscurves12)
```



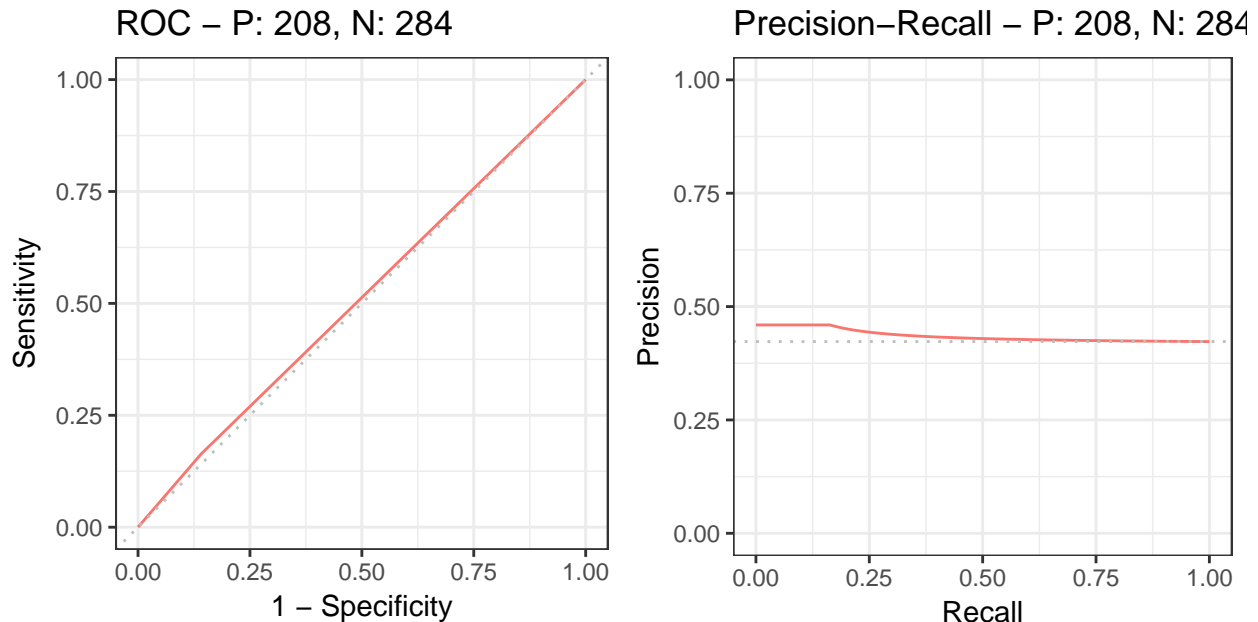
```
#####
t_C1_EC3<-table(C1,EC3)
confusionMatrix(t_C1_EC3)
```

```
## Confusion Matrix and Statistics
```

```
##
##      EC3
## C1    0    1
## 0 244 174
## 1  40  34
##
##              Accuracy : 0.565
##              95% CI : (0.5199, 0.6094)
##    No Information Rate : 0.5772
##    P-Value [Acc > NIR] : 0.724
##
##              Kappa : 0.0247
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.8592
##              Specificity : 0.1635
##    Pos Pred Value : 0.5837
##    Neg Pred Value : 0.4595
##              Prevalence : 0.5772
##    Detection Rate : 0.4959
```

```
## Detection Prevalence : 0.8496
## Balanced Accuracy : 0.5113
##
## 'Positive' Class : 0
##
```

```
sscurves13<- evalmod(scores = C1, labels = EC3)
autoplot(sscurves13)
```



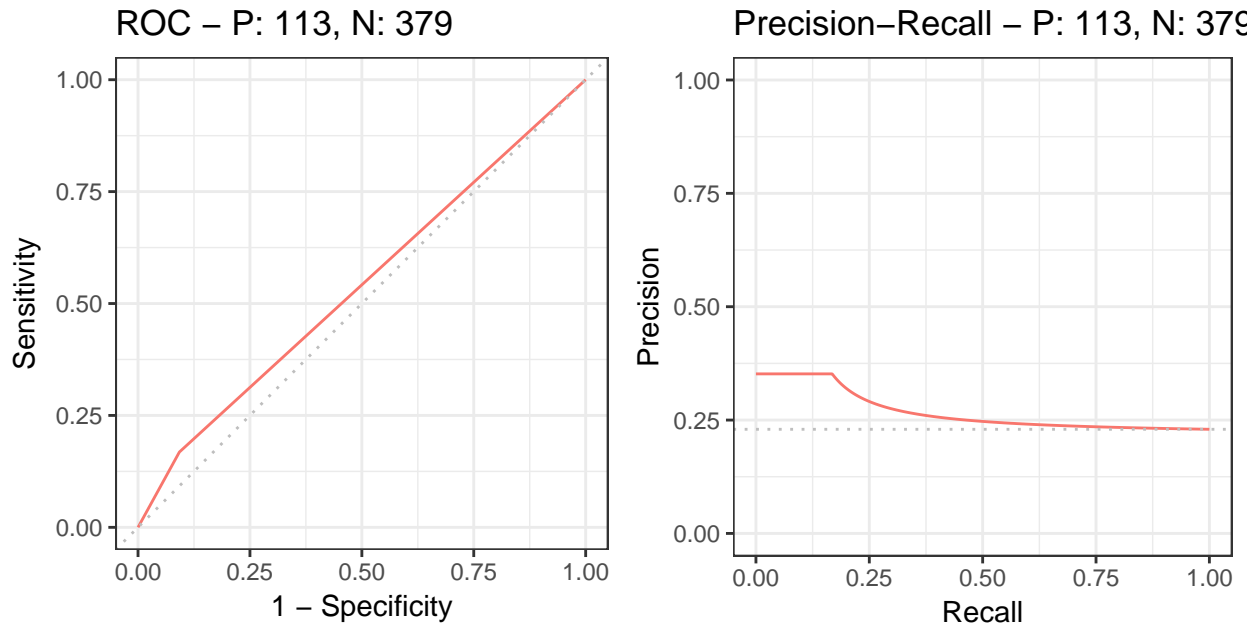
```
###C2
t_C2_EC1<-table(C2,EC1)
confusionMatrix(t_C2_EC1)
```

```
## Confusion Matrix and Statistics
```

```
##
##      EC1
## C2    0    1
##  0 344   94
##  1   35   19
##
##              Accuracy : 0.7378
##              95% CI : (0.6966, 0.7762)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.9599
##
##              Kappa : 0.0928
##  Mcnemar's Test P-Value : 3.28e-07
##
##      Sensitivity : 0.9077
##      Specificity : 0.1681
##      Pos Pred Value : 0.7854
##      Neg Pred Value : 0.3519
##      Prevalence : 0.7703
##      Detection Rate : 0.6992
##      Detection Prevalence : 0.8902
```

```
##      Balanced Accuracy : 0.5379
##
##      'Positive' Class : 0
##
```

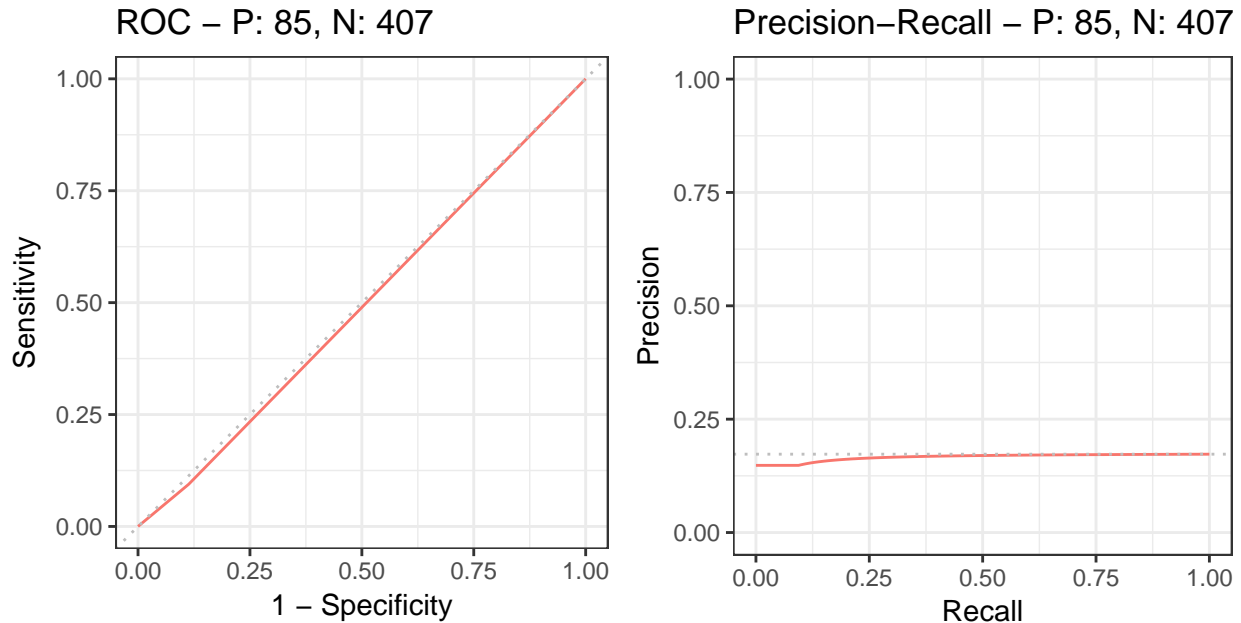
```
sscurves21<- evalmod(scores = C2, labels = EC1)
autoplot(sscurves21)
```



```
#
t_C2_EC2<-table(C2,EC2)
confusionMatrix(t_C2_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
## C2    0    1
##  0 361  77
##  1  46   8
##
##              Accuracy : 0.75
##              95% CI : (0.7093, 0.7877)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.99999
##
##              Kappa : -0.0221
##  Mcnemar's Test P-Value : 0.00683
##
##      Sensitivity : 0.88698
##      Specificity : 0.09412
##      Pos Pred Value : 0.82420
##      Neg Pred Value : 0.14815
##      Prevalence : 0.82724
##      Detection Rate : 0.73374
##      Detection Prevalence : 0.89024
##      Balanced Accuracy : 0.49055
```

```
##
##      'Positive' Class : 0
##
sscurves22<- evalmod(scores = C2, labels = EC2)
autoplot(sscurves22)
```

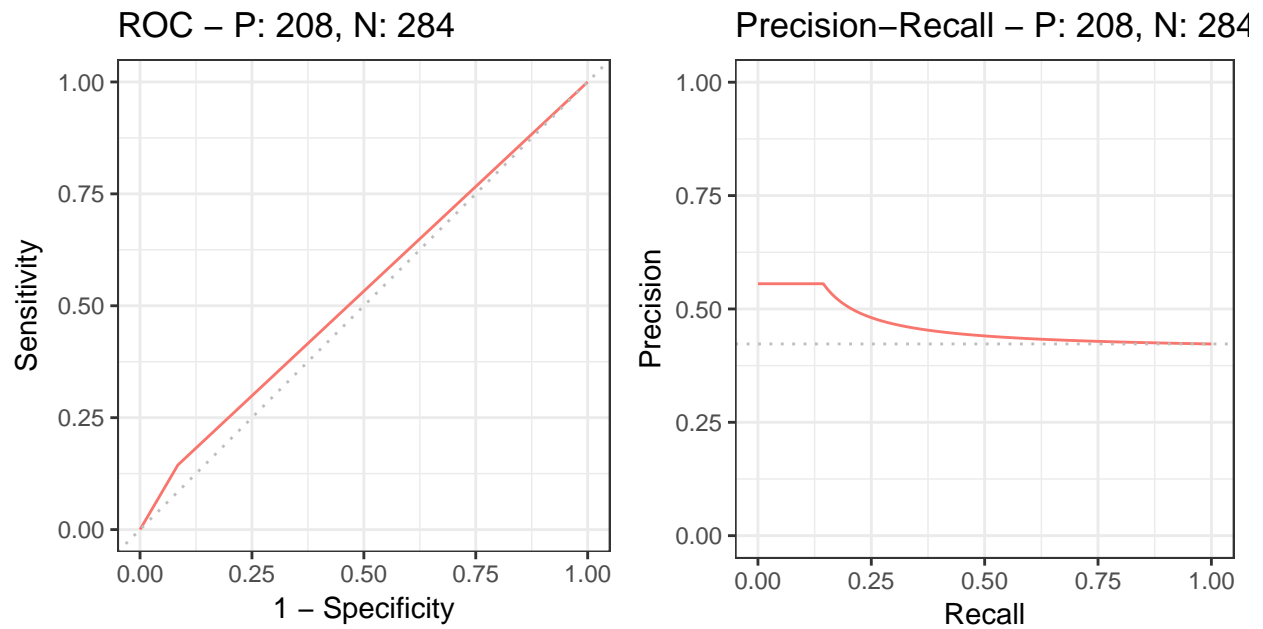


```
#
t_C2_EC3<-table(C2,EC3)
confusionMatrix(t_C2_EC3)

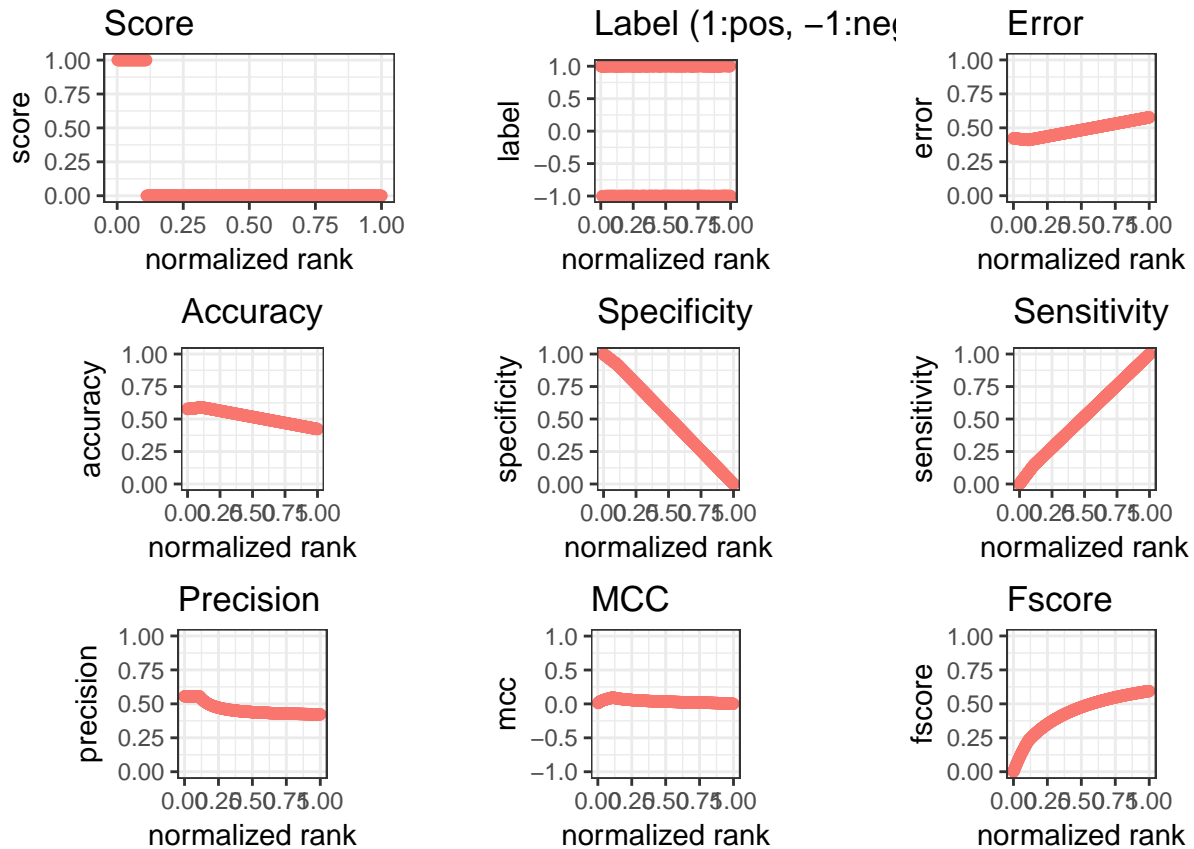
## Confusion Matrix and Statistics
##
##      EC3
## C2      0      1
##  0 260 178
##  1  24  30
##
##              Accuracy : 0.5894
##              95% CI   : (0.5445, 0.6333)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.3085
##
##              Kappa : 0.0663
##  Mcnemar's Test P-Value : <2e-16
##
##      Sensitivity : 0.9155
##      Specificity : 0.1442
##      Pos Pred Value : 0.5936
##      Neg Pred Value : 0.5556
##      Prevalence : 0.5772
##      Detection Rate : 0.5285
##      Detection Prevalence : 0.8902
##      Balanced Accuracy : 0.5299
##
```

```
##      'Positive' Class : 0
##
```

```
sscurves23<- evalmod(scores = C2, labels = EC3)
autoplot(sscurves23)
```



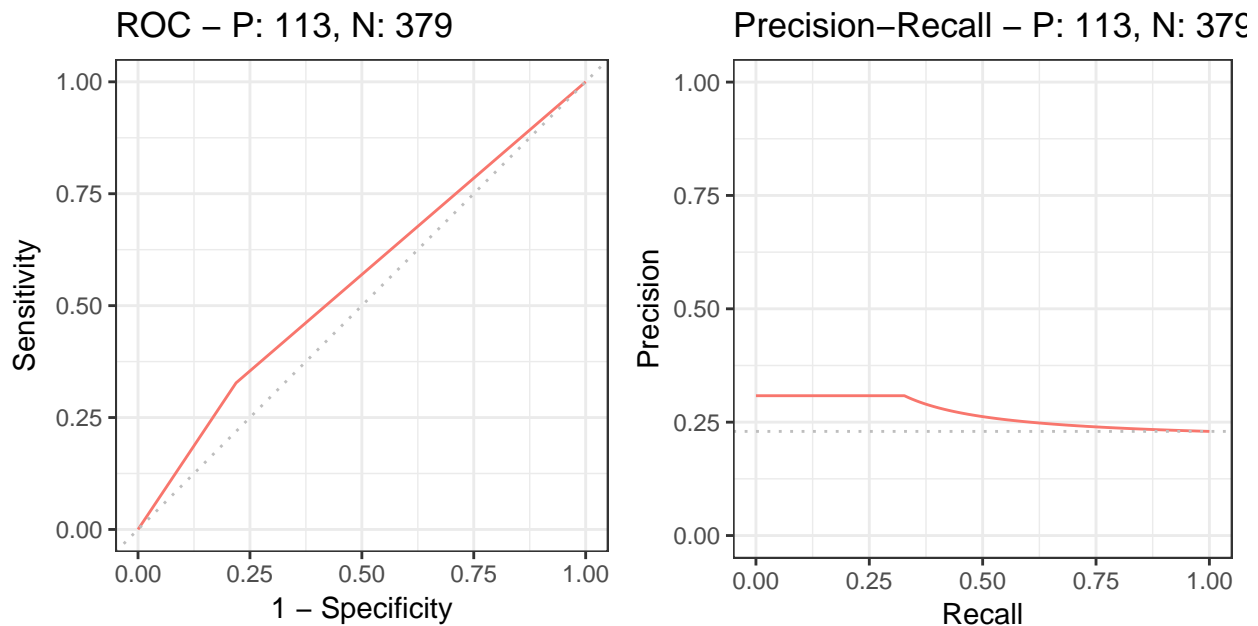
```
sspoints23 <- evalmod(mode = "basic", scores = C2, labels = EC3)
## Normalized ranks vs. basic evaluation measures
autoplot(sspoints23)
```



```
###C3
t_C3_EC1<-table(C3,EC1)
confusionMatrix(t_C3_EC1)

## Confusion Matrix and Statistics
##
##      EC1
## C3    0    1
##  0 296   76
##  1   83   37
##
##              Accuracy : 0.6768
##              95% CI   : (0.6335, 0.718)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 1.0000
##
##              Kappa : 0.1061
##  Mcnemar's Test P-Value : 0.6342
##
##              Sensitivity : 0.7810
##              Specificity : 0.3274
##              Pos Pred Value : 0.7957
##              Neg Pred Value : 0.3083
##              Prevalence : 0.7703
##              Detection Rate : 0.6016
##              Detection Prevalence : 0.7561
##              Balanced Accuracy : 0.5542
```

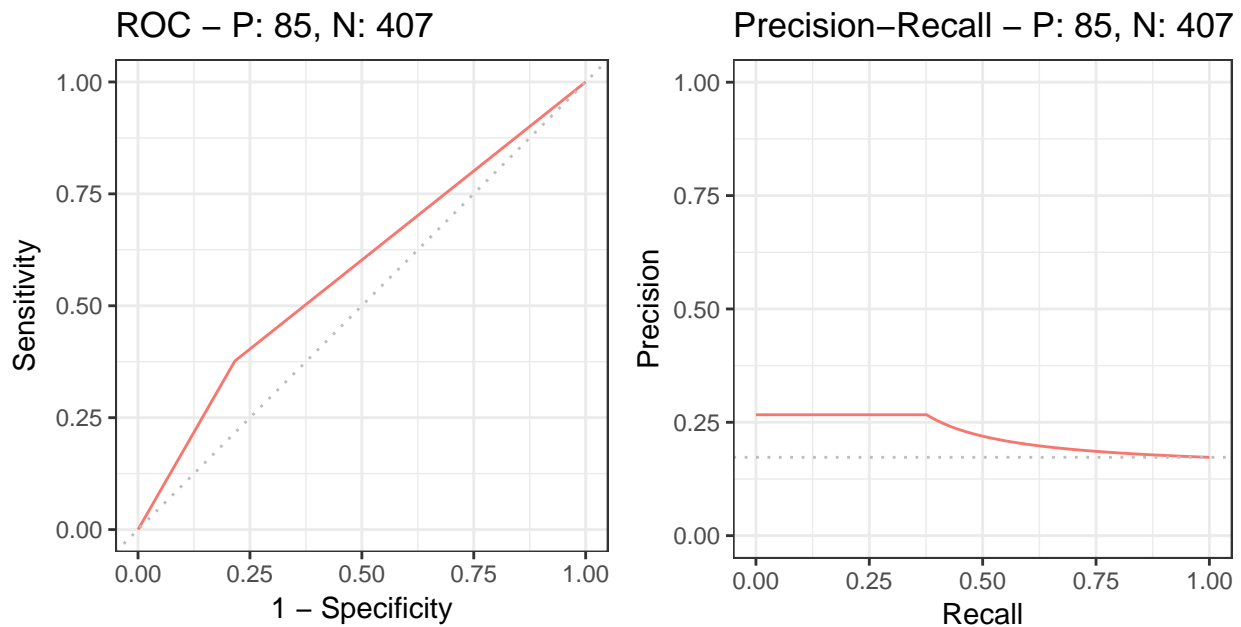
```
##
##      'Positive' Class : 0
##
sscurves31<- evalmod(scores = C3, labels = EC1)
autoplot(sscurves31)
```



```
#
t_C3_EC2<-table(C3,EC2)
confusionMatrix(t_C3_EC2)

## Confusion Matrix and Statistics
##
##      EC2
## C3      0      1
##  0 319  53
##  1  88  32
##
##              Accuracy : 0.7134
##              95% CI : (0.6712, 0.753)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 1.000000
##
##              Kappa : 0.1378
##  Mcnemar's Test P-Value : 0.004192
##
##      Sensitivity : 0.7838
##      Specificity : 0.3765
##      Pos Pred Value : 0.8575
##      Neg Pred Value : 0.2667
##      Prevalence : 0.8272
##      Detection Rate : 0.6484
##      Detection Prevalence : 0.7561
##      Balanced Accuracy : 0.5801
##
```

```
##      'Positive' Class : 0
##
sscurves32<- evalmod(scores = C3, labels = EC2)
autoplot(sscurves32)
```



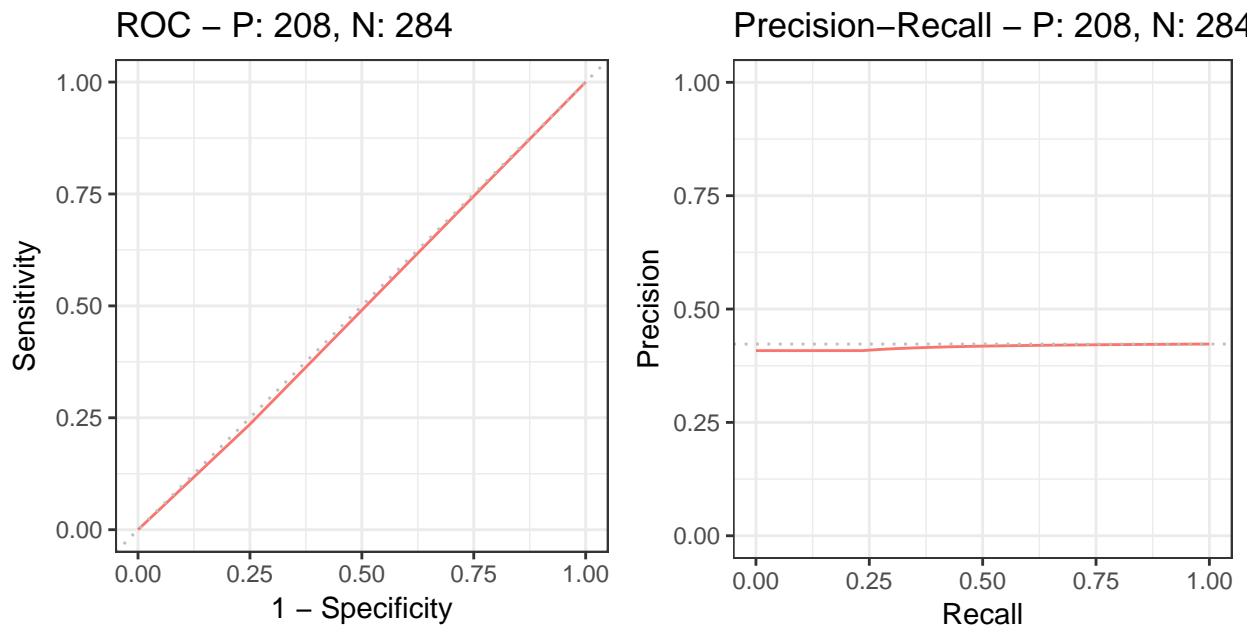
```
#
t_C3_EC3<-table(C3,EC3)
confusionMatrix(t_C3_EC3)

## Confusion Matrix and Statistics
##
##      EC3
## C3      0      1
##  0  213  159
##  1   71   49
##
##              Accuracy : 0.5325
##              95% CI : (0.4873, 0.5773)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.9797
##
##              Kappa : -0.0153
##  Mcnemar's Test P-Value : 9.659e-09
##
##      Sensitivity : 0.7500
##      Specificity : 0.2356
##      Pos Pred Value : 0.5726
##      Neg Pred Value : 0.4083
##      Prevalence : 0.5772
##      Detection Rate : 0.4329
##      Detection Prevalence : 0.7561
##      Balanced Accuracy : 0.4928
##
##      'Positive' Class : 0
```



```
##
```

```
sscurves33<- evalmod(scores = C3, labels = EC3)
autoplot(sscurves33)
```



```
###C4
```

```
t_C4_EC1<-table(C4,EC1)
confusionMatrix(t_C4_EC1)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC1
## C4    0    1
##    0 258  64
##    1 121  49
```

```
##
```

```
##              Accuracy : 0.624
##              95% CI : (0.5795, 0.6669)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 1
```

```
##
```

```
##              Kappa : 0.0972
##      McNemar's Test P-Value : 3.835e-05
```

```
##
```

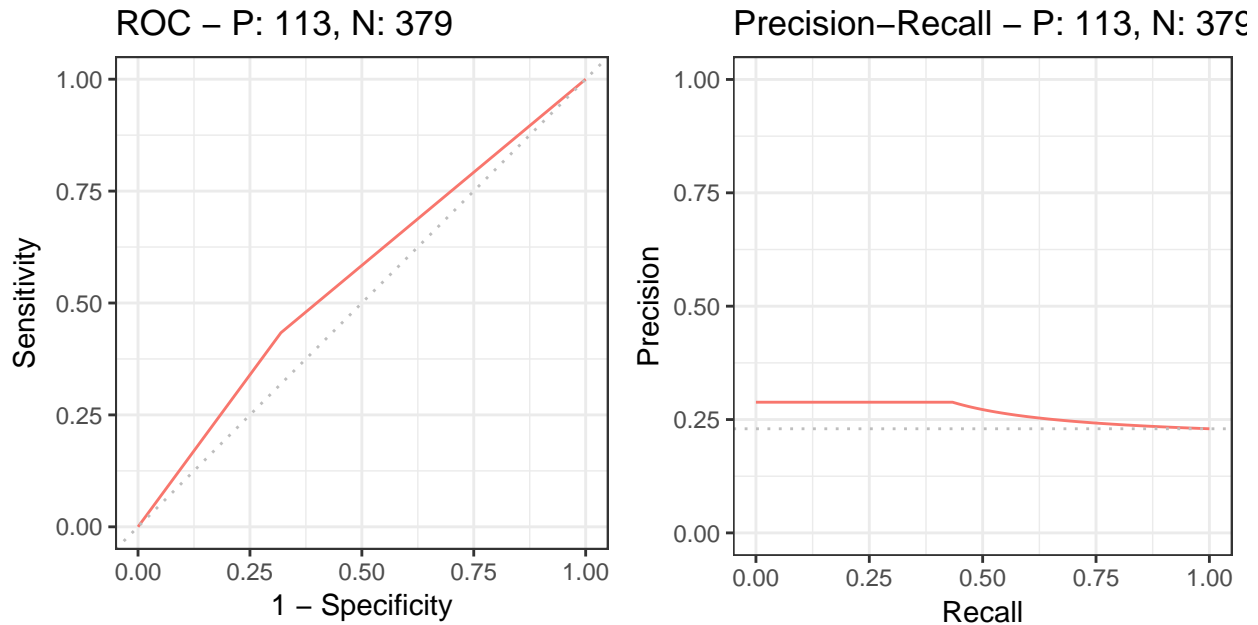
```
##              Sensitivity : 0.6807
##              Specificity : 0.4336
##              Pos Pred Value : 0.8012
##              Neg Pred Value : 0.2882
##              Prevalence : 0.7703
##              Detection Rate : 0.5244
##      Detection Prevalence : 0.6545
##              Balanced Accuracy : 0.5572
```

```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves41<- evalmod(scores = C4, labels = EC1)
autoplot(sscurves41)
```

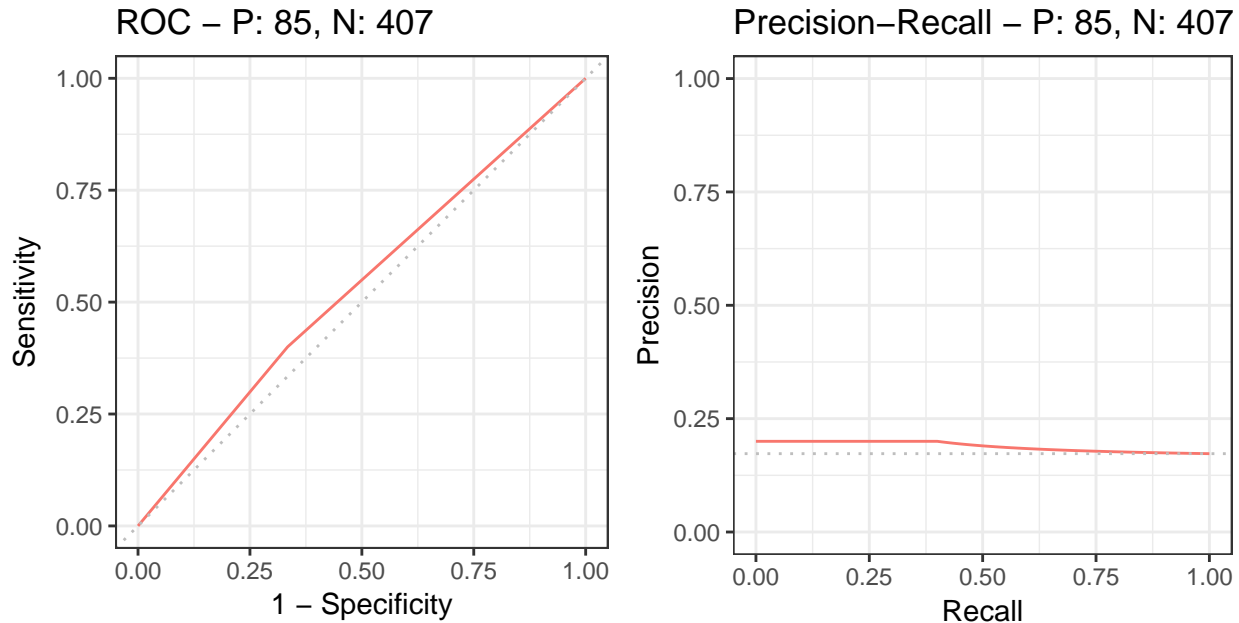


```
t_C4_EC2<-table(C4,EC2)
confusionMatrix(t_C4_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
## C4    0    1
##  0 271  51
##  1 136  34
##
##              Accuracy : 0.6199
##              95% CI   : (0.5754, 0.663)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 1
##
##              Kappa   : 0.0472
##  Mcnemar's Test P-Value : 8.114e-10
##
##              Sensitivity : 0.6658
##              Specificity : 0.4000
##              Pos Pred Value : 0.8416
##              Neg Pred Value : 0.2000
##              Prevalence : 0.8272
##              Detection Rate : 0.5508
##      Detection Prevalence : 0.6545
##              Balanced Accuracy : 0.5329
##
##              'Positive' Class : 0
##
```

```
sscurves42<- evalmod(scores = C4, labels = EC2)
```

```
autoplot(sscurves42)
```

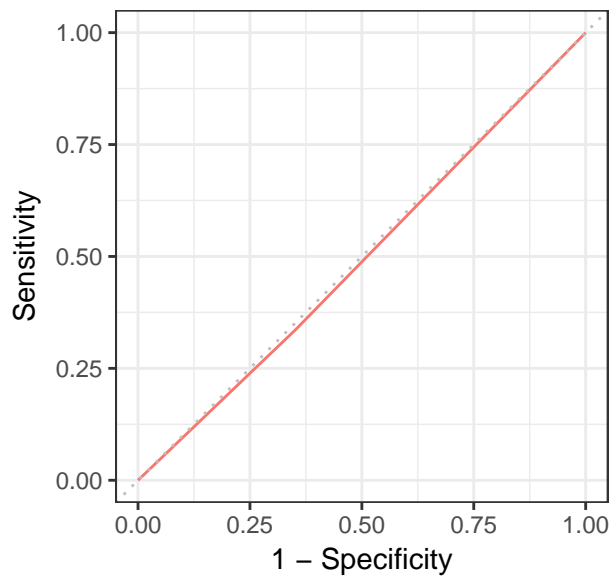


```
t_C4_EC3<-table(C4,EC3)
confusionMatrix(t_C4_EC3)
```

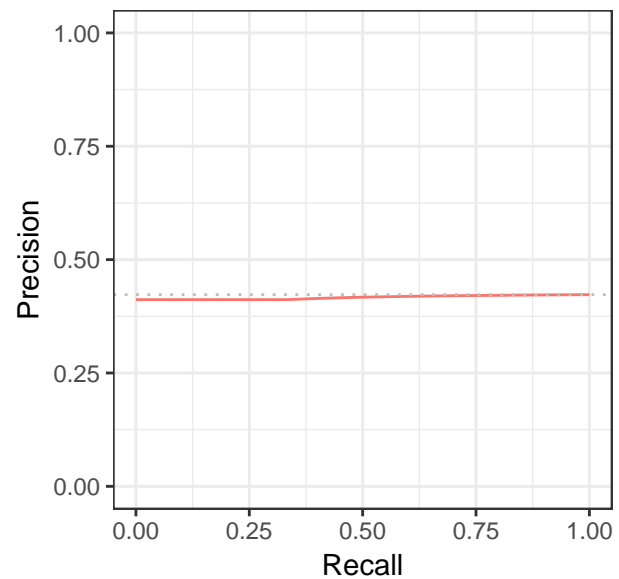
```
## Confusion Matrix and Statistics
##
##      EC3
## C4      0      1
##  0 184 138
##  1 100  70
##
##              Accuracy : 0.5163
##              95% CI   : (0.4711, 0.5612)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.99721
##
##              Kappa   : -0.016
##  Mcnemar's Test P-Value : 0.01647
##
##              Sensitivity : 0.6479
##              Specificity : 0.3365
##              Pos Pred Value : 0.5714
##              Neg Pred Value : 0.4118
##              Prevalence : 0.5772
##              Detection Rate : 0.3740
##      Detection Prevalence : 0.6545
##              Balanced Accuracy : 0.4922
##
##              'Positive' Class : 0
##
```

```
sscurves43<- evalmod(scores = C4, labels = EC3)
autoplot(sscurves43)
```

ROC – P: 208, N: 284



Precision-Recall – P: 208, N: 284



```
###C1_C2 and EC1
```

```
#1
```

```
t_C1_C2_EC1<-table(C1*C2,EC1)
```

```
confusionMatrix(t_C1_C2_EC1)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC1
```

```
##      0   1
```

```
## 0 370 105
```

```
## 1   9   8
```

```
##
```

```
##              Accuracy : 0.7683
```

```
##              95% CI : (0.7284, 0.8049)
```

```
##      No Information Rate : 0.7703
```

```
##      P-Value [Acc > NIR] : 0.5676
```

```
##
```

```
##              Kappa : 0.067
```

```
##      McNemar's Test P-Value : <2e-16
```

```
##
```

```
##              Sensitivity : 0.9763
```

```
##              Specificity : 0.0708
```

```
##      Pos Pred Value : 0.7789
```

```
##      Neg Pred Value : 0.4706
```

```
##              Prevalence : 0.7703
```

```
##      Detection Rate : 0.7520
```

```
##      Detection Prevalence : 0.9654
```

```
##      Balanced Accuracy : 0.5235
```

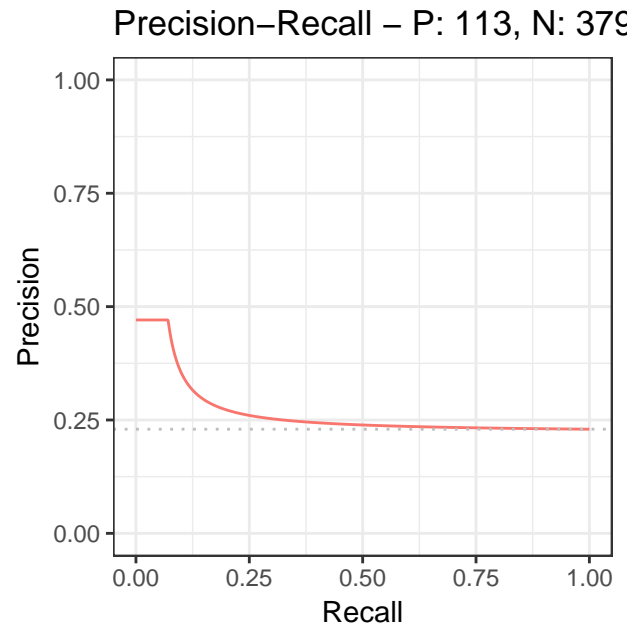
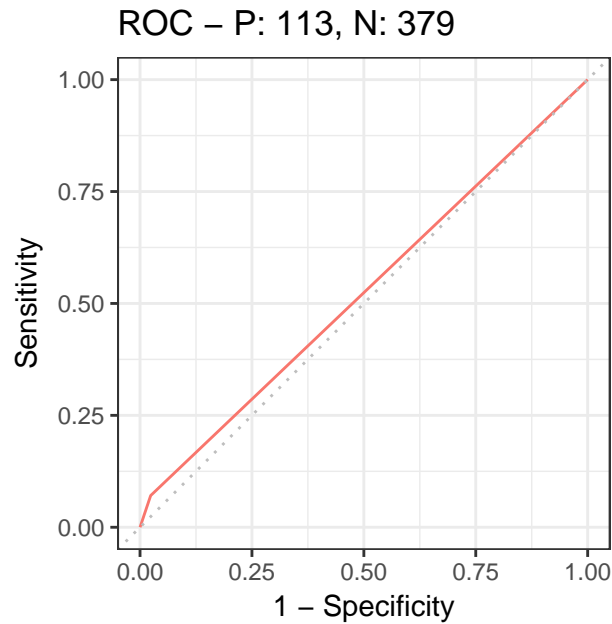
```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves12_1<- evalmod(scores = C1*C2, labels = EC1)
```

```
autoplot(sscurves12_1)
```

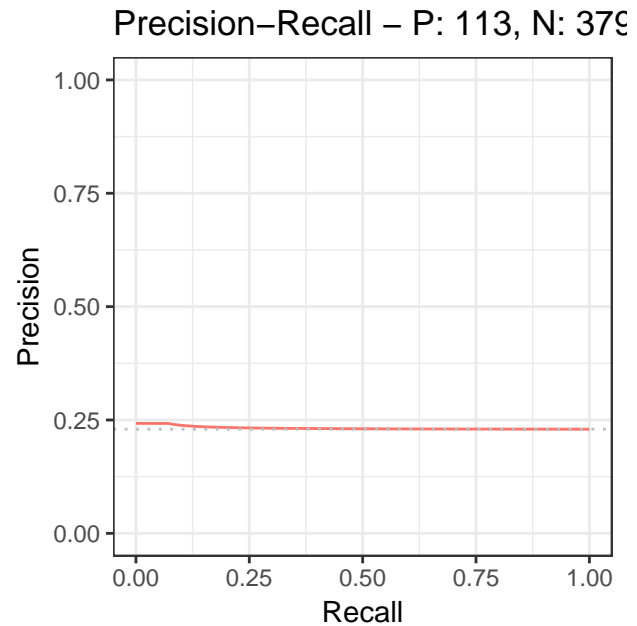
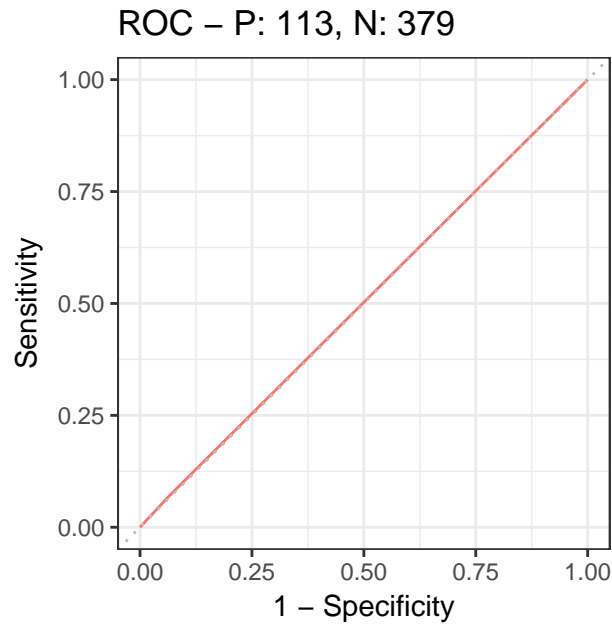


#2

```
t_C1_C3_EC1<-table(C1*C3,EC1)
confusionMatrix(t_C1_C3_EC1)
```

```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 354 105
## 1  25   8
##
##              Accuracy : 0.7358
##              95% CI : (0.6945, 0.7742)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.9681
##
##              Kappa : 0.0064
##  Mcnemar's Test P-Value : 4.246e-12
##
##      Sensitivity : 0.9340
##      Specificity : 0.0708
##      Pos Pred Value : 0.7712
##      Neg Pred Value : 0.2424
##      Prevalence : 0.7703
##      Detection Rate : 0.7195
##      Detection Prevalence : 0.9329
##      Balanced Accuracy : 0.5024
##
##      'Positive' Class : 0
##
```

```
sscurves13_1<- evalmod(scores = C1*C3, labels = EC1)
autoplot(sscurves13_1)
```

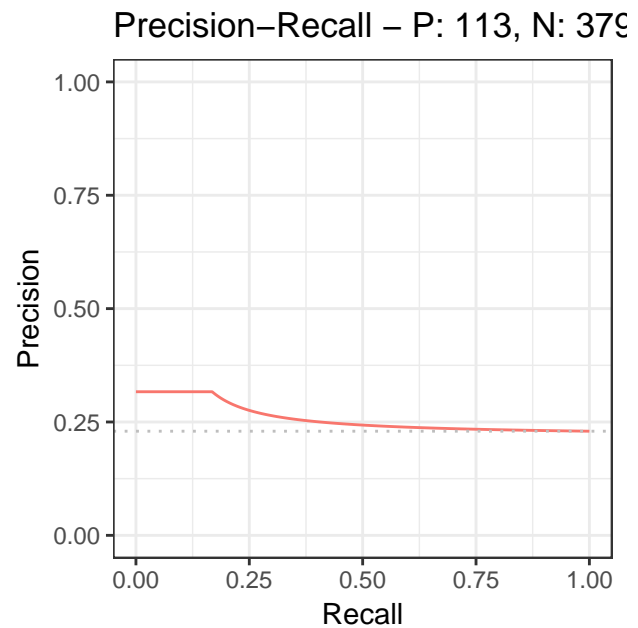
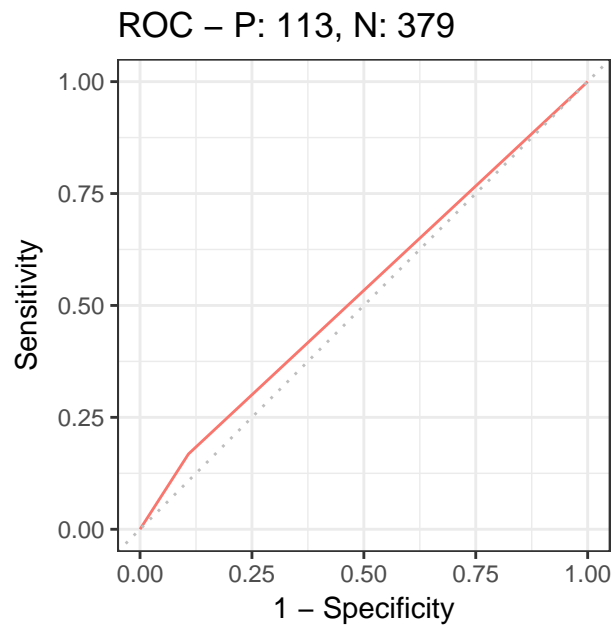


#3

```
t_C1_C4_EC1<-table(C1*C4,EC1)
confusionMatrix(t_C1_C4_EC1)
```

```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 338  94
## 1  41  19
##
##              Accuracy : 0.7256
##              95% CI   : (0.6839, 0.7646)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.9911
##
##              Kappa   : 0.0718
##  Mcnemar's Test P-Value : 7.625e-06
##
##      Sensitivity : 0.8918
##      Specificity : 0.1681
##      Pos Pred Value : 0.7824
##      Neg Pred Value : 0.3167
##      Prevalence : 0.7703
##      Detection Rate : 0.6870
##      Detection Prevalence : 0.8780
##      Balanced Accuracy : 0.5300
##
##      'Positive' Class : 0
##
```

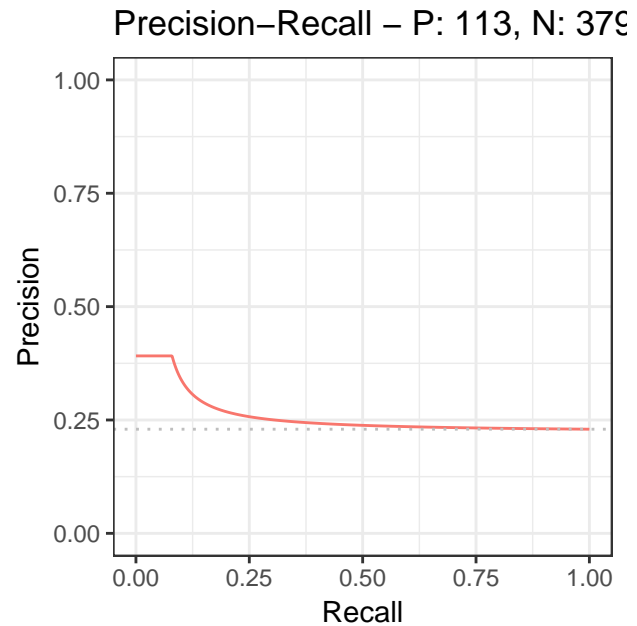
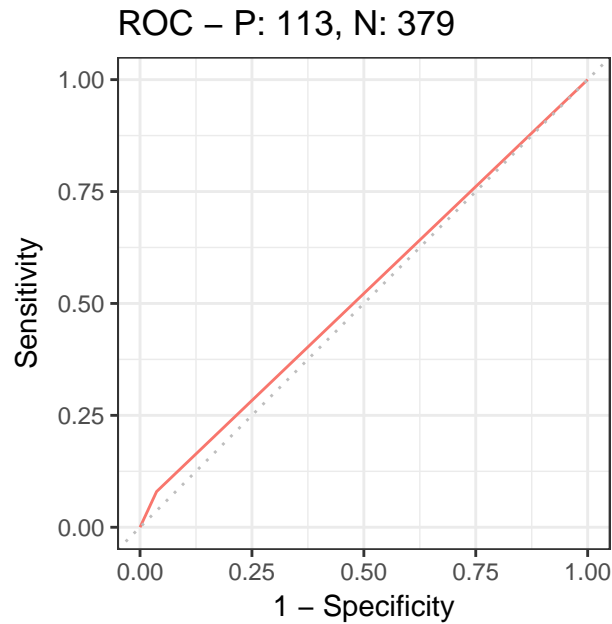
```
sscurves14_1<- evalmod(scores = C1*C4, labels = EC1)
autoplot(sscurves14_1)
```



```
#4
t_C2_C3_EC1<-table(C2*C3,EC1)
confusionMatrix(t_C2_C3_EC1)

## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 365 104
## 1  14   9
##
##              Accuracy : 0.7602
##              95% CI : (0.7199, 0.7972)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.7243
##
##              Kappa : 0.0593
##  Mcnemar's Test P-Value : 2.546e-16
##
##      Sensitivity : 0.96306
##      Specificity : 0.07965
##      Pos Pred Value : 0.77825
##      Neg Pred Value : 0.39130
##      Prevalence : 0.77033
##      Detection Rate : 0.74187
##      Detection Prevalence : 0.95325
##      Balanced Accuracy : 0.52135
##
##      'Positive' Class : 0
##

sscurves23_1<- evalmod(scores = C2*C3, labels = EC1)
autoplot(sscurves23_1)
```

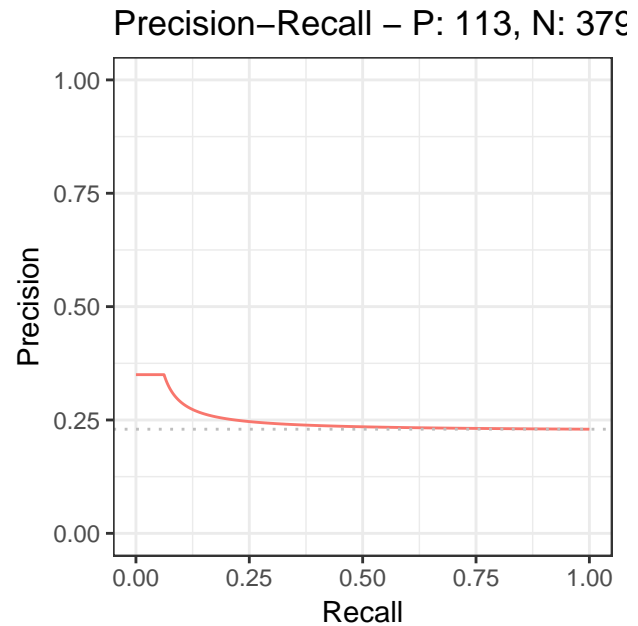
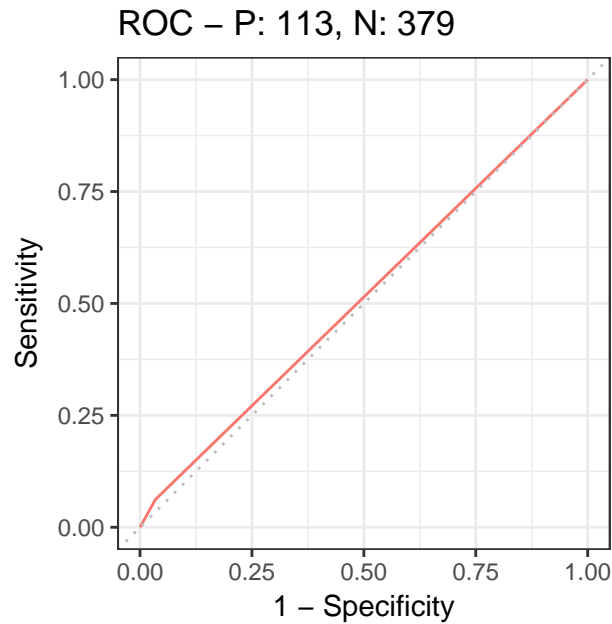


#5

```
t_C2_C4_EC1<-table(C2*C4,EC1)
confusionMatrix(t_C2_C4_EC1)
```

```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 366 106
## 1  13   7
##
##              Accuracy : 0.7581
##              95% CI : (0.7178, 0.7953)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.7585
##
##              Kappa : 0.0389
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.96570
##              Specificity : 0.06195
##      Pos Pred Value : 0.77542
##      Neg Pred Value : 0.35000
##      Prevalence : 0.77033
##      Detection Rate : 0.74390
##      Detection Prevalence : 0.95935
##      Balanced Accuracy : 0.51382
##
##      'Positive' Class : 0
##
```

```
sscurves24_1<- evalmod(scores = C2*C4, labels = EC1)
autoplot(sscurves24_1)
```

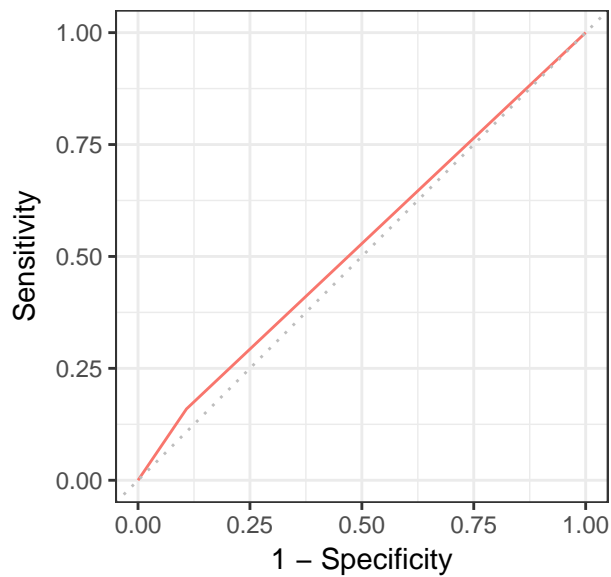
#6

```
t_C3_C4_EC1<-table(C3*C4,EC1)
confusionMatrix(t_C3_C4_EC1)
```

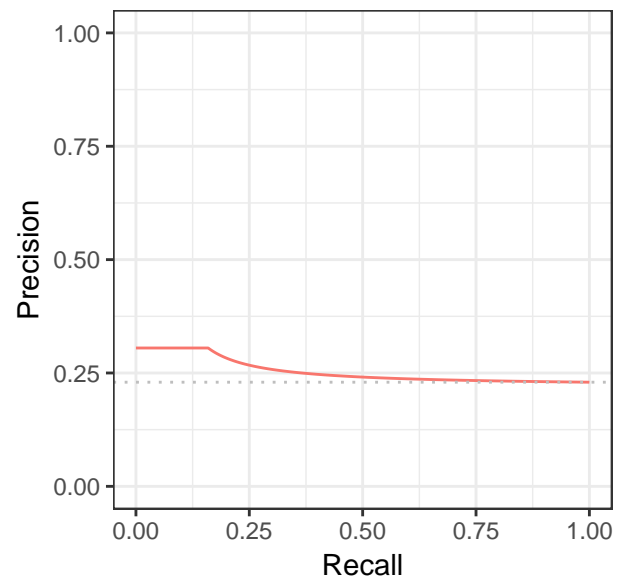
```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 338  95
## 1  41  18
##
##              Accuracy : 0.7236
##              95% CI   : (0.6818, 0.7627)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.9933
##
##              Kappa : 0.0614
##  Mcnemar's Test P-Value : 5.501e-06
##
##      Sensitivity : 0.8918
##      Specificity : 0.1593
##      Pos Pred Value : 0.7806
##      Neg Pred Value : 0.3051
##      Prevalence : 0.7703
##      Detection Rate : 0.6870
##      Detection Prevalence : 0.8801
##      Balanced Accuracy : 0.5256
##
##      'Positive' Class : 0
##
```

```
sscurves34_1<- evalmod(scores = C3*C4, labels = EC1)
autoplot(sscurves34_1)
```

ROC – P: 113, N: 379



Precision-Recall – P: 113, N: 379



```
###C1_C2 and EC2
```

```
#1
```

```
t_C1_C2_EC2<-table(C1*C2,EC2)
```

```
confusionMatrix(t_C1_C2_EC2)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC2
```

```
##      0   1
```

```
## 0 391  84
```

```
## 1  16   1
```

```
##
```

```
##              Accuracy : 0.7967
```

```
##              95% CI : (0.7584, 0.8314)
```

```
##      No Information Rate : 0.8272
```

```
##      P-Value [Acc > NIR] : 0.9656
```

```
##
```

```
##              Kappa : -0.0403
```

```
##      McNemar's Test P-Value : 2.084e-11
```

```
##
```

```
##              Sensitivity : 0.96069
```

```
##              Specificity : 0.01176
```

```
##              Pos Pred Value : 0.82316
```

```
##              Neg Pred Value : 0.05882
```

```
##              Prevalence : 0.82724
```

```
##              Detection Rate : 0.79472
```

```
##      Detection Prevalence : 0.96545
```

```
##              Balanced Accuracy : 0.48623
```

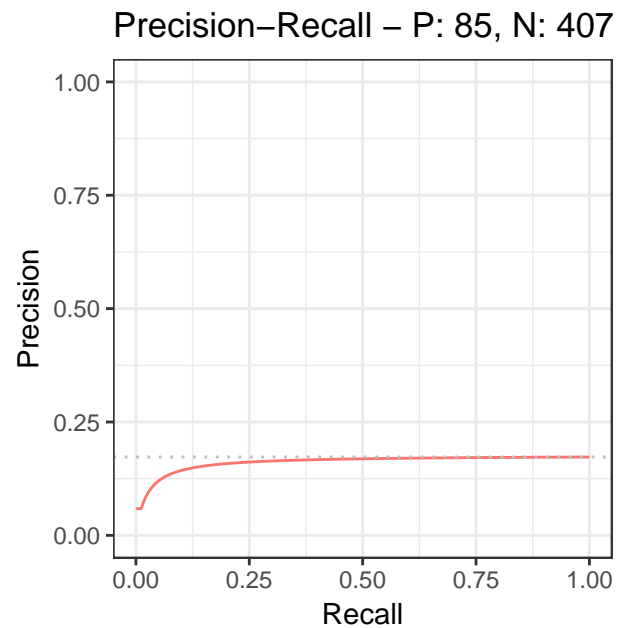
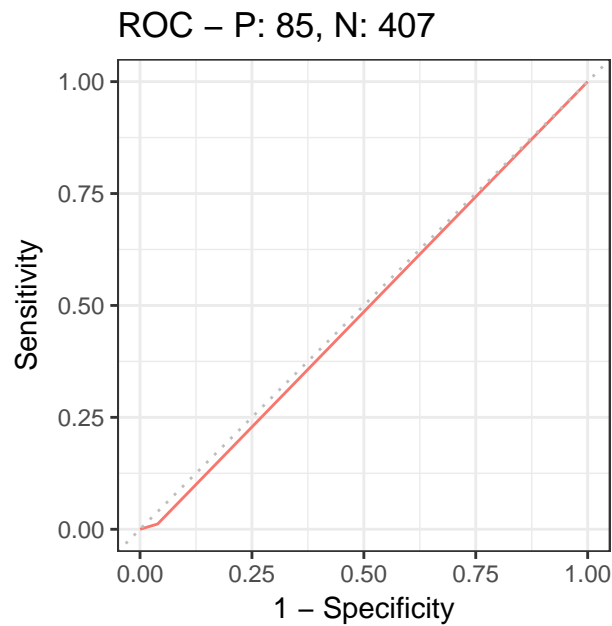
```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves12_2<- evalmod(scores = C1*C2, labels = EC2)
```

```
autoplot(sscurves12_2)
```

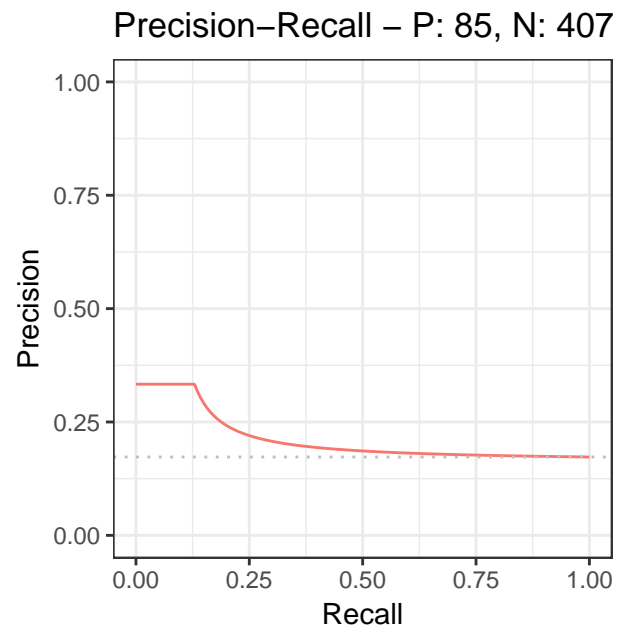
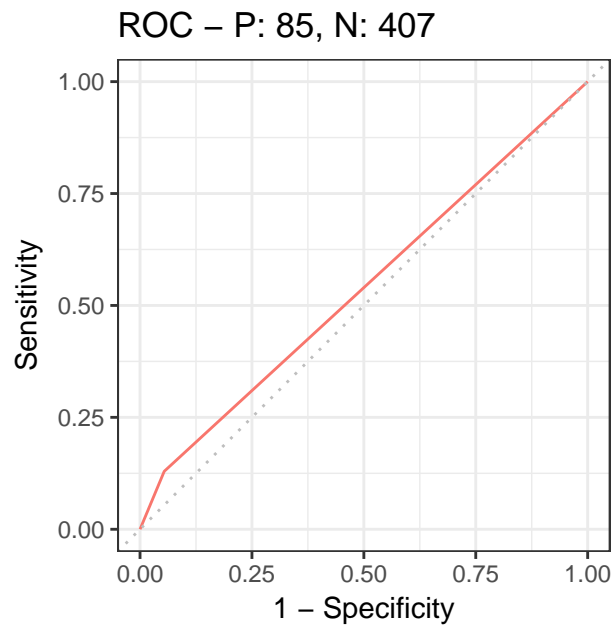


#2

```
t_C1_C3_EC2<-table(C1*C3,EC2)
confusionMatrix(t_C1_C3_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 385  74
## 1  22  11
##
##              Accuracy : 0.8049
##              95% CI   : (0.7671, 0.839)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.9132
##
##              Kappa : 0.0994
##  Mcnemar's Test P-Value : 1.938e-07
##
##      Sensitivity : 0.9459
##      Specificity : 0.1294
##      Pos Pred Value : 0.8388
##      Neg Pred Value : 0.3333
##      Prevalence : 0.8272
##      Detection Rate : 0.7825
##      Detection Prevalence : 0.9329
##      Balanced Accuracy : 0.5377
##
##      'Positive' Class : 0
##
```

```
sscurves13_2<- evalmod(scores = C1*C3, labels = EC2)
autoplot(sscurves13_2)
```

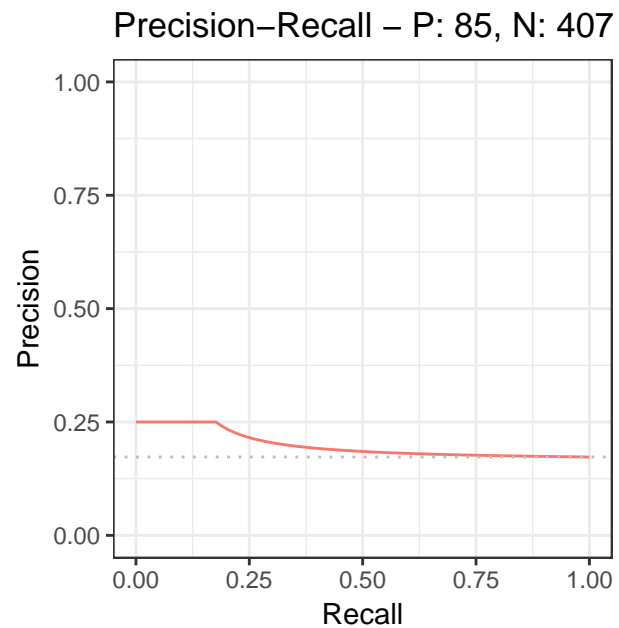
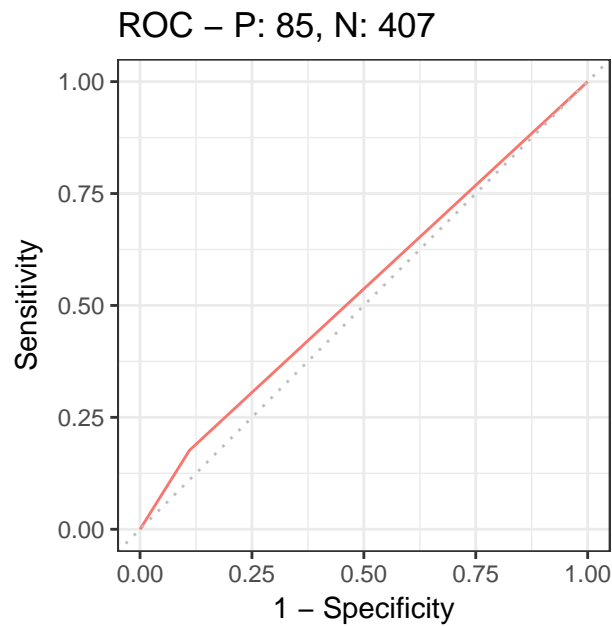


#3

```
t_C1_C4_EC2<-table(C1*C4,EC2)
confusionMatrix(t_C1_C4_EC2)
```

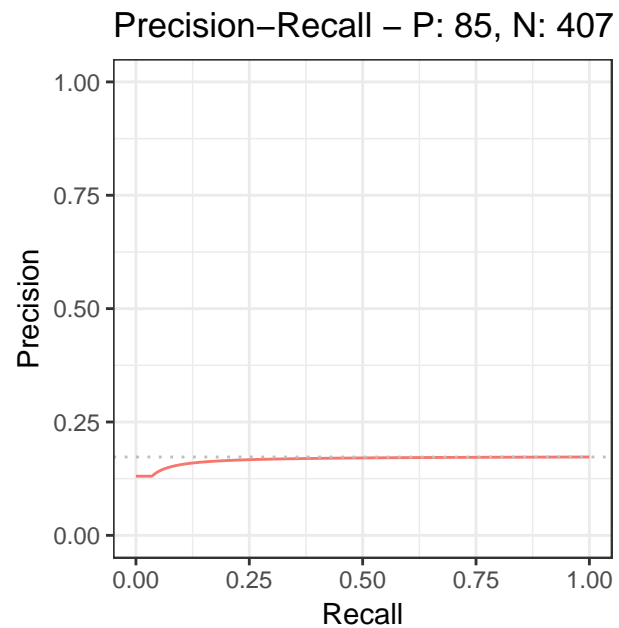
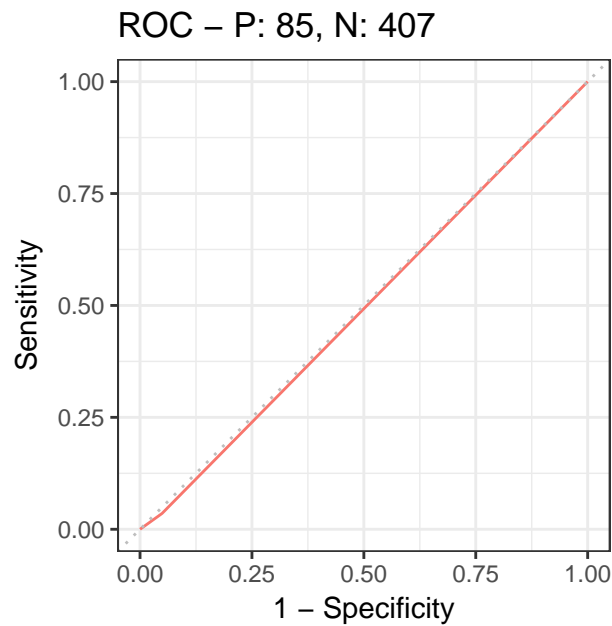
```
## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 362  70
## 1  45  15
##
##              Accuracy : 0.7663
##              95% CI   : (0.7263, 0.803)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.99977
##
##              Kappa : 0.0746
##  Mcnemar's Test P-Value : 0.02522
##
##              Sensitivity : 0.8894
##              Specificity : 0.1765
##              Pos Pred Value : 0.8380
##              Neg Pred Value : 0.2500
##              Prevalence : 0.8272
##              Detection Rate : 0.7358
##      Detection Prevalence : 0.8780
##              Balanced Accuracy : 0.5330
##
##              'Positive' Class : 0
##
```

```
sscurves14_2<- evalmod(scores = C1*C4, labels = EC2)
autoplot(sscurves14_2)
```



```
#4
t_C2_C3_EC2<-table(C2*C3,EC2)
confusionMatrix(t_C2_C3_EC2)

## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 387  82
## 1  20   3
##
##              Accuracy : 0.7927
##              95% CI   : (0.7541, 0.8277)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.9797
##
##              Kappa : -0.0195
##  Mcnemar's Test P-Value : 1.542e-09
##
##              Sensitivity : 0.95086
##              Specificity : 0.03529
##              Pos Pred Value : 0.82516
##              Neg Pred Value : 0.13043
##              Prevalence : 0.82724
##              Detection Rate : 0.78659
##              Detection Prevalence : 0.95325
##              Balanced Accuracy : 0.49308
##
##              'Positive' Class : 0
##
sscurves23_2<- evalmod(scores = C2*C3, labels = EC2)
autoplot(sscurves23_2)
```

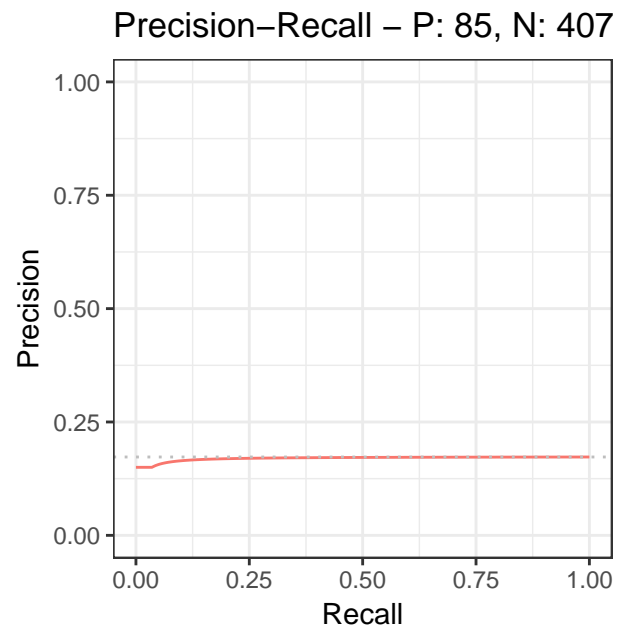
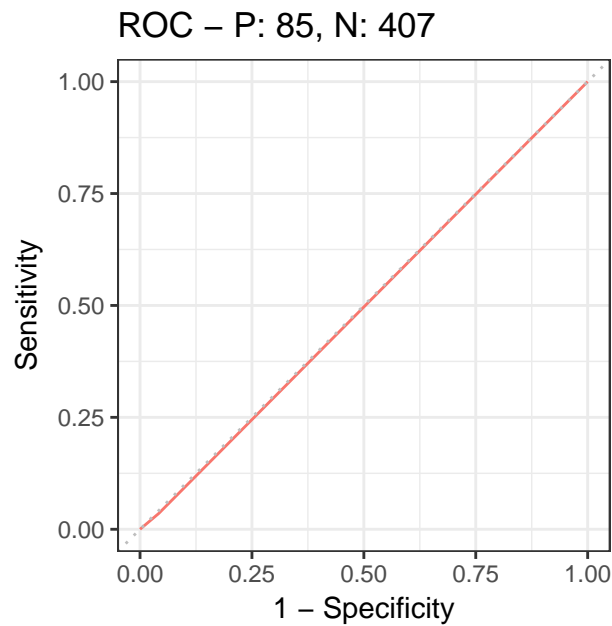


#5

```
t_C2_C4_EC2<-table(C2*C4,EC2)
confusionMatrix(t_C2_C4_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 390  82
## 1  17   3
##
##              Accuracy : 0.7988
##              95% CI   : (0.7606, 0.8333)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.956
##
##              Kappa : -0.0093
##  Mcnemar's Test P-Value : 1.257e-10
##
##              Sensitivity : 0.95823
##              Specificity : 0.03529
##              Pos Pred Value : 0.82627
##              Neg Pred Value : 0.15000
##              Prevalence : 0.82724
##              Detection Rate : 0.79268
##      Detection Prevalence : 0.95935
##              Balanced Accuracy : 0.49676
##
##              'Positive' Class : 0
##
```

```
sscurves24_2<- evalmod(scores = C2*C4, labels = EC2)
autoplot(sscurves24_2)
```

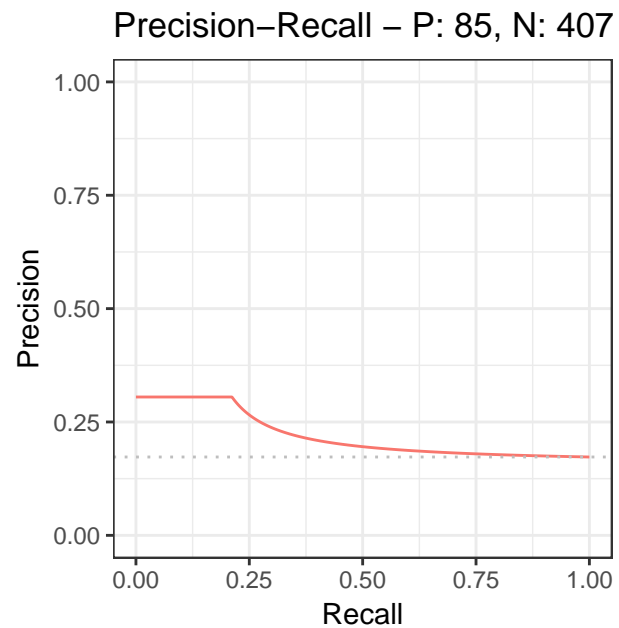
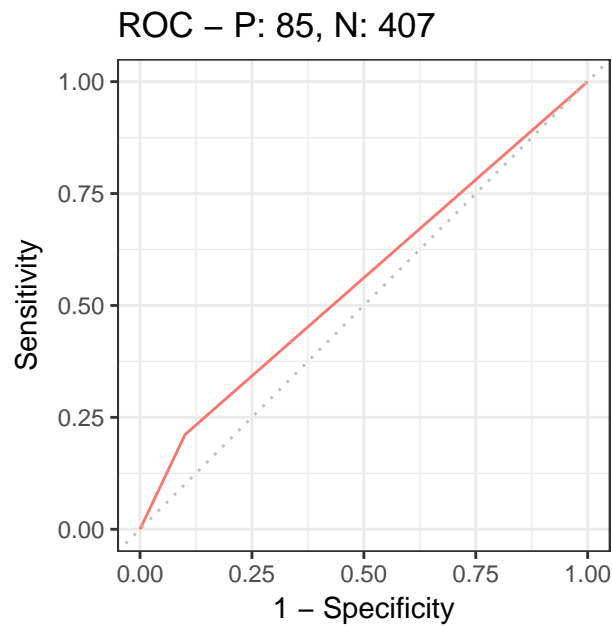


#6

```
t_C3_C4_EC2<-table(C3*C4,EC2)
confusionMatrix(t_C3_C4_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 366  67
## 1  41  18
##
##              Accuracy : 0.7805
##              95% CI   : (0.7413, 0.8163)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.99677
##
##              Kappa   : 0.1263
##  Mcnemar's Test P-Value : 0.01614
##
##              Sensitivity : 0.8993
##              Specificity : 0.2118
##              Pos Pred Value : 0.8453
##              Neg Pred Value : 0.3051
##              Prevalence : 0.8272
##              Detection Rate : 0.7439
##      Detection Prevalence : 0.8801
##              Balanced Accuracy : 0.5555
##
##              'Positive' Class : 0
##
```

```
sscurves34_2<- evalmod(scores = C3*C4, labels = EC2)
autoplot(sscurves34_2)
```



```
###C1_C2 and EC3
```

```
#1
```

```
t_C1_C2_EC3<-table(C1*C2,EC3)
```

```
confusionMatrix(t_C1_C2_EC3)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC3
```

```
##      0   1
```

```
## 0 278 197
```

```
## 1   6  11
```

```
##
```

```
##              Accuracy : 0.5874
```

```
##              95% CI : (0.5425, 0.6313)
```

```
##      No Information Rate : 0.5772
```

```
##      P-Value [Acc > NIR] : 0.3414
```

```
##
```

```
##              Kappa : 0.0362
```

```
##      McNemar's Test P-Value : <2e-16
```

```
##
```

```
##              Sensitivity : 0.97887
```

```
##              Specificity : 0.05288
```

```
##      Pos Pred Value : 0.58526
```

```
##      Neg Pred Value : 0.64706
```

```
##              Prevalence : 0.57724
```

```
##      Detection Rate : 0.56504
```

```
##      Detection Prevalence : 0.96545
```

```
##      Balanced Accuracy : 0.51588
```

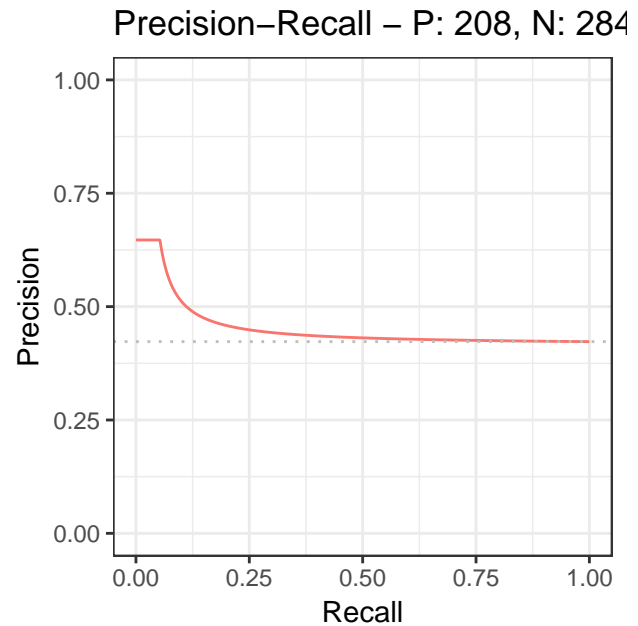
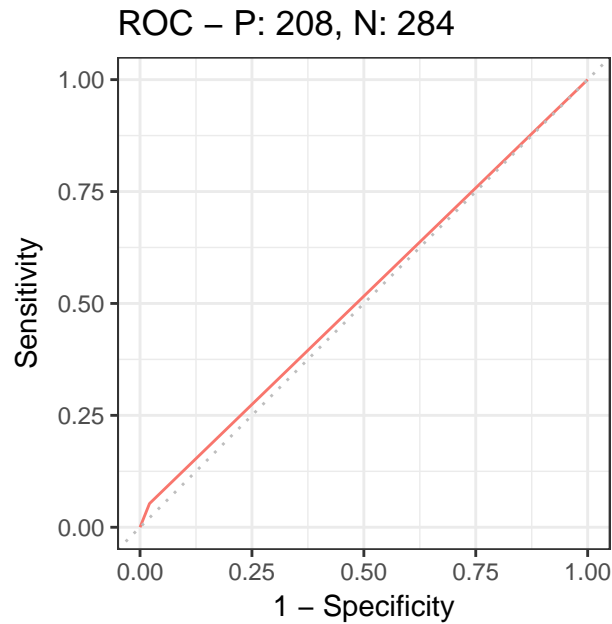
```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves12_3<- evalmod(scores = C1*C2, labels = EC3)
```

```
autoplot(sscurves12_3)
```

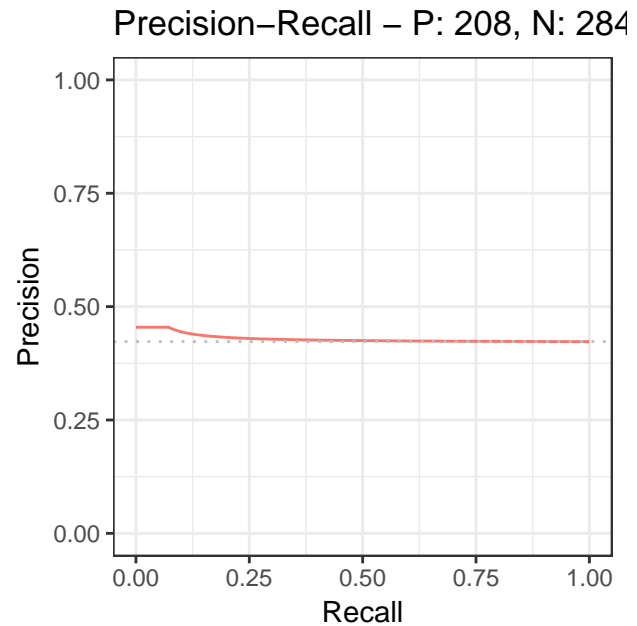
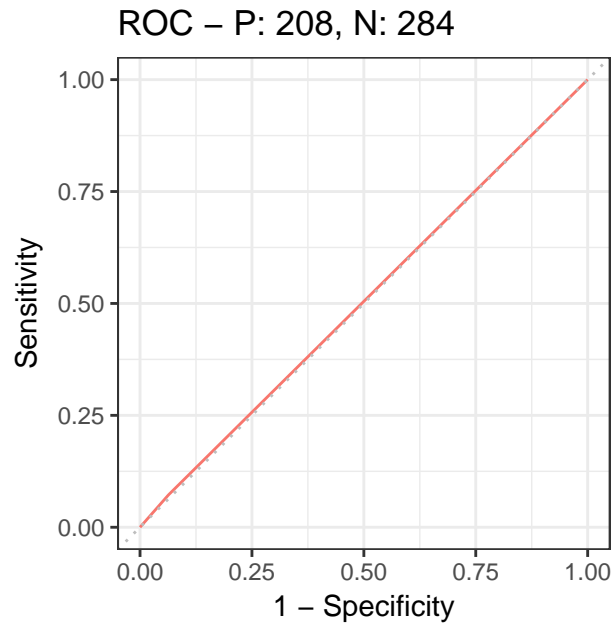



#2

```
t_C1_C3_EC3<-table(C1*C3,EC3)
confusionMatrix(t_C1_C3_EC3)
```

```
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 266 193
## 1  18  15
##
##              Accuracy : 0.5711
##              95% CI   : (0.5261, 0.6153)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.6261
##
##              Kappa   : 0.0098
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.93662
##              Specificity : 0.07212
##              Pos Pred Value : 0.57952
##              Neg Pred Value : 0.45455
##              Prevalence : 0.57724
##              Detection Rate : 0.54065
##      Detection Prevalence : 0.93293
##              Balanced Accuracy : 0.50437
##
##              'Positive' Class : 0
##
```

```
sscurves13_3<- evalmod(scores = C1*C3, labels = EC3)
autoplot(sscurves13_3)
```

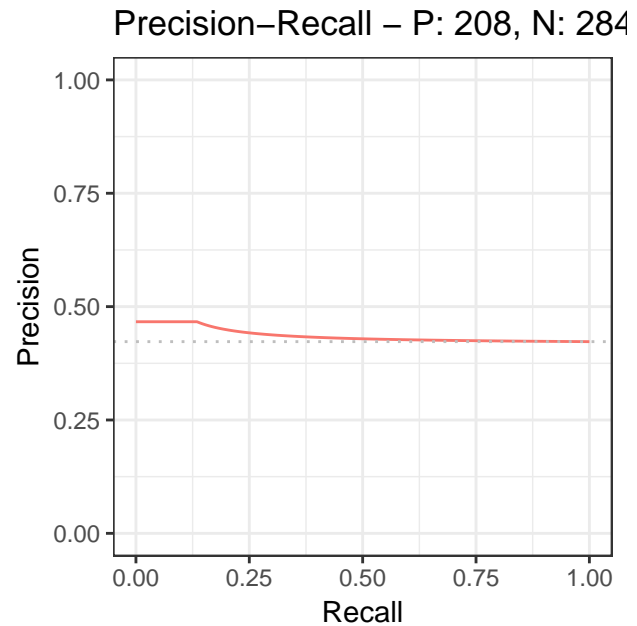
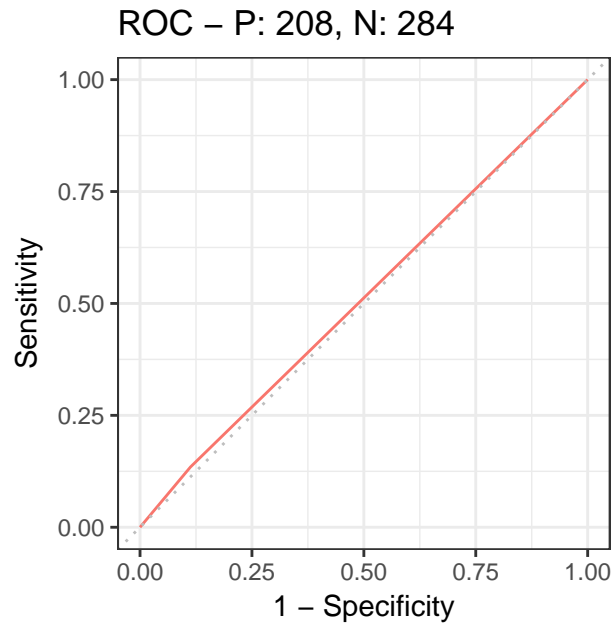


#3

```
t_C1_C4_EC3<-table(C1*C4,EC3)
confusionMatrix(t_C1_C4_EC3)
```

```
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 252 180
## 1   32   28
##
##              Accuracy : 0.5691
##              95% CI   : (0.524, 0.6133)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.66
##
##              Kappa : 0.0242
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.8873
##              Specificity : 0.1346
##              Pos Pred Value : 0.5833
##              Neg Pred Value : 0.4667
##              Prevalence : 0.5772
##              Detection Rate : 0.5122
##      Detection Prevalence : 0.8780
##              Balanced Accuracy : 0.5110
##
##              'Positive' Class : 0
##
```

```
sscurves14_3<- evalmod(scores = C1*C4, labels = EC3)
autoplot(sscurves14_3)
```

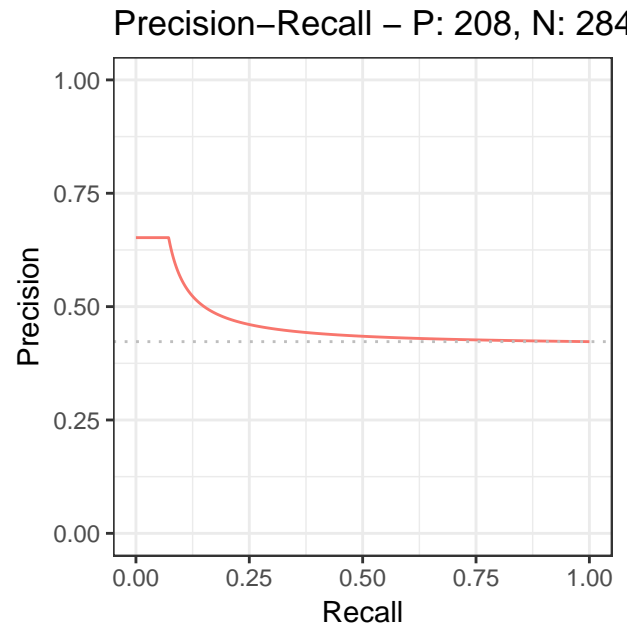
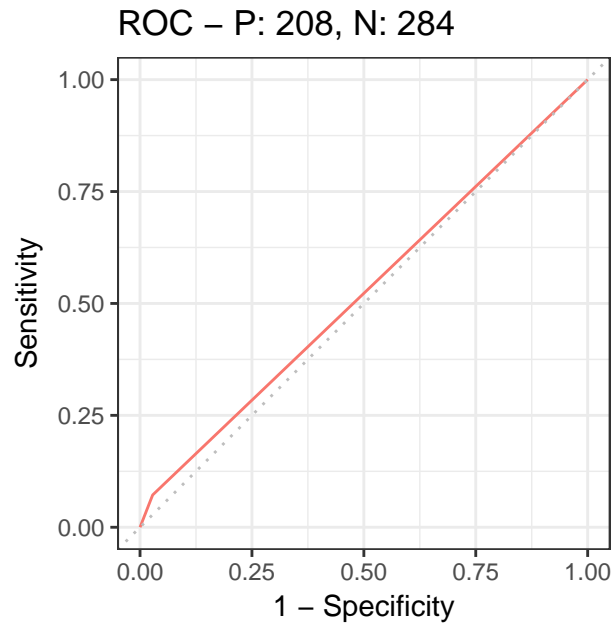


#4

```
t_C2_C3_EC3<-table(C2*C3,EC3)
confusionMatrix(t_C2_C3_EC3)
```

```
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 276 193
## 1   8  15
##
##              Accuracy : 0.5915
##              95% CI : (0.5466, 0.6353)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.2771
##
##              Kappa : 0.0499
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.97183
##              Specificity : 0.07212
##      Pos Pred Value : 0.58849
##      Neg Pred Value : 0.65217
##      Prevalence : 0.57724
##      Detection Rate : 0.56098
##      Detection Prevalence : 0.95325
##      Balanced Accuracy : 0.52197
##
##      'Positive' Class : 0
##
```

```
sscurves23_3<- evalmod(scores = C2*C3, labels = EC3)
autoplot(sscurves23_3)
```



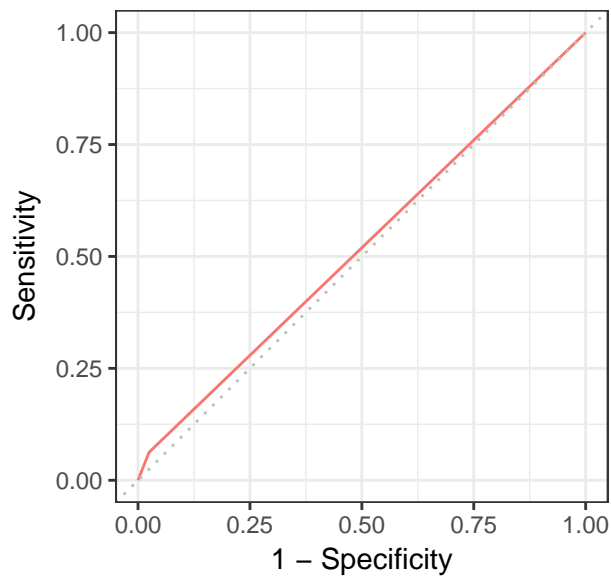
#5

```
t_C2_C4_EC3<-table(C2*C4,EC3)
confusionMatrix(t_C2_C4_EC3)
```

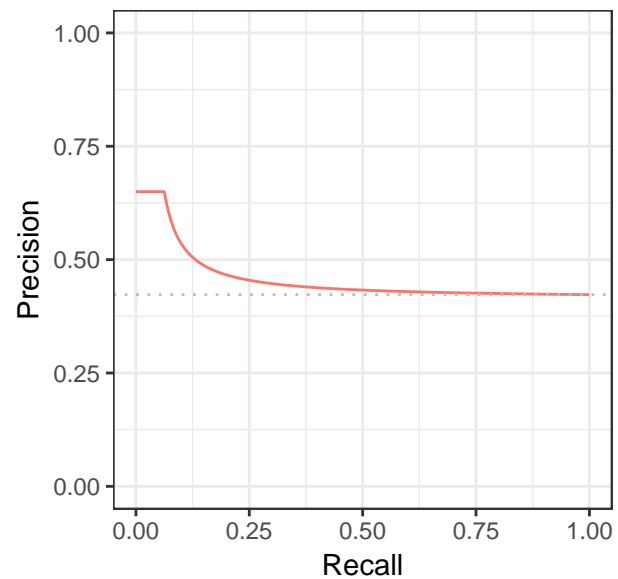
```
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 277 195
## 1   7  13
##
##              Accuracy : 0.5894
##              95% CI : (0.5445, 0.6333)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.3085
##
##              Kappa : 0.0431
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.9754
##              Specificity : 0.0625
##      Pos Pred Value : 0.5869
##      Neg Pred Value : 0.6500
##      Prevalence : 0.5772
##      Detection Rate : 0.5630
##      Detection Prevalence : 0.9593
##      Balanced Accuracy : 0.5189
##
##      'Positive' Class : 0
##
```

```
sscurves24_3<- evalmod(scores = C2*C4, labels = EC3)
autoplot(sscurves24_3)
```

ROC – P: 208, N: 284



Precision-Recall – P: 208, N: 284



#6

```
t_C3_C4_EC3<-table(C3*C4,EC3)
confusionMatrix(t_C3_C4_EC3)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC3
```

```
##      0   1
```

```
## 0 250 183
```

```
## 1   34   25
```

```
##
```

```
##              Accuracy : 0.5589
```

```
##              95% CI : (0.5138, 0.6034)
```

```
##      No Information Rate : 0.5772
```

```
##      P-Value [Acc > NIR] : 0.8072
```

```
##
```

```
##              Kappa : 5e-04
```

```
##      McNemar's Test P-Value : <2e-16
```

```
##
```

```
##              Sensitivity : 0.8803
```

```
##              Specificity : 0.1202
```

```
##      Pos Pred Value : 0.5774
```

```
##      Neg Pred Value : 0.4237
```

```
##              Prevalence : 0.5772
```

```
##      Detection Rate : 0.5081
```

```
##      Detection Prevalence : 0.8801
```

```
##      Balanced Accuracy : 0.5002
```

```
##
```

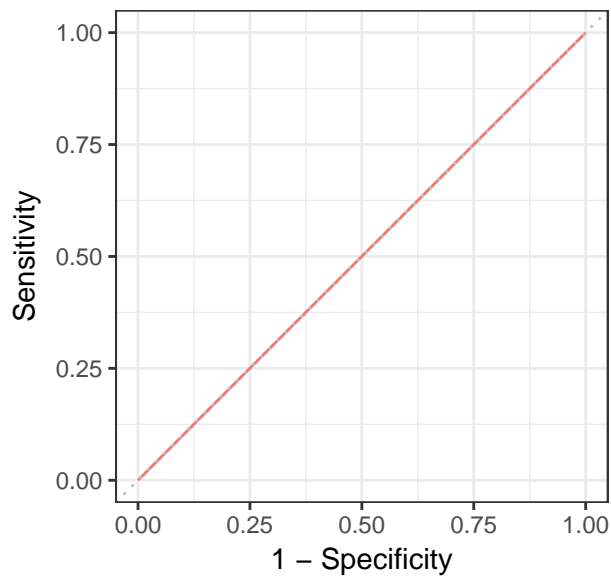
```
##      'Positive' Class : 0
```

```
##
```

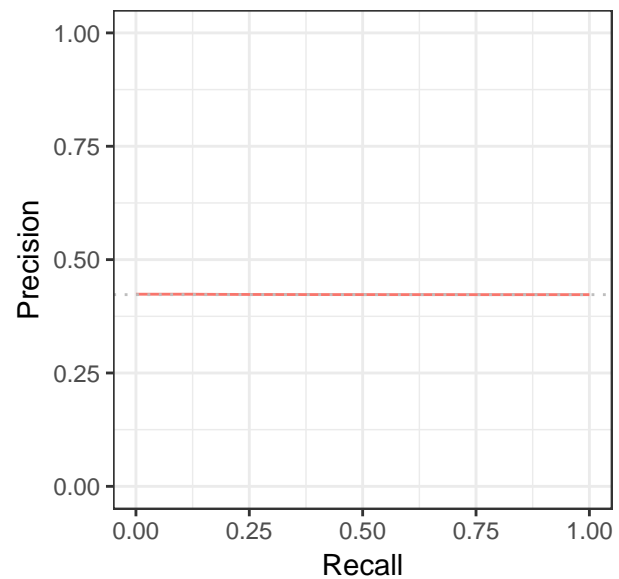
```
sscurves34_3<- evalmod(scores = C3*C4, labels = EC3)
```

```
autoplot(sscurves34_3)
```

ROC – P: 208, N: 284



Precision-Recall – P: 208, N: 284



```
####C1_C2_C3 and EC1
```

```
#1
```

```
t_C1_C2_C3_EC1<-table(C1*C2*C3,EC1)
```

```
confusionMatrix(t_C1_C2_C3_EC1)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC1
```

```
##      0   1
```

```
## 0 374 109
```

```
## 1   5   4
```

```
##
```

```
##              Accuracy : 0.7683
```

```
##              95% CI : (0.7284, 0.8049)
```

```
##      No Information Rate : 0.7703
```

```
##      P-Value [Acc > NIR] : 0.5676
```

```
##
```

```
##              Kappa : 0.0328
```

```
##      McNemar's Test P-Value : <2e-16
```

```
##
```

```
##              Sensitivity : 0.9868
```

```
##              Specificity : 0.0354
```

```
##      Pos Pred Value : 0.7743
```

```
##      Neg Pred Value : 0.4444
```

```
##              Prevalence : 0.7703
```

```
##      Detection Rate : 0.7602
```

```
##      Detection Prevalence : 0.9817
```

```
##      Balanced Accuracy : 0.5111
```

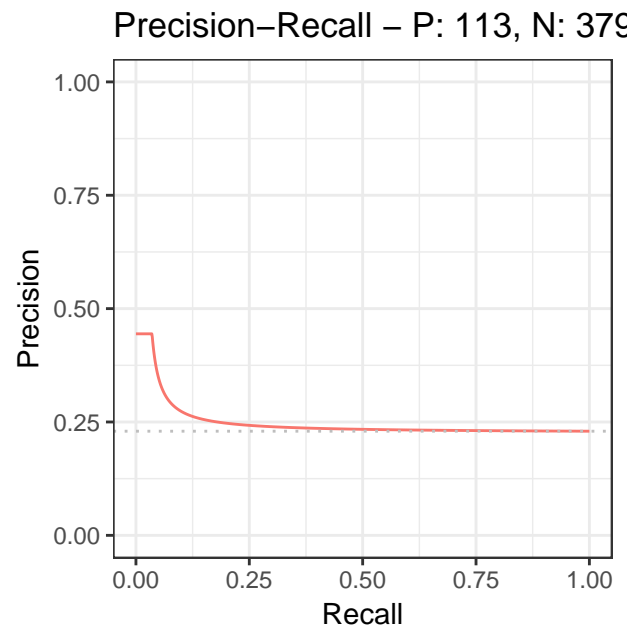
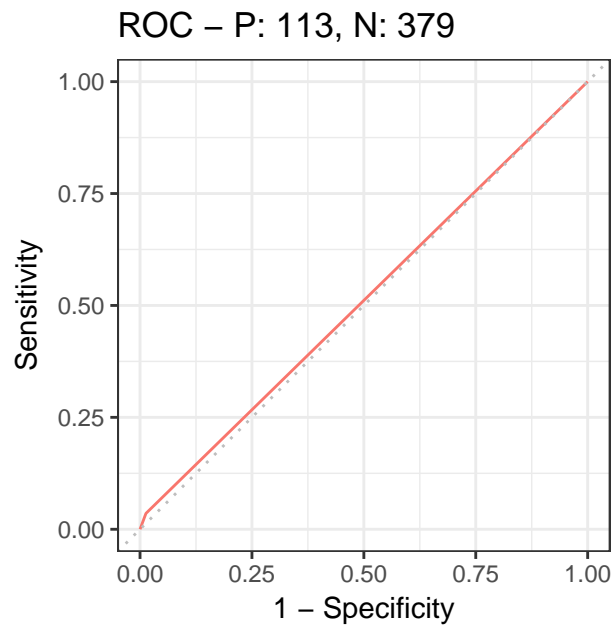
```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves123_1<- evalmod(scores = C1*C2*C3, labels = EC1)
```

```
autoplot(sscurves123_1)
```

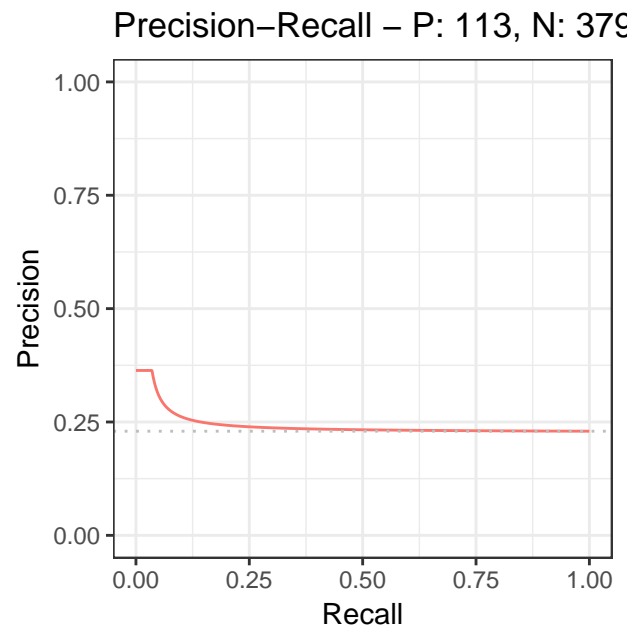
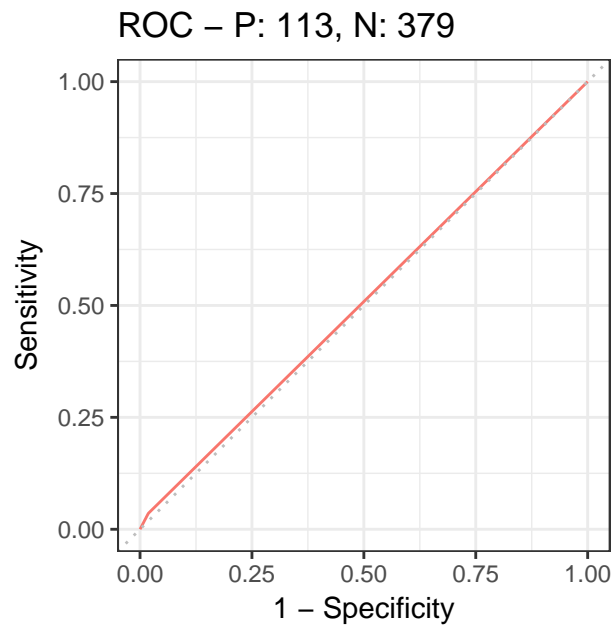


#2

```
t_C1_C2_C4_EC1<-table(C1*C2*C4,EC1)
confusionMatrix(t_C1_C2_C4_EC1)
```

```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 372 109
## 1   7   4
##
##              Accuracy : 0.7642
##              95% CI   : (0.7242, 0.8011)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.6493
##
##              Kappa   : 0.0248
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.9815
##              Specificity : 0.0354
##              Pos Pred Value : 0.7734
##              Neg Pred Value : 0.3636
##              Prevalence : 0.7703
##              Detection Rate : 0.7561
##      Detection Prevalence : 0.9776
##              Balanced Accuracy : 0.5085
##
##              'Positive' Class : 0
##
```

```
sscurves124_1<- evalmod(scores = C1*C2*C4, labels = EC1)
autoplot(sscurves124_1)
```

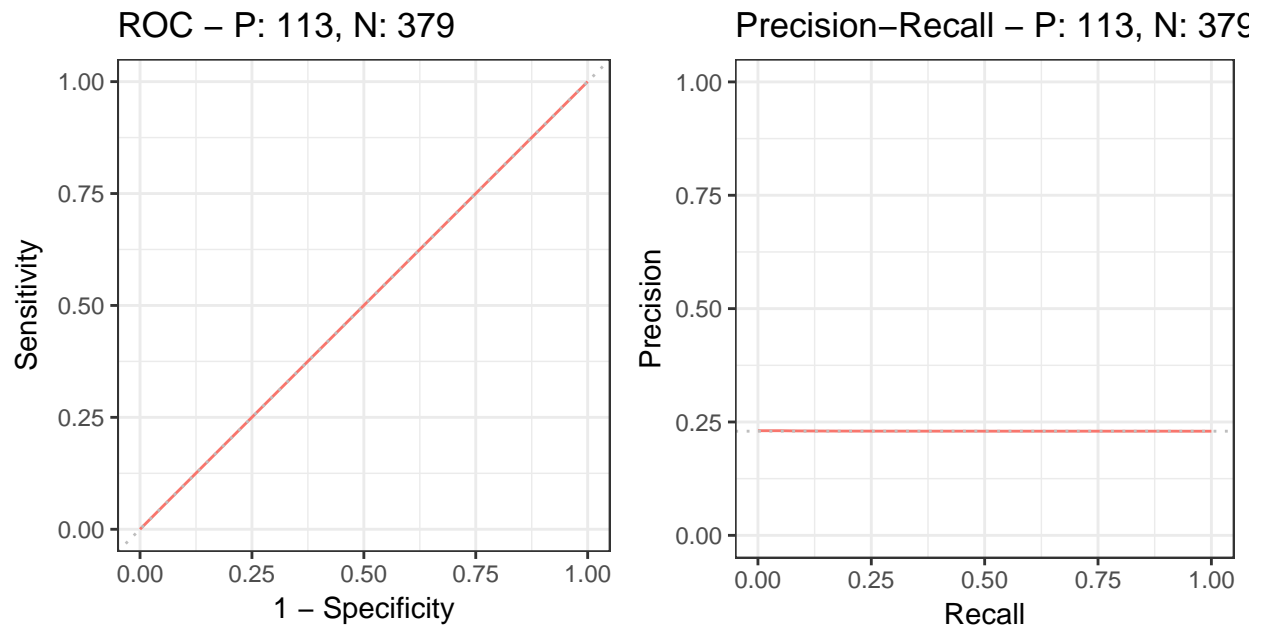


#3

```
t_C1_C3_C4_EC1<-table(C1*C3*C4,EC1)
confusionMatrix(t_C1_C3_C4_EC1)
```

```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 359 107
## 1   20   6
##
##              Accuracy : 0.7419
##              95% CI : (0.7008, 0.78)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.9384
##
##              Kappa : 4e-04
##  Mcnemar's Test P-Value : 2.325e-14
##
##              Sensitivity : 0.9472
##              Specificity : 0.0531
##      Pos Pred Value : 0.7704
##      Neg Pred Value : 0.2308
##      Prevalence : 0.7703
##      Detection Rate : 0.7297
##      Detection Prevalence : 0.9472
##      Balanced Accuracy : 0.5002
##
##      'Positive' Class : 0
##
```

```
sscurves134_1<- evalmod(scores = C1*C3*C4, labels = EC1)
autoplot(sscurves134_1)
```

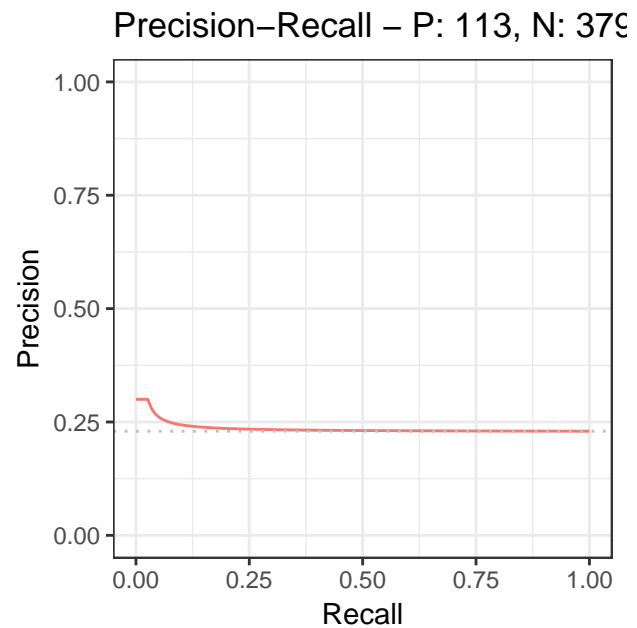
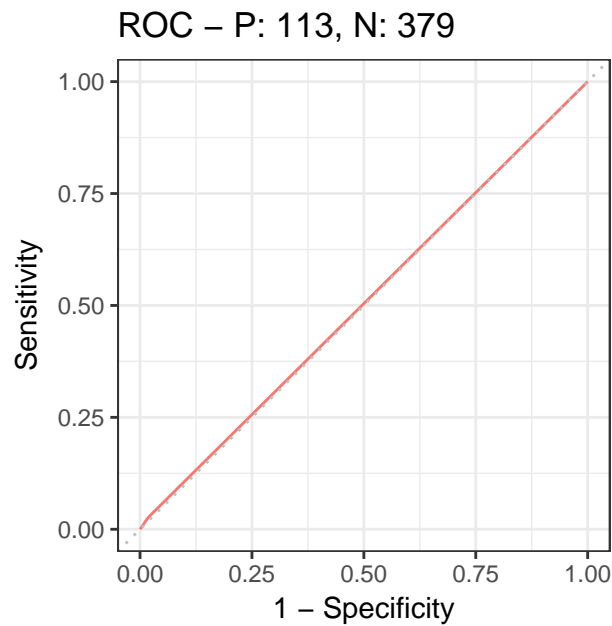



#4

```
t_C2_C3_C4_EC1<-table(C2*C3*C4,EC1)
confusionMatrix(t_C2_C3_C4_EC1)
```

```
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 372 110
## 1   7   3
##
##              Accuracy : 0.7622
##              95% CI : (0.722, 0.7992)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.6878
##
##              Kappa : 0.0119
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.98153
##              Specificity : 0.02655
##      Pos Pred Value : 0.77178
##      Neg Pred Value : 0.30000
##      Prevalence : 0.77033
##      Detection Rate : 0.75610
##      Detection Prevalence : 0.97967
##      Balanced Accuracy : 0.50404
##
##      'Positive' Class : 0
##
```

```
sscurves234_1<- evalmod(scores = C2*C3*C4, labels = EC1)
autoplot(sscurves234_1)
```



```
####C1_C2_C3 and EC2
```

```
#1
```

```
t_C1_C2_C3_EC2<-table(C1*C2*C3,EC2)
```

```
confusionMatrix(t_C1_C2_C3_EC2)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC2
```

```
##      0   1
```

```
## 0 399  84
```

```
## 1   8   1
```

```
##
```

```
##              Accuracy : 0.813
```

```
##              95% CI : (0.7757, 0.8465)
```

```
##      No Information Rate : 0.8272
```

```
##      P-Value [Acc > NIR] : 0.8152
```

```
##
```

```
##              Kappa : -0.0122
```

```
##      McNemar's Test P-Value : 5.312e-15
```

```
##
```

```
##              Sensitivity : 0.98034
```

```
##              Specificity : 0.01176
```

```
##              Pos Pred Value : 0.82609
```

```
##              Neg Pred Value : 0.11111
```

```
##              Prevalence : 0.82724
```

```
##              Detection Rate : 0.81098
```

```
##      Detection Prevalence : 0.98171
```

```
##              Balanced Accuracy : 0.49605
```

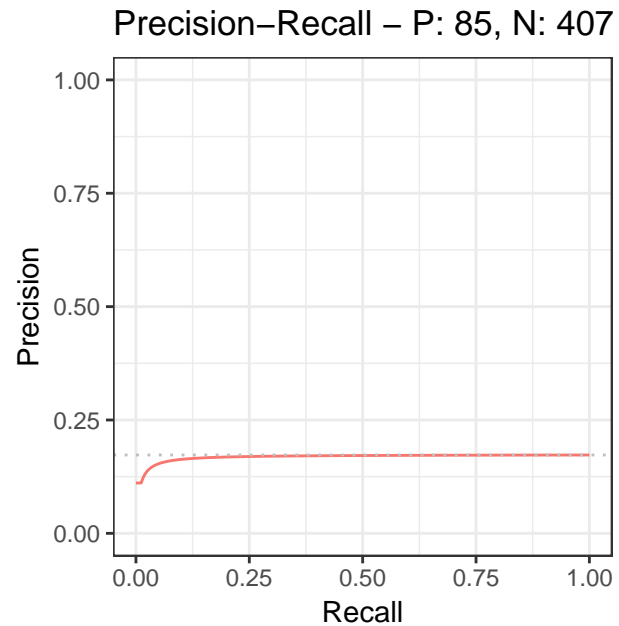
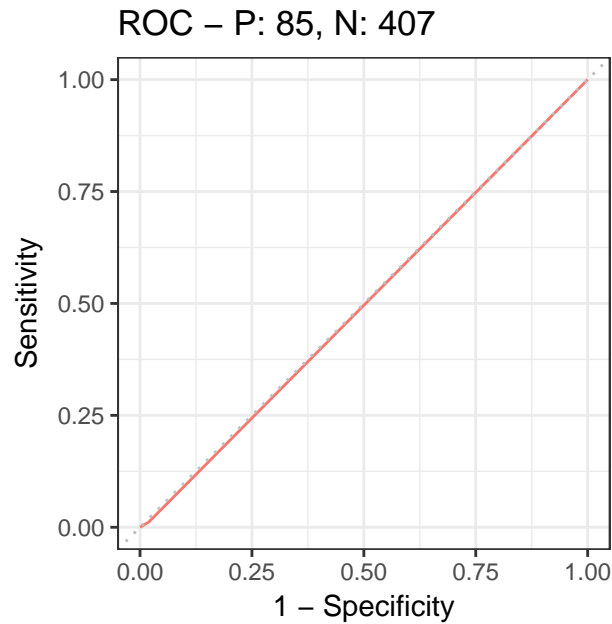
```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves123_2<- evalmod(scores = C1*C2*C3, labels = EC2)
```

```
autoplot(sscurves123_2)
```

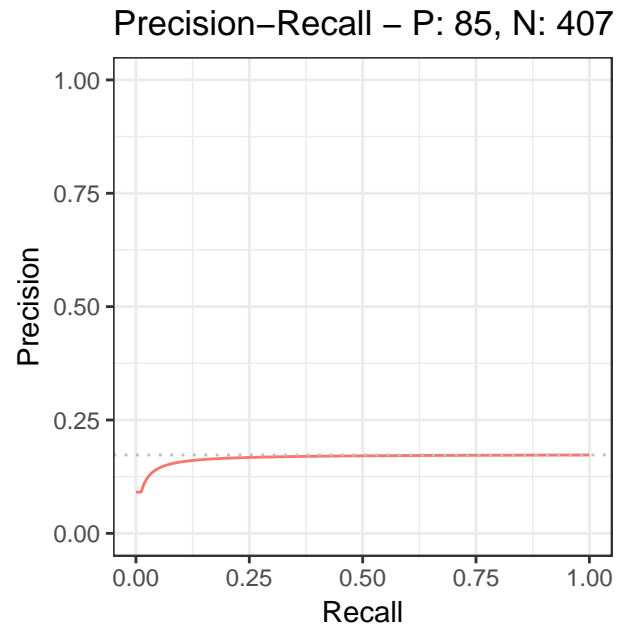
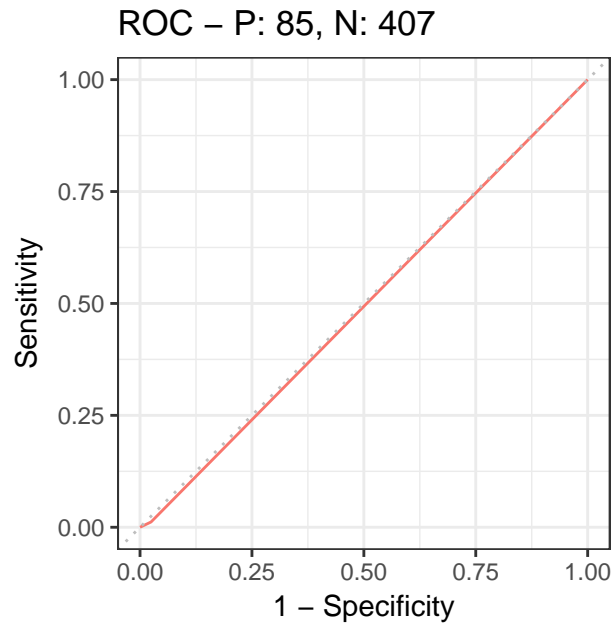


#2

```
t_C1_C2_C4_EC2<-table(C1*C2*C4,EC2)
confusionMatrix(t_C1_C2_C4_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 397  84
## 1  10   1
##
##              Accuracy : 0.8089
##              95% CI   : (0.7714, 0.8428)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.8707
##
##              Kappa : -0.0195
##  Mcnemar's Test P-Value : 5.098e-14
##
##              Sensitivity : 0.97543
##              Specificity : 0.01176
##              Pos Pred Value : 0.82536
##              Neg Pred Value : 0.09091
##              Prevalence : 0.82724
##              Detection Rate : 0.80691
##      Detection Prevalence : 0.97764
##              Balanced Accuracy : 0.49360
##
##              'Positive' Class : 0
##
```

```
sscurves124_2<- evalmod(scores = C1*C2*C4, labels = EC2)
autoplot(sscurves124_2)
```



#3

```
t_C1_C3_C4_EC2<-table(C1*C3*C4,EC2)
confusionMatrix(t_C1_C3_C4_EC2)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC2
##      0   1
## 0 391  75
## 1  16  10
```

```
##
```

```
##              Accuracy : 0.815
##              95% CI   : (0.7779, 0.8484)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.7824
```

```
##
```

```
##              Kappa : 0.108
##  Mcnemar's Test P-Value : 1.201e-09
```

```
##
```

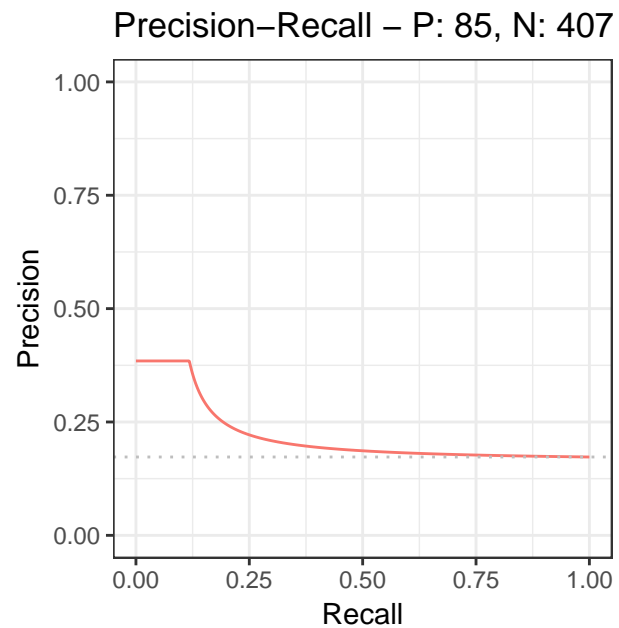
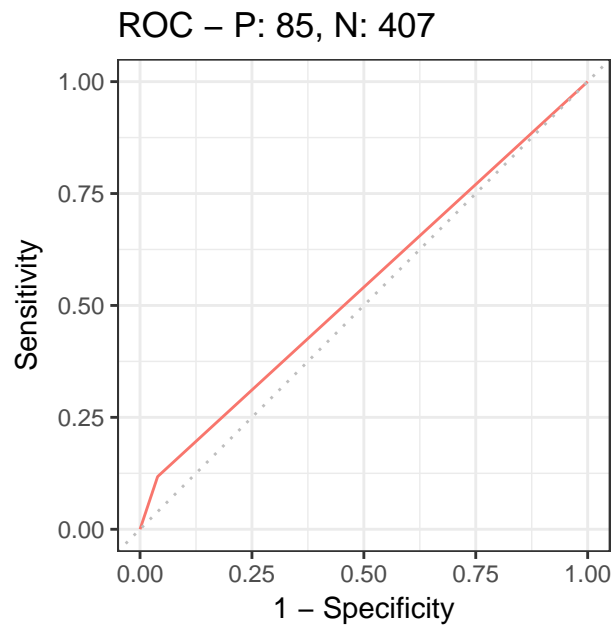
```
##              Sensitivity : 0.9607
##              Specificity : 0.1176
##      Pos Pred Value : 0.8391
##      Neg Pred Value : 0.3846
##      Prevalence : 0.8272
##      Detection Rate : 0.7947
##      Detection Prevalence : 0.9472
##      Balanced Accuracy : 0.5392
```

```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves134_2<- evalmod(scores = C1*C3*C4, labels = EC2)
autoplot(sscurves134_2)
```

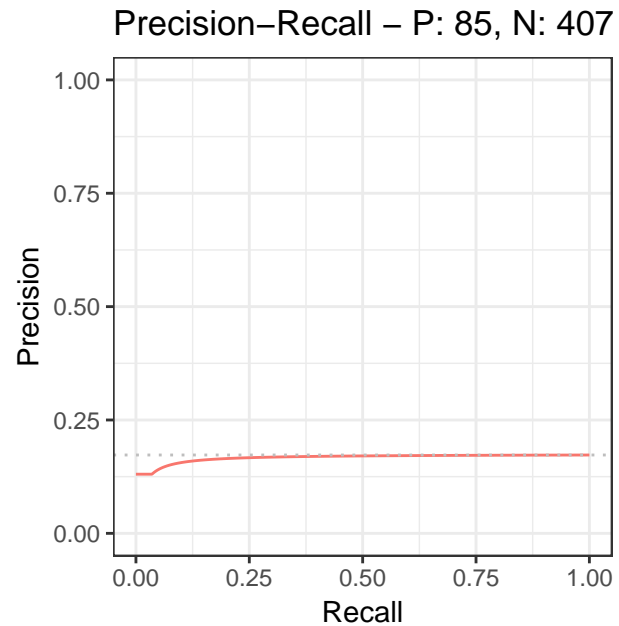
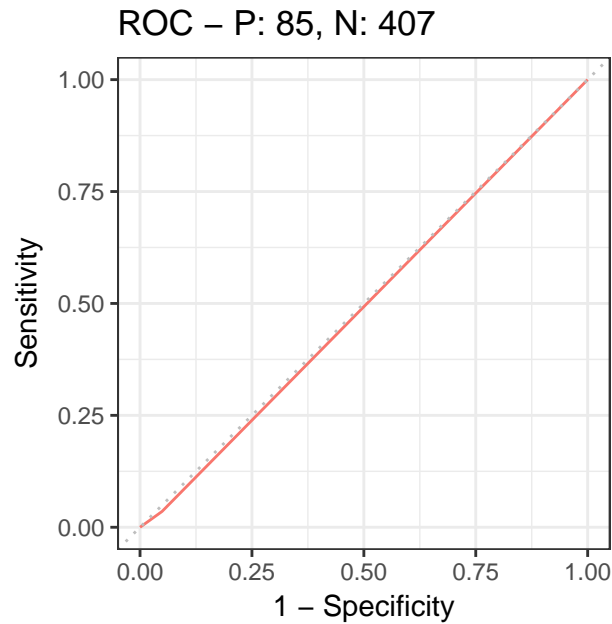


#4

```
t_C2_C3_C4_EC2<-table(C2*C3*C4,EC2)
confusionMatrix(t_C2_C3_C4_EC2)
```

```
## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 399  83
## 1   8   2
##
##              Accuracy : 0.815
##              95% CI : (0.7779, 0.8484)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.7824
##
##              Kappa : 0.006
##  Mcnemar's Test P-Value : 8.675e-15
##
##      Sensitivity : 0.98034
##      Specificity : 0.02353
##      Pos Pred Value : 0.82780
##      Neg Pred Value : 0.20000
##      Prevalence : 0.82724
##      Detection Rate : 0.81098
##      Detection Prevalence : 0.97967
##      Balanced Accuracy : 0.50194
##
##      'Positive' Class : 0
##
```

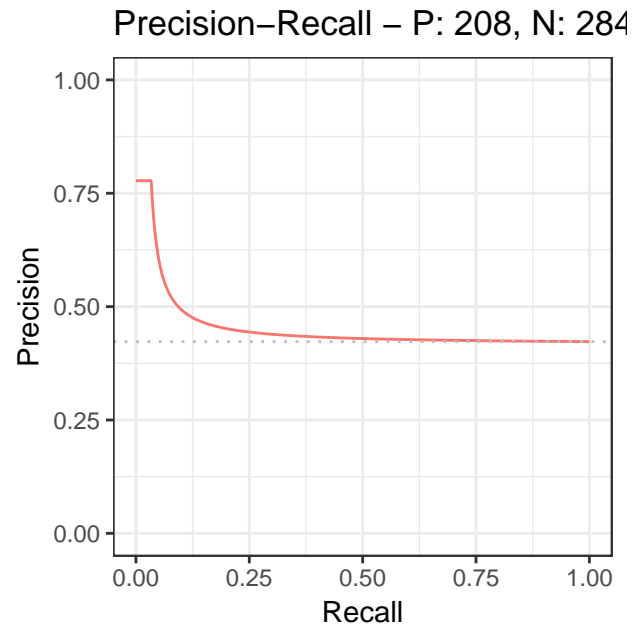
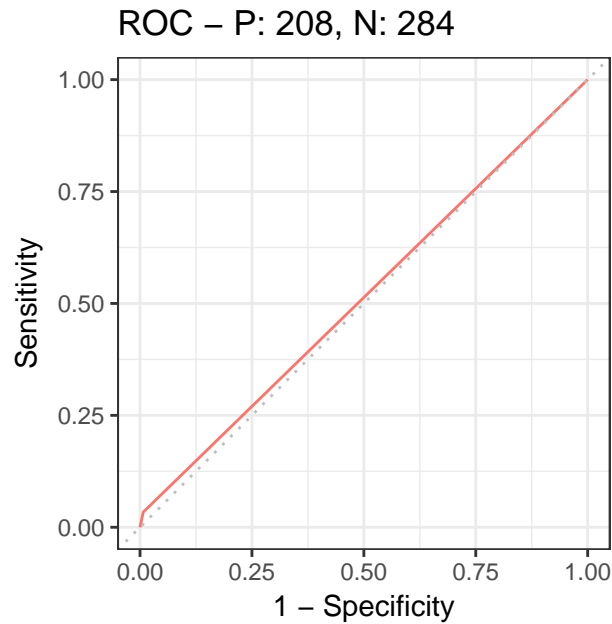
```
sscurves234_2<- evalmod(scores = C2*C3*C2, labels = EC2)
autoplot(sscurves234_2)
```



```
####C1_C2_C3 and EC3
#1
t_C1_C2_C3_EC3<-table(C1*C2*C3,EC3)
confusionMatrix(t_C1_C2_C3_EC3)

## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 282 201
## 1   2   7
##
##              Accuracy : 0.5874
##              95% CI : (0.5425, 0.6313)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.3414
##
##              Kappa : 0.0305
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.99296
##              Specificity : 0.03365
##      Pos Pred Value : 0.58385
##      Neg Pred Value : 0.77778
##              Prevalence : 0.57724
##      Detection Rate : 0.57317
##      Detection Prevalence : 0.98171
##      Balanced Accuracy : 0.51331
##
##      'Positive' Class : 0
##

sscurves123_3<- evalmod(scores = C1*C2*C3, labels = EC3)
autoplot(sscurves123_3)
```



#2

```
t_C1_C2_C4_EC3<-table(C1*C2*C4,EC3)
confusionMatrix(t_C1_C2_C4_EC3)
```

```
## Confusion Matrix and Statistics
```

```
##
```

```
##      EC3
```

```
##      0   1
```

```
## 0 280 201
```

```
## 1   4   7
```

```
##
```

```
##              Accuracy : 0.5833
```

```
##              95% CI : (0.5384, 0.6273)
```

```
##      No Information Rate : 0.5772
```

```
##      P-Value [Acc > NIR] : 0.4106
```

```
##
```

```
##              Kappa : 0.0224
```

```
##      McNemar's Test P-Value : <2e-16
```

```
##
```

```
##              Sensitivity : 0.98592
```

```
##              Specificity : 0.03365
```

```
##              Pos Pred Value : 0.58212
```

```
##              Neg Pred Value : 0.63636
```

```
##              Prevalence : 0.57724
```

```
##              Detection Rate : 0.56911
```

```
##      Detection Prevalence : 0.97764
```

```
##              Balanced Accuracy : 0.50978
```

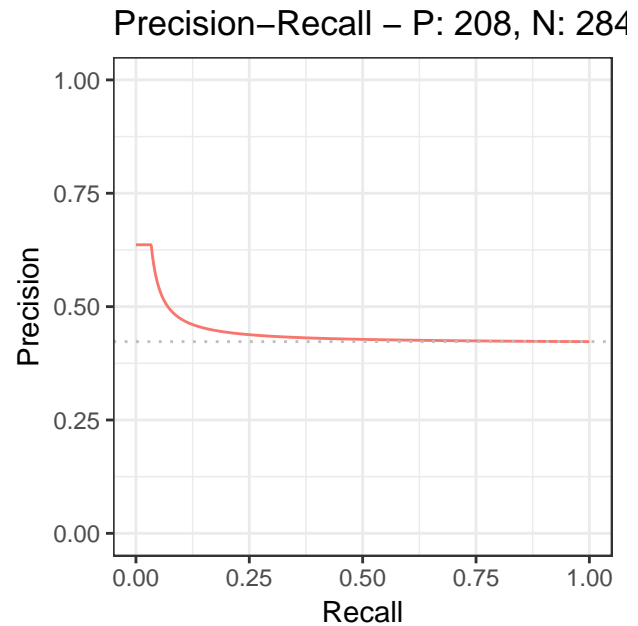
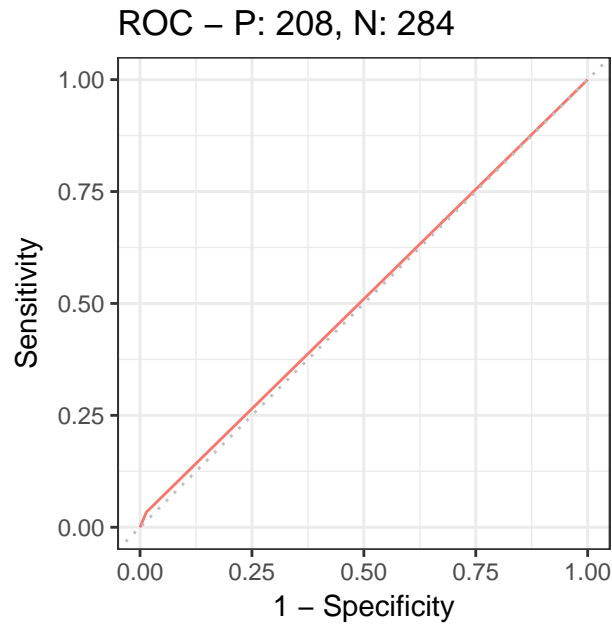
```
##
```

```
##      'Positive' Class : 0
```

```
##
```

```
sscurves124_3<- evalmod(scores = C1*C2*C4, labels = EC3)
```

```
autoplot(sscurves124_3)
```

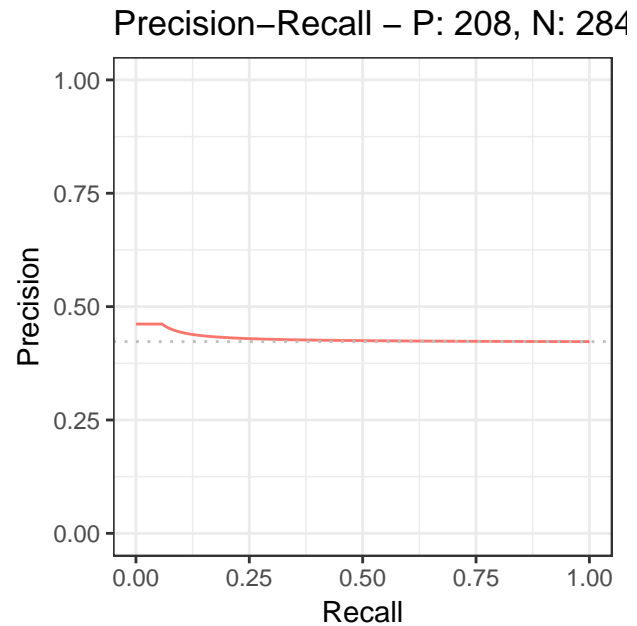
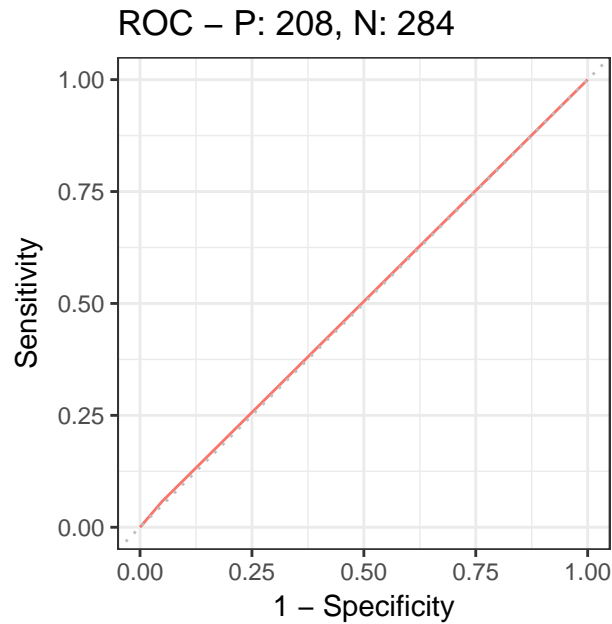


#3

```
t_C1_C3_C4_EC3<-table(C1*C3*C4,EC3)
confusionMatrix(t_C1_C3_C4_EC3)
```

```
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 270 196
## 1  14  12
##
##              Accuracy : 0.5732
##              95% CI : (0.5281, 0.6173)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.5911
##
##              Kappa : 0.0095
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.95070
##              Specificity : 0.05769
##              Pos Pred Value : 0.57940
##              Neg Pred Value : 0.46154
##              Prevalence : 0.57724
##              Detection Rate : 0.54878
##      Detection Prevalence : 0.94715
##              Balanced Accuracy : 0.50420
##
##              'Positive' Class : 0
##
```

```
sscurves134_3<- evalmod(scores = C1*C3*C4, labels = EC3)
autoplot(sscurves134_3)
```

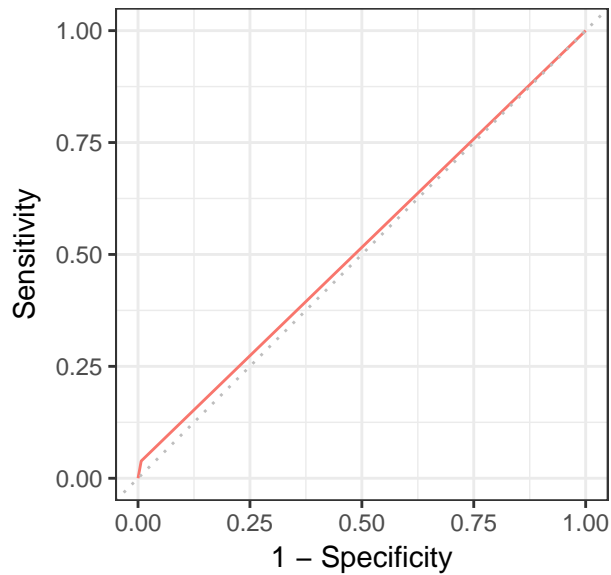
#4

```
t_C2_C3_C4_EC3<-table(C2*C3*C4,EC3)
confusionMatrix(t_C2_C3_C4_EC3)
```

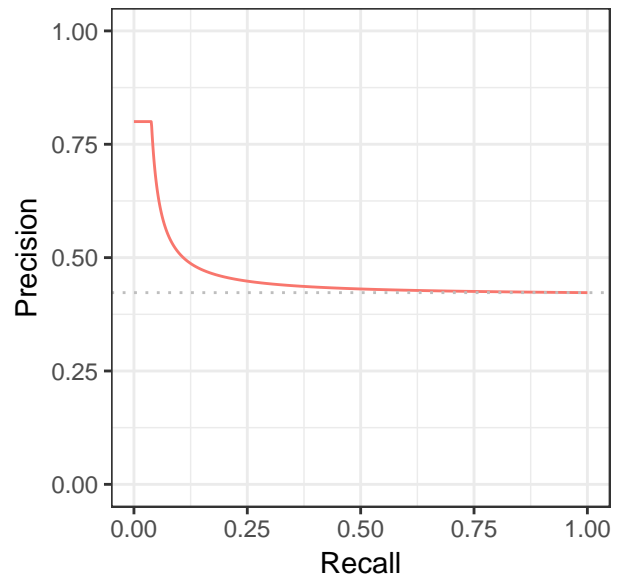
```
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 282 200
## 1   2   8
##
##              Accuracy : 0.5894
##              95% CI : (0.5445, 0.6333)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.3085
##
##              Kappa : 0.036
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.99296
##              Specificity : 0.03846
##              Pos Pred Value : 0.58506
##              Neg Pred Value : 0.80000
##              Prevalence : 0.57724
##              Detection Rate : 0.57317
##      Detection Prevalence : 0.97967
##              Balanced Accuracy : 0.51571
##
##              'Positive' Class : 0
##
```

```
sscurves234_3<- evalmod(scores = C2*C3*C4, labels = EC3)
autoplot(sscurves234_3)
```

ROC – P: 208, N: 284



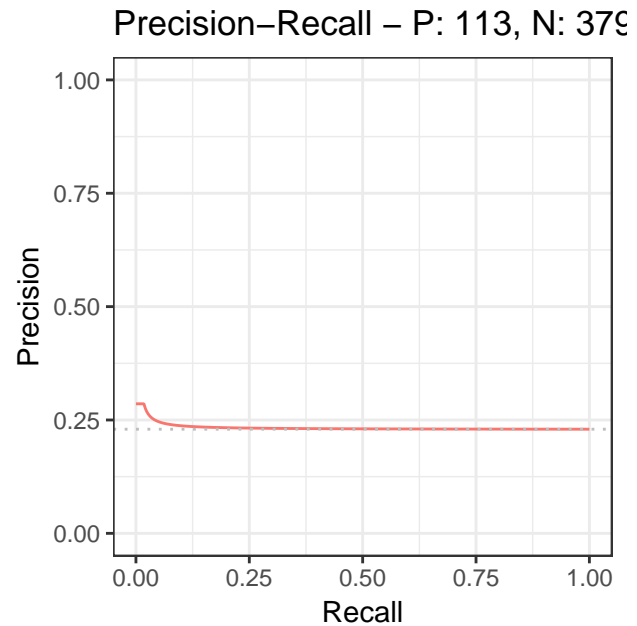
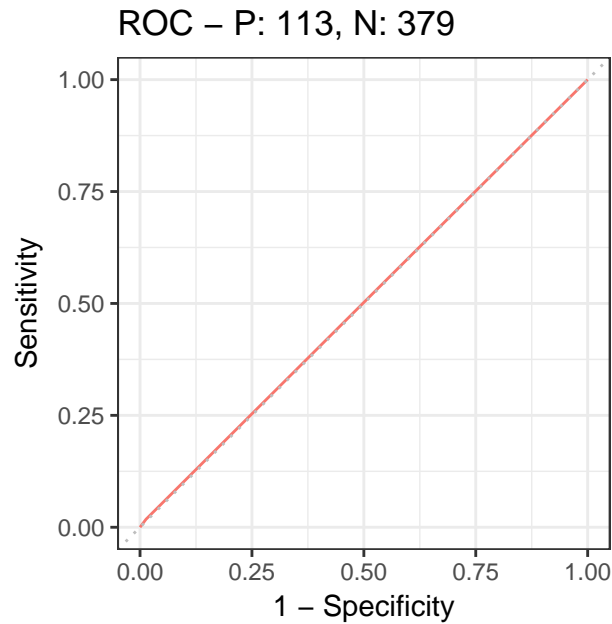
Precision-Recall – P: 208, N: 284



```
###C1_C2_C3_C4_EC123
t_C1_C2_C3_C4_EC1<-table(C1*C2*C3*C4,EC1)
confusionMatrix(t_C1_C2_C3_C4_EC1)

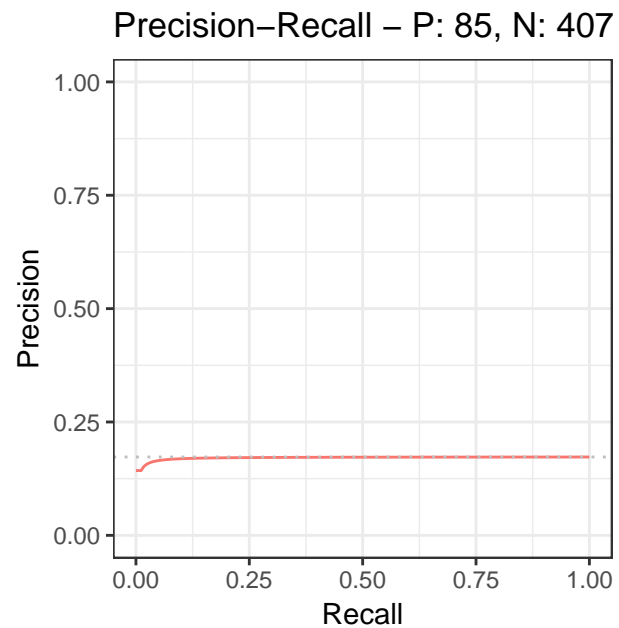
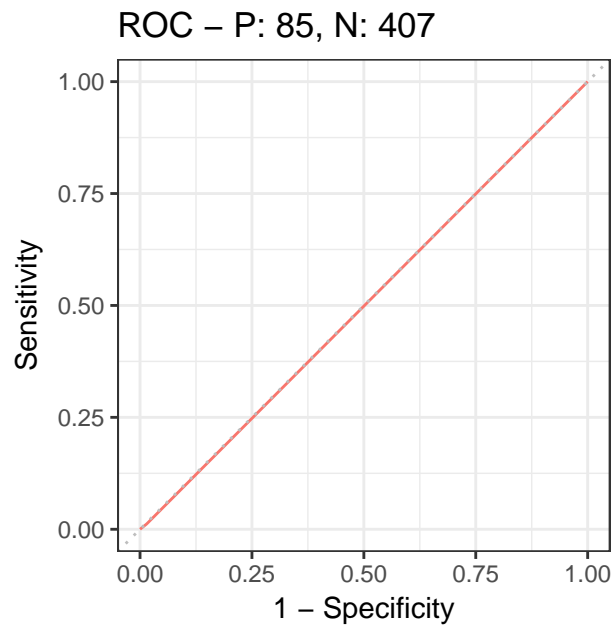
## Confusion Matrix and Statistics
##
##      EC1
##      0   1
## 0 374 111
## 1   5   2
##
##              Accuracy : 0.7642
##              95% CI   : (0.7242, 0.8011)
##      No Information Rate : 0.7703
##      P-Value [Acc > NIR] : 0.6493
##
##              Kappa : 0.0067
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.9868
##              Specificity : 0.0177
##      Pos Pred Value : 0.7711
##      Neg Pred Value : 0.2857
##      Prevalence : 0.7703
##      Detection Rate : 0.7602
##      Detection Prevalence : 0.9858
##      Balanced Accuracy : 0.5023
##
##      'Positive' Class : 0
##

sscurves1234_1<- evalmod(scores = C1*C2*C3*C4, labels = EC1)
autoplot(sscurves1234_1)
```



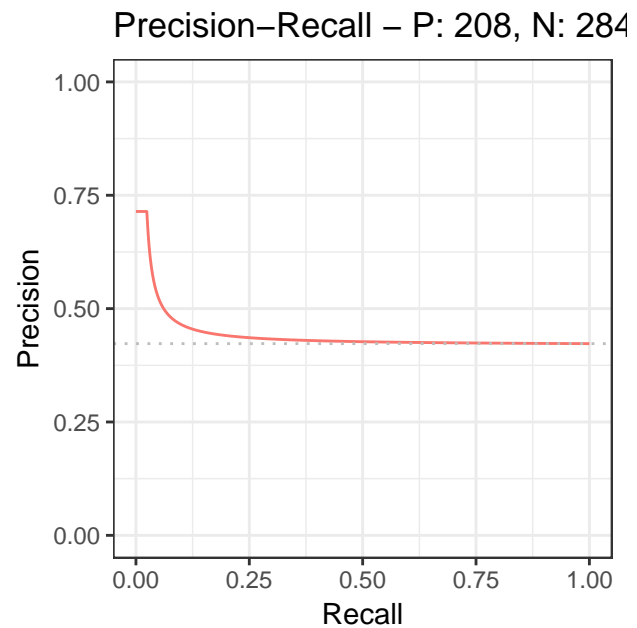
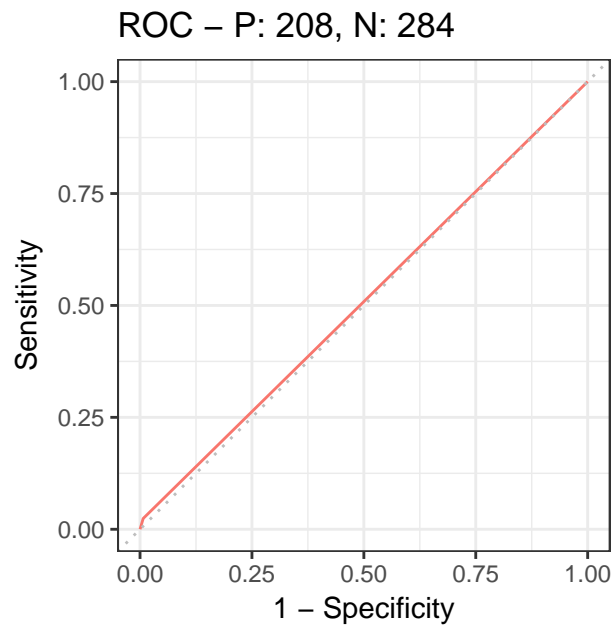
```
#
t_C1_C2_C3_C4_EC2<-table(C1*C2*C3*C4,EC2)
confusionMatrix(t_C1_C2_C3_C4_EC2)

## Confusion Matrix and Statistics
##
##      EC2
##      0   1
## 0 401  84
## 1   6   1
##
##              Accuracy : 0.8171
##              95% CI : (0.78, 0.8503)
##      No Information Rate : 0.8272
##      P-Value [Acc > NIR] : 0.7464
##
##              Kappa : -0.0047
##  Mcnemar's Test P-Value : 4.798e-16
##
##      Sensitivity : 0.98526
##      Specificity : 0.01176
##      Pos Pred Value : 0.82680
##      Neg Pred Value : 0.14286
##      Prevalence : 0.82724
##      Detection Rate : 0.81504
##      Detection Prevalence : 0.98577
##      Balanced Accuracy : 0.49851
##
##      'Positive' Class : 0
##
sscurves1234_2<- evalmod(scores = C1*C2*C3*C4, labels = EC2)
autoplot(sscurves1234_2)
```



```
#
t_C1_C2_C3_C4_EC3<-table(C1*C2*C3*C4,EC3)
confusionMatrix(t_C1_C2_C3_C4_EC3)

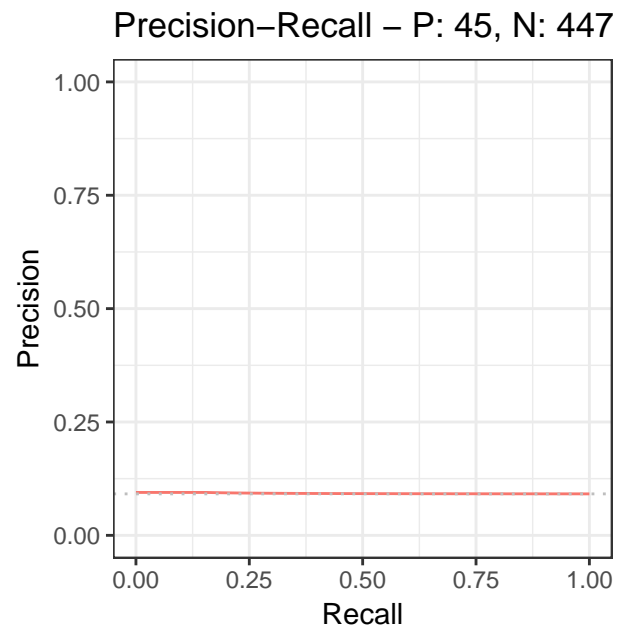
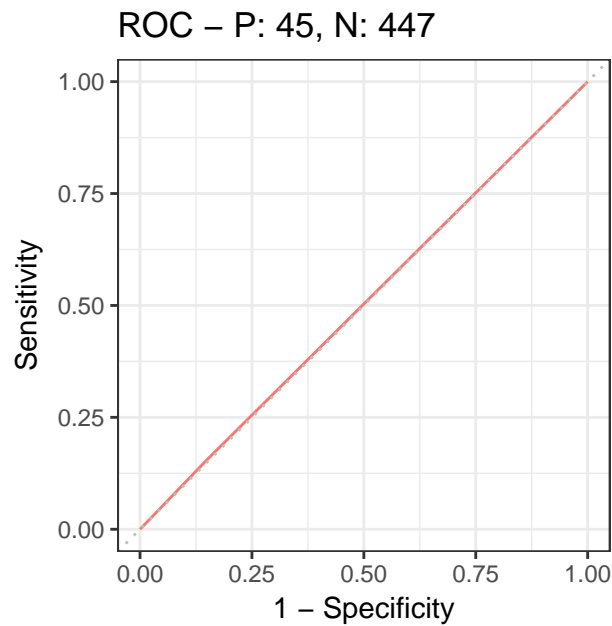
## Confusion Matrix and Statistics
##
##      EC3
##      0   1
## 0 282 203
## 1   2   5
##
##              Accuracy : 0.5833
##              95% CI : (0.5384, 0.6273)
##      No Information Rate : 0.5772
##      P-Value [Acc > NIR] : 0.4106
##
##              Kappa : 0.0195
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.99296
##              Specificity : 0.02404
##              Pos Pred Value : 0.58144
##              Neg Pred Value : 0.71429
##              Prevalence : 0.57724
##              Detection Rate : 0.57317
##      Detection Prevalence : 0.98577
##              Balanced Accuracy : 0.50850
##
##              'Positive' Class : 0
##
sscurves1234_3<- evalmod(scores = C1*C2*C3*C4, labels = EC3)
autoplot(sscurves1234_3)
```



```
##C1_EC1_EC2
t_C1_EC1_EC2<-table(C1,EC1*EC2)
confusionMatrix(t_C1_EC1_EC2)

## Confusion Matrix and Statistics
##
##
## C1      0      1
##  0 380   38
##  1  67    7
##
##              Accuracy : 0.7866
##              95% CI : (0.7477, 0.822)
##      No Information Rate : 0.9085
##      P-Value [Acc > NIR] : 1.000000
##
##              Kappa : 0.0044
##  Mcnemar's Test P-Value : 0.006285
##
##              Sensitivity : 0.85011
##              Specificity : 0.15556
##              Pos Pred Value : 0.90909
##              Neg Pred Value : 0.09459
##              Prevalence : 0.90854
##              Detection Rate : 0.77236
##      Detection Prevalence : 0.84959
##              Balanced Accuracy : 0.50283
##
##              'Positive' Class : 0
##

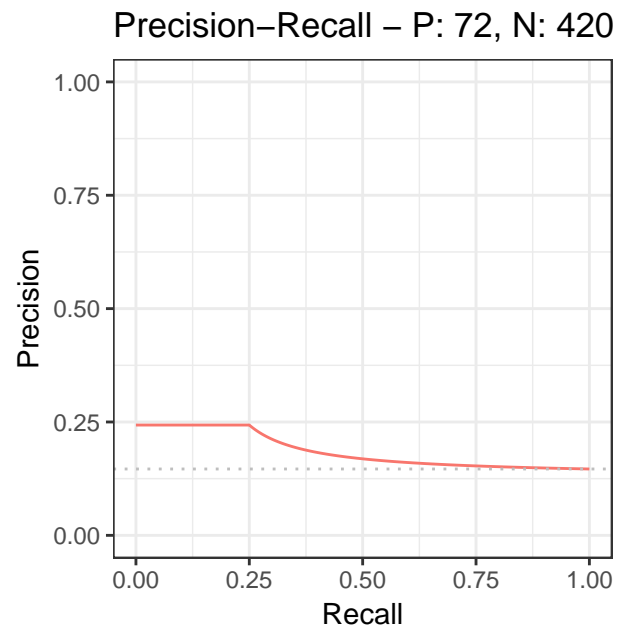
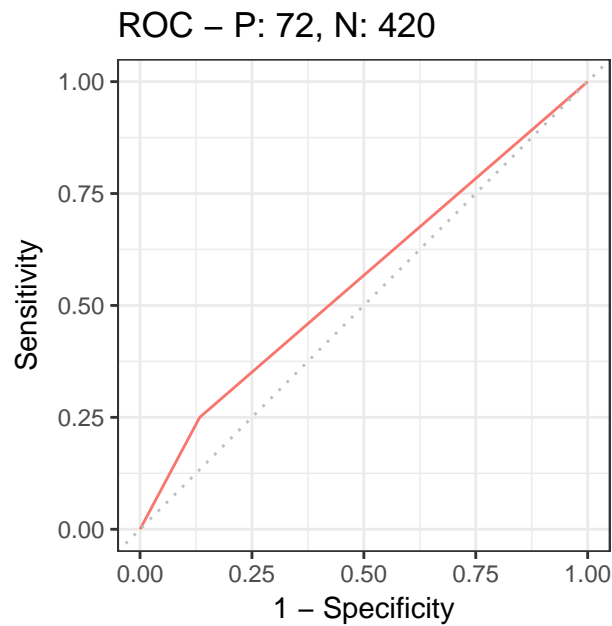
sscurves1_12<- evalmod(scores = C1, labels = EC1*EC2)
autoplot(sscurves1_12)
```



```
#
t_C1_EC1_EC3<-table(C1,EC1*EC3)
confusionMatrix(t_C1_EC1_EC3)

## Confusion Matrix and Statistics
##
##
## C1      0      1
##  0 364   54
##  1  56   18
##
##              Accuracy : 0.7764
##              95% CI   : (0.737, 0.8125)
##    No Information Rate : 0.8537
##    P-Value [Acc > NIR] : 1.000
##
##              Kappa : 0.1153
##  Mcnemar's Test P-Value : 0.924
##
##              Sensitivity : 0.8667
##              Specificity : 0.2500
##              Pos Pred Value : 0.8708
##              Neg Pred Value : 0.2432
##              Prevalence : 0.8537
##              Detection Rate : 0.7398
##              Detection Prevalence : 0.8496
##              Balanced Accuracy : 0.5583
##
##              'Positive' Class : 0
##

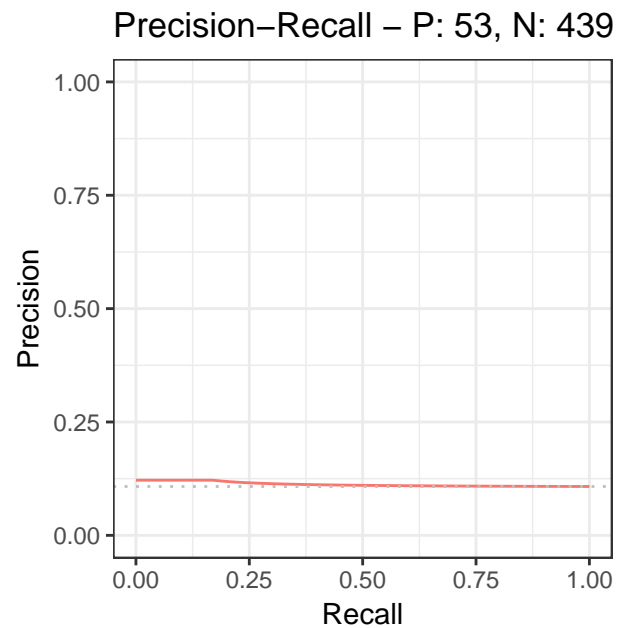
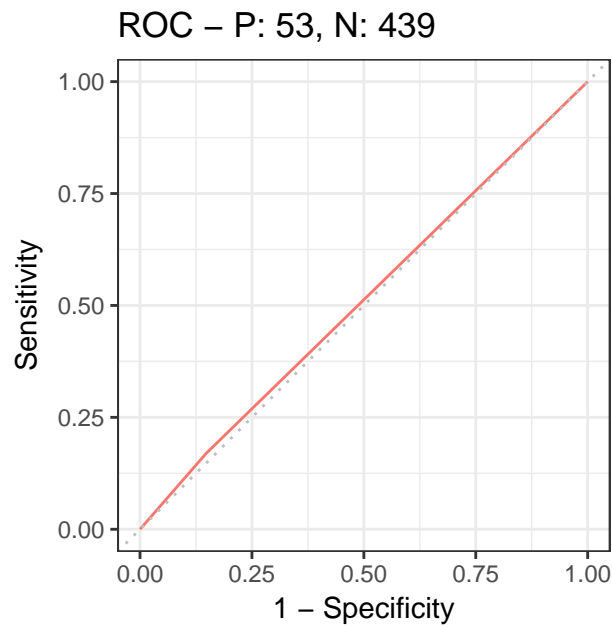
sscurves1_13<- evalmod(scores = C1, labels = EC1*EC3)
autoplot(sscurves1_13)
```



```
#
t_C1_EC2_EC3<-table(C1,EC2*EC3)
confusionMatrix(t_C1_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C1      0      1
##  0 374   44
##  1   65    9
##
##              Accuracy : 0.7785
##              95% CI   : (0.7391, 0.8144)
##    No Information Rate : 0.8923
##    P-Value [Acc > NIR] : 1.00000
##
##              Kappa : 0.0185
##  Mcnemar's Test P-Value : 0.05541
##
##              Sensitivity : 0.8519
##              Specificity : 0.1698
##              Pos Pred Value : 0.8947
##              Neg Pred Value : 0.1216
##              Prevalence : 0.8923
##              Detection Rate : 0.7602
##              Detection Prevalence : 0.8496
##              Balanced Accuracy : 0.5109
##
##              'Positive' Class : 0
##

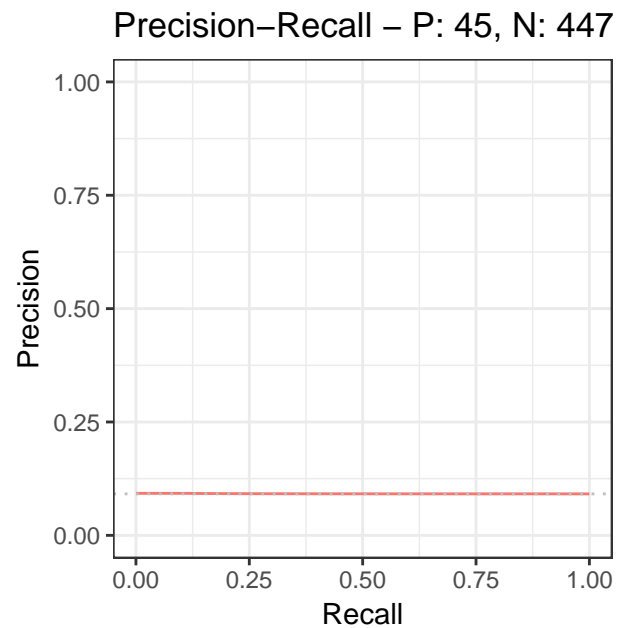
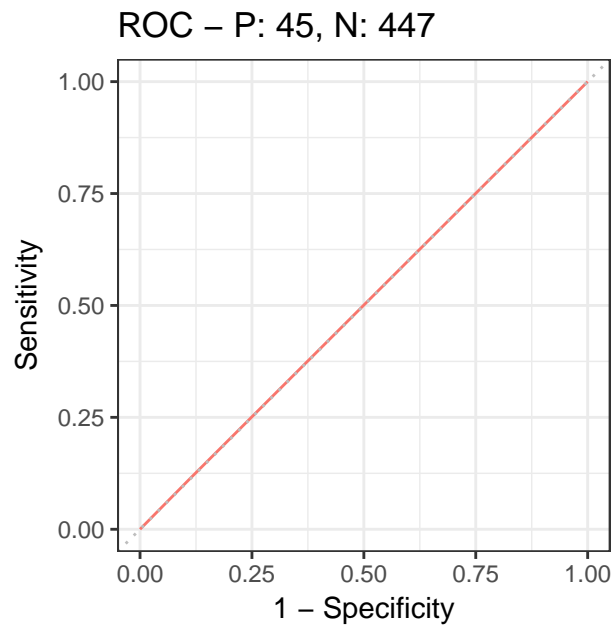
sscurves1_23<- evalmod(scores = C1, labels = EC2*EC3)
autoplot(sscurves1_23)
```



```
##C2_EC1_EC2
t_C2_EC1_EC2<-table(C2,EC1*EC2)
confusionMatrix(t_C2_EC1_EC2)

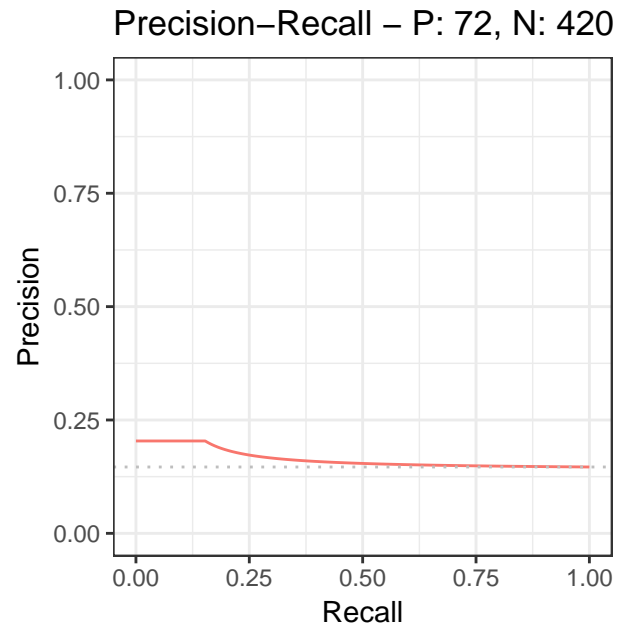
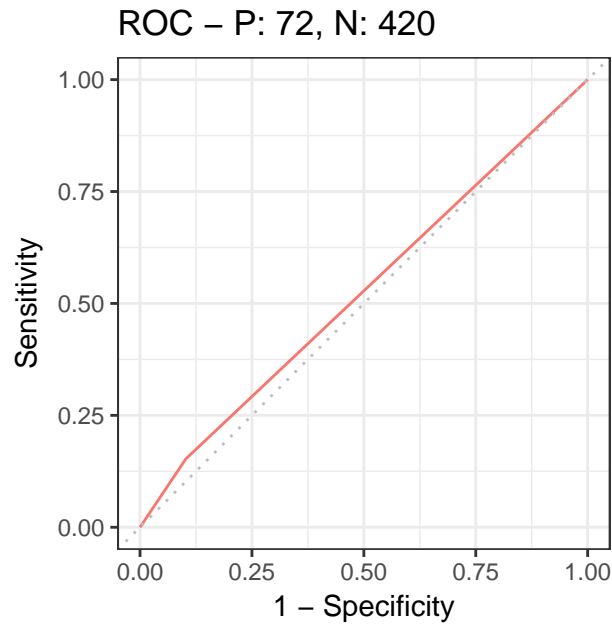
## Confusion Matrix and Statistics
##
##
##  C2      0      1
##    0 398   40
##    1  49    5
##
##              Accuracy : 0.8191
##              95% CI   : (0.7822, 0.8521)
##    No Information Rate : 0.9085
##    P-Value [Acc > NIR] : 1.0000
##
##              Kappa : 0.0014
##  Mcnemar's Test P-Value : 0.3964
##
##              Sensitivity : 0.89038
##              Specificity : 0.11111
##              Pos Pred Value : 0.90868
##              Neg Pred Value : 0.09259
##              Prevalence : 0.90854
##              Detection Rate : 0.80894
##              Detection Prevalence : 0.89024
##              Balanced Accuracy : 0.50075
##
##              'Positive' Class : 0
##

sscurves2_12<- evalmod(scores = C2, labels = EC1*EC2)
autoplot(sscurves2_12)
```

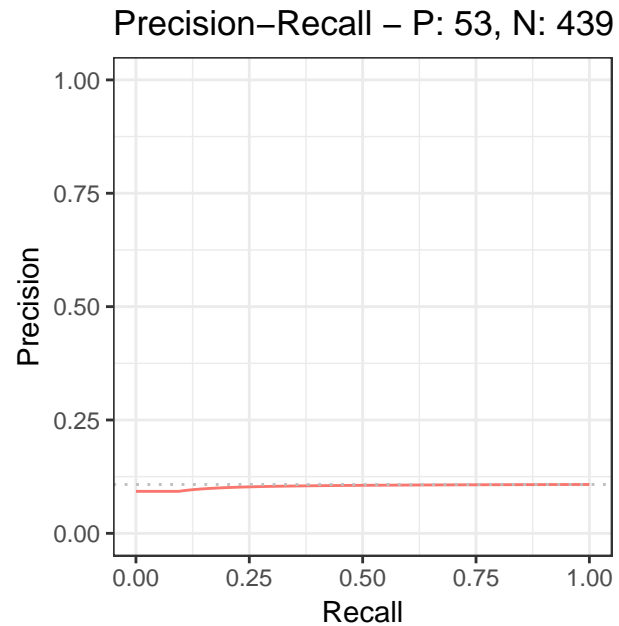
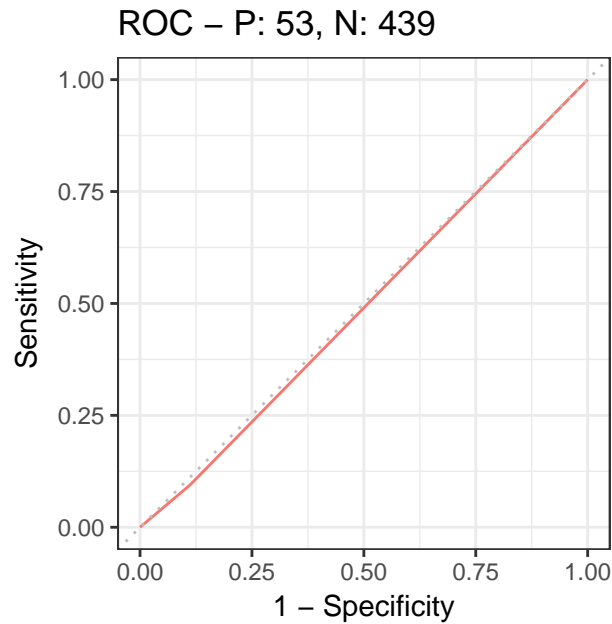
```
#
t_C2_EC1_EC3<-table(C2,EC1*EC3)
confusionMatrix(t_C2_EC1_EC3)

## Confusion Matrix and Statistics
##
##
## C2      0      1
##  0 377    61
##  1  43    11
##
##              Accuracy : 0.7886
##              95% CI   : (0.7498, 0.8239)
##    No Information Rate : 0.8537
##    P-Value [Acc > NIR] : 0.99996
##
##              Kappa : 0.0562
##  Mcnemar's Test P-Value : 0.09552
##
##              Sensitivity : 0.8976
##              Specificity : 0.1528
##              Pos Pred Value : 0.8607
##              Neg Pred Value : 0.2037
##              Prevalence : 0.8537
##              Detection Rate : 0.7663
##              Detection Prevalence : 0.8902
##              Balanced Accuracy : 0.5252
##
##              'Positive' Class : 0
##
sscurves2_13<- evalmod(scores = C2, labels = EC1*EC3)
autoplot(sscurves2_13)
```



```
#
t_C2_EC2_EC3<-table(C2,EC2*EC3)
confusionMatrix(t_C2_EC2_EC3)

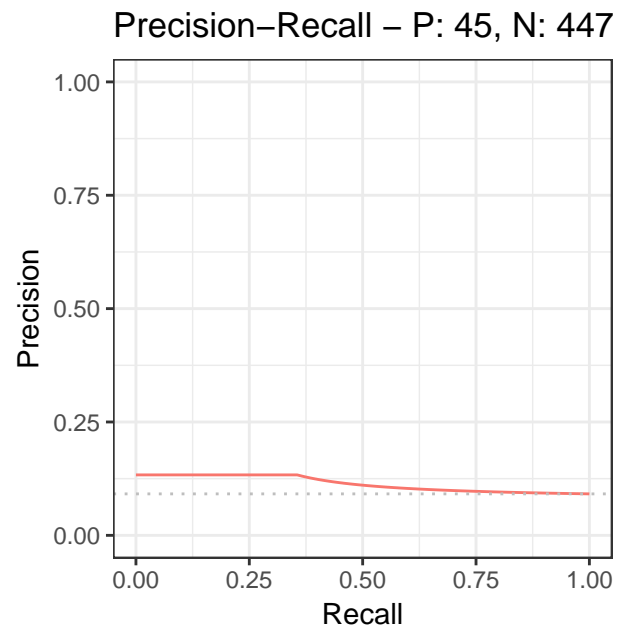
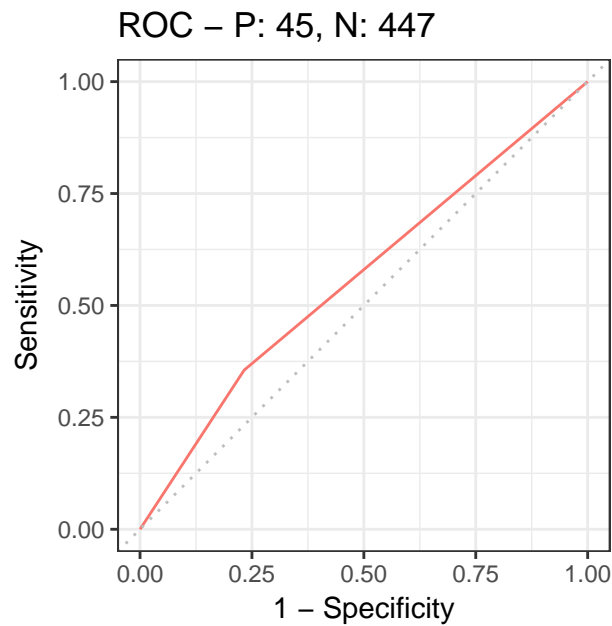
## Confusion Matrix and Statistics
##
##
## C2      0      1
##  0 390    48
##  1   49     5
##
##              Accuracy : 0.8028
##              95% CI   : (0.7649, 0.8371)
##    No Information Rate : 0.8923
##    P-Value [Acc > NIR] : 1
##
##              Kappa : -0.0171
##  Mcnemar's Test P-Value : 1
##
##              Sensitivity : 0.88838
##              Specificity : 0.09434
##              Pos Pred Value : 0.89041
##              Neg Pred Value : 0.09259
##              Prevalence : 0.89228
##              Detection Rate : 0.79268
##              Detection Prevalence : 0.89024
##              Balanced Accuracy : 0.49136
##
##              'Positive' Class : 0
##
sscurves2_23<- evalmod(scores = C2, labels = EC2*EC3)
autoplot(sscurves2_23)
```



```
##C3_EC1_EC2
t_C3_EC1_EC2<-table(C3,EC1*EC2)
confusionMatrix(t_C3_EC1_EC2)

## Confusion Matrix and Statistics
##
##
##  C3      0      1
##    0 343   29
##    1 104   16
##
##               Accuracy : 0.7297
##               95% CI   : (0.6881, 0.7685)
##    No Information Rate : 0.9085
##    P-Value [Acc > NIR] : 1
##
##               Kappa : 0.0702
##  Mcnemar's Test P-Value : 1.393e-10
##
##               Sensitivity : 0.7673
##               Specificity : 0.3556
##               Pos Pred Value : 0.9220
##               Neg Pred Value : 0.1333
##               Prevalence : 0.9085
##               Detection Rate : 0.6972
##    Detection Prevalence : 0.7561
##    Balanced Accuracy : 0.5614
##
##    'Positive' Class : 0
##

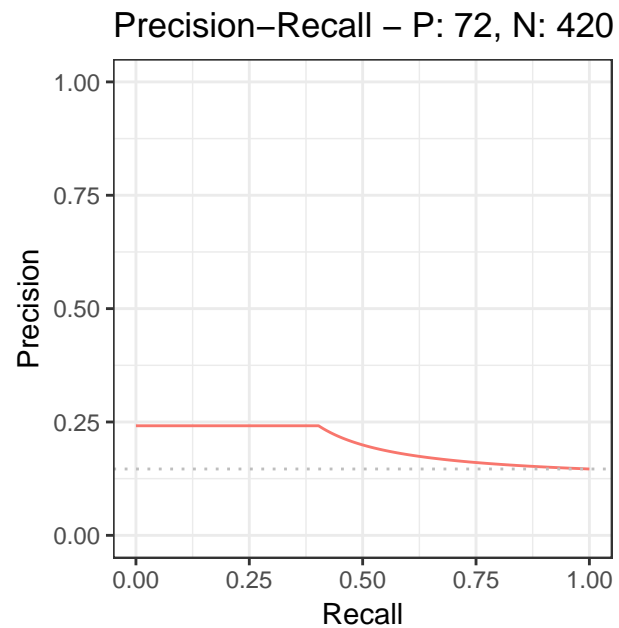
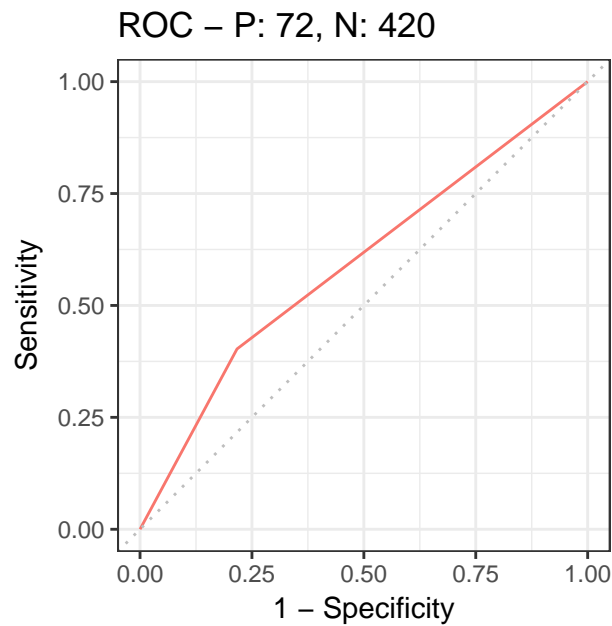
sscurves3_12<- evalmod(scores = C3, labels = EC1*EC2)
autoplot(sscurves3_12)
```



```
#
t_C3_EC1_EC3<-table(C3,EC1*EC3)
confusionMatrix(t_C3_EC1_EC3)

## Confusion Matrix and Statistics
##
##
## C3      0      1
##  0 329   43
##  1  91   29
##
##               Accuracy : 0.7276
##               95% CI   : (0.686, 0.7665)
##      No Information Rate : 0.8537
##      P-Value [Acc > NIR] : 1
##
##               Kappa : 0.1458
##  Mcnemar's Test P-Value : 4.903e-05
##
##      Sensitivity : 0.7833
##      Specificity : 0.4028
##      Pos Pred Value : 0.8844
##      Neg Pred Value : 0.2417
##      Prevalence : 0.8537
##      Detection Rate : 0.6687
##      Detection Prevalence : 0.7561
##      Balanced Accuracy : 0.5931
##
##      'Positive' Class : 0
##

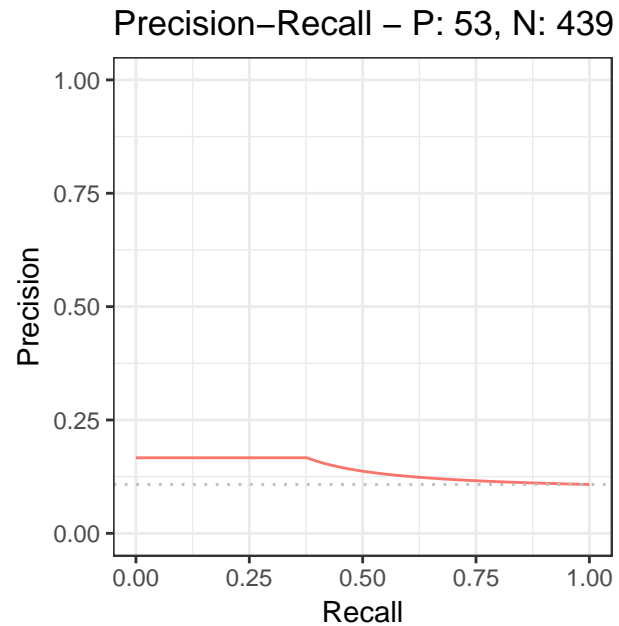
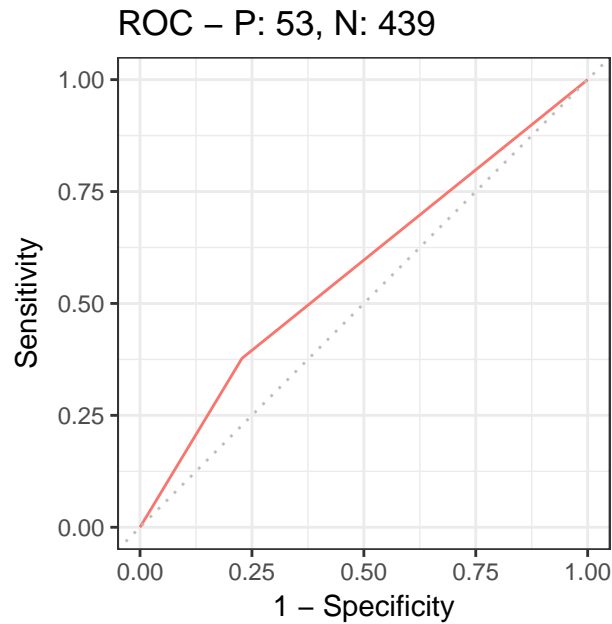
sscurves3_13<- evalmod(scores = C3, labels = EC1*EC3)
autoplot(sscurves3_13)
```



```
#
t_C3_EC2_EC3<-table(C3,EC2*EC3)
confusionMatrix(t_C3_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C3      0      1
##  0 339   33
##  1 100   20
##
##              Accuracy : 0.7297
##              95% CI   : (0.6881, 0.7685)
##    No Information Rate : 0.8923
##    P-Value [Acc > NIR] : 1
##
##              Kappa : 0.0961
##  Mcnemar's Test P-Value : 1.047e-08
##
##              Sensitivity : 0.7722
##              Specificity : 0.3774
##              Pos Pred Value : 0.9113
##              Neg Pred Value : 0.1667
##              Prevalence : 0.8923
##              Detection Rate : 0.6890
##              Detection Prevalence : 0.7561
##              Balanced Accuracy : 0.5748
##
##              'Positive' Class : 0
##

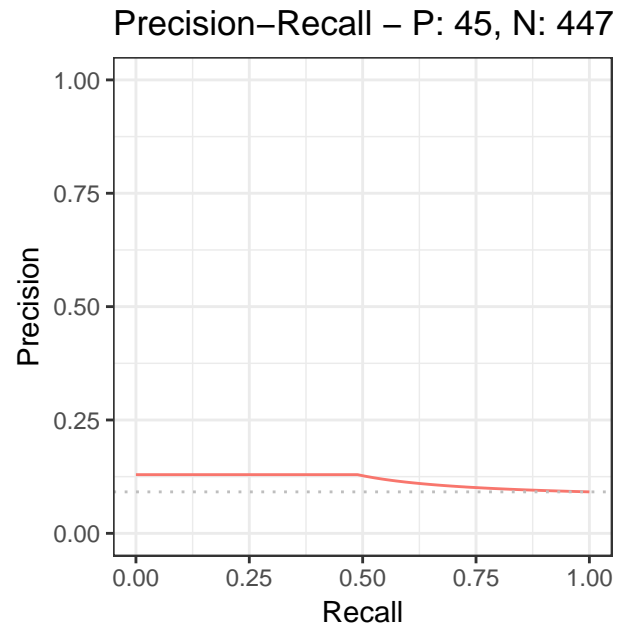
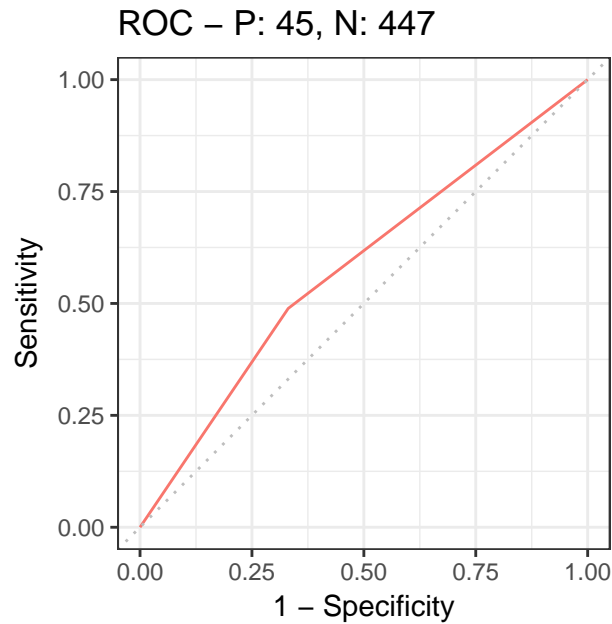
sscurves3_23<- evalmod(scores = C3, labels = EC2*EC3)
autoplot(sscurves3_23)
```



```
##C4_EC1_EC2
t_C4_EC1_EC2<-table(C4,EC1*EC2)
confusionMatrix(t_C4_EC1_EC2)

## Confusion Matrix and Statistics
##
##
##  C4      0      1
##    0 299   23
##    1 148   22
##
##              Accuracy : 0.6524
##              95% CI   : (0.6085, 0.6945)
##    No Information Rate : 0.9085
##    P-Value [Acc > NIR] : 1
##
##              Kappa : 0.0702
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.6689
##              Specificity : 0.4889
##              Pos Pred Value : 0.9286
##              Neg Pred Value : 0.1294
##              Prevalence : 0.9085
##              Detection Rate : 0.6077
##              Detection Prevalence : 0.6545
##              Balanced Accuracy : 0.5789
##
##              'Positive' Class : 0
##

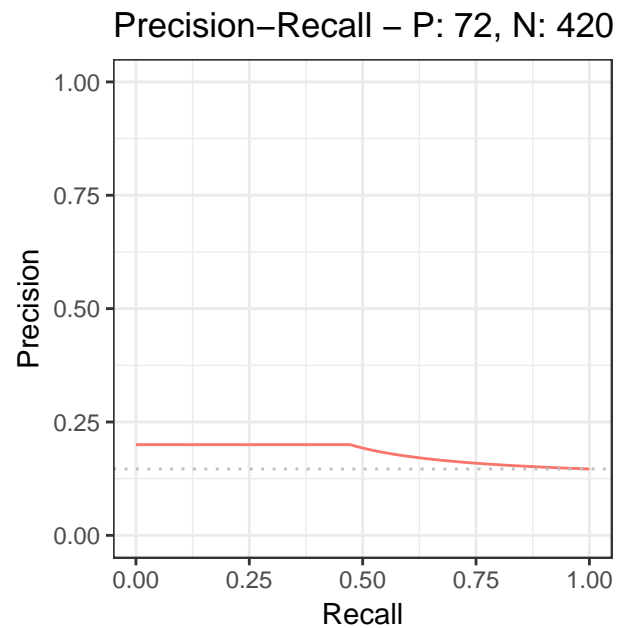
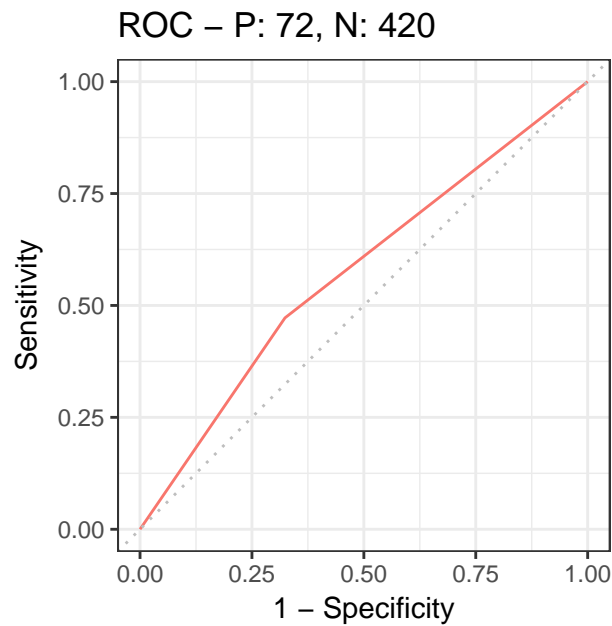
sscurves4_12<- evalmod(scores = C4, labels = EC1*EC2)
autoplot(sscurves4_12)
```



```
#
t_C4_EC1_EC3<-table(C4,EC1*EC3)
confusionMatrix(t_C4_EC1_EC3)

## Confusion Matrix and Statistics
##
##
## C4      0      1
## 0 284   38
## 1 136   34
##
##              Accuracy : 0.6463
##              95% CI   : (0.6023, 0.6886)
##    No Information Rate : 0.8537
##    P-Value [Acc > NIR] : 1
##
##              Kappa : 0.0949
##  Mcnemar's Test P-Value : 1.93e-13
##
##              Sensitivity : 0.6762
##              Specificity : 0.4722
##              Pos Pred Value : 0.8820
##              Neg Pred Value : 0.2000
##              Prevalence : 0.8537
##              Detection Rate : 0.5772
##              Detection Prevalence : 0.6545
##              Balanced Accuracy : 0.5742
##
##              'Positive' Class : 0
##

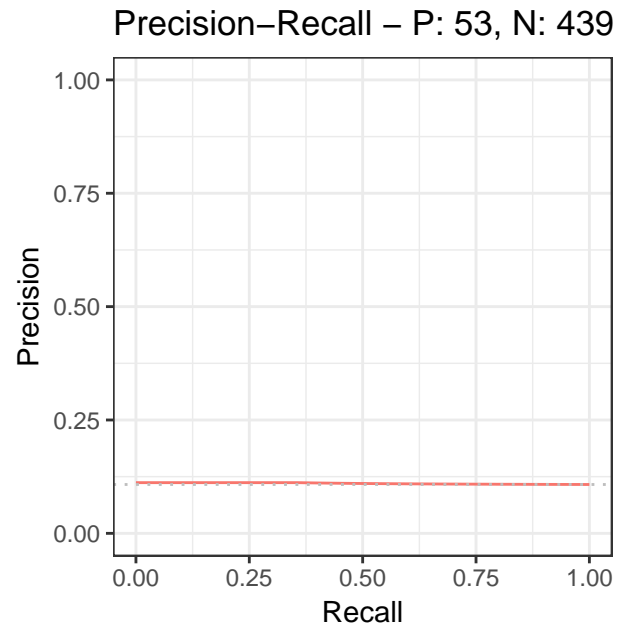
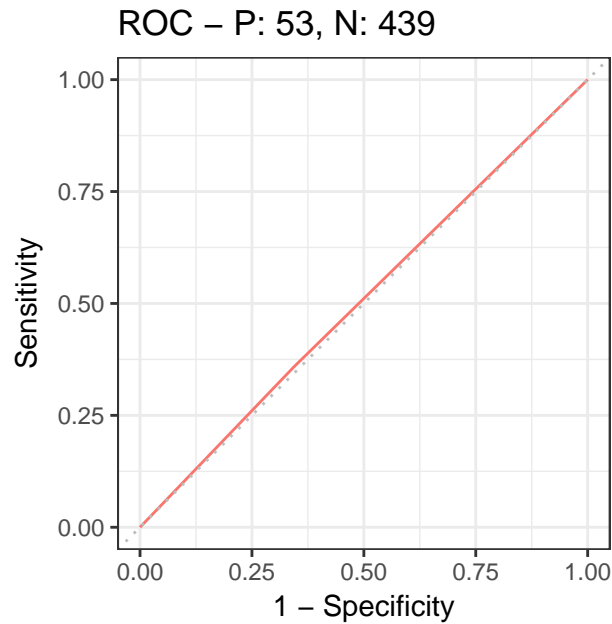
sscurves4_13<- evalmod(scores = C4, labels = EC1*EC3)
autoplot(sscurves4_13)
```



```
#
t_C4_EC2_EC3<-table(C4,EC2*EC3)
confusionMatrix(t_C4_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C4      0      1
## 0 288   34
## 1 151   19
##
##              Accuracy : 0.624
##              95% CI : (0.5795, 0.6669)
##      No Information Rate : 0.8923
##      P-Value [Acc > NIR] : 1
##
##              Kappa : 0.0074
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.6560
##              Specificity : 0.3585
##              Pos Pred Value : 0.8944
##              Neg Pred Value : 0.1118
##              Prevalence : 0.8923
##              Detection Rate : 0.5854
##      Detection Prevalence : 0.6545
##              Balanced Accuracy : 0.5073
##
##              'Positive' Class : 0
##

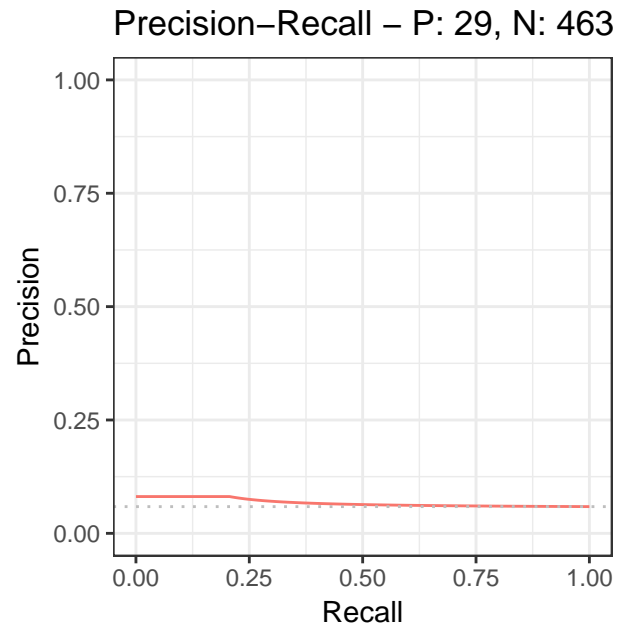
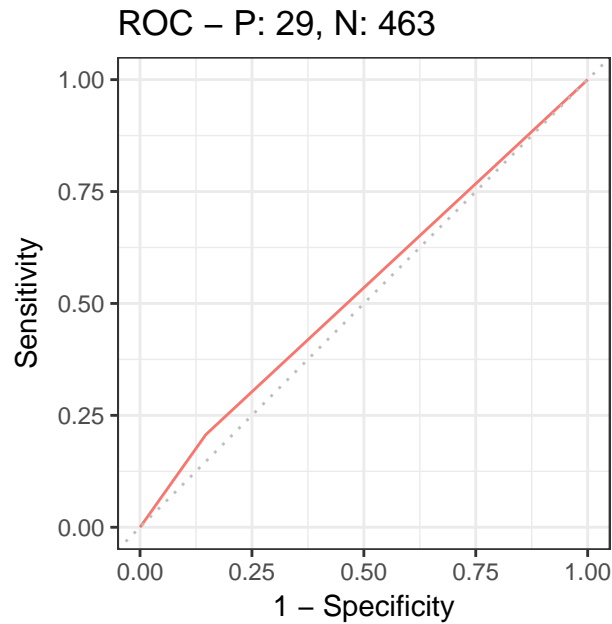
sscurves4_23<- evalmod(scores = C4, labels = EC2*EC3)
autoplot(sscurves4_23)
```

```
##C1 with EC1_EC2_EC3
t_C1_EC1_EC2_EC3<-table(C1,EC1*EC2*EC3)
confusionMatrix(t_C1_EC1_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C1      0      1
##  0 395    23
##  1   68     6
##
##               Accuracy : 0.815
##               95% CI   : (0.7779, 0.8484)
##      No Information Rate : 0.9411
##      P-Value [Acc > NIR] : 1
##
##               Kappa : 0.0348
##  Mcnemar's Test P-Value : 3.979e-06
##
##      Sensitivity : 0.85313
##      Specificity : 0.20690
##      Pos Pred Value : 0.94498
##      Neg Pred Value : 0.08108
##      Prevalence : 0.94106
##      Detection Rate : 0.80285
##      Detection Prevalence : 0.84959
##      Balanced Accuracy : 0.53001
##
##      'Positive' Class : 0
##

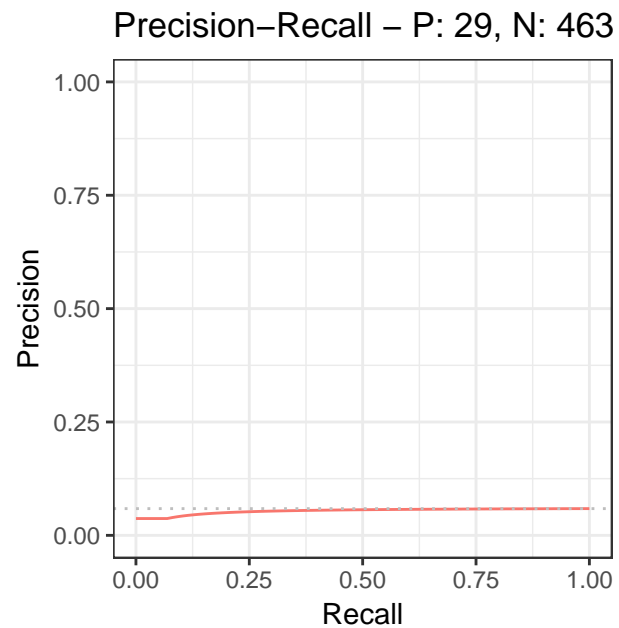
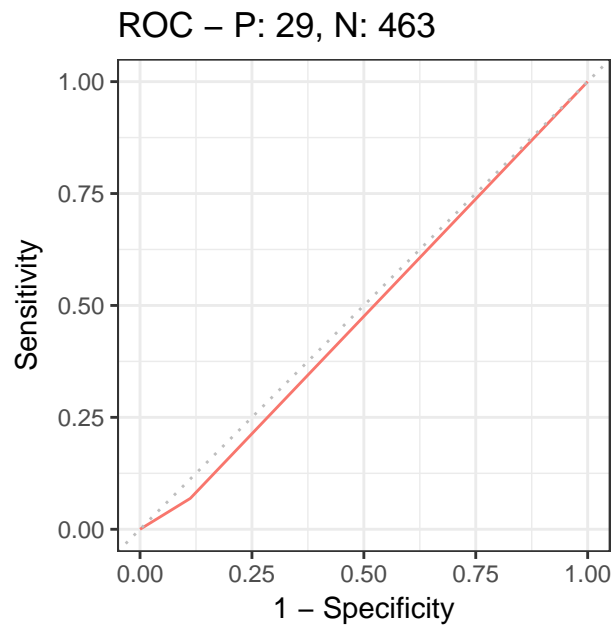
sscurves1_123<-evalmod(scores = C1, labels = EC1*EC2*EC3)
autoplot(sscurves1_123)
```



```
#
t_C2_EC1_EC2_EC3<-table(C2,EC1*EC2*EC3)
confusionMatrix(t_C2_EC1_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C2      0      1
##  0 411    27
##  1  52     2
##
##              Accuracy : 0.8394
##              95% CI   : (0.804, 0.8708)
##    No Information Rate : 0.9411
##    P-Value [Acc > NIR] : 1.00000
##
##              Kappa : -0.0309
##  Mcnemar's Test P-Value : 0.00693
##
##              Sensitivity : 0.88769
##              Specificity : 0.06897
##              Pos Pred Value : 0.93836
##              Neg Pred Value : 0.03704
##              Prevalence : 0.94106
##              Detection Rate : 0.83537
##              Detection Prevalence : 0.89024
##              Balanced Accuracy : 0.47833
##
##              'Positive' Class : 0
##

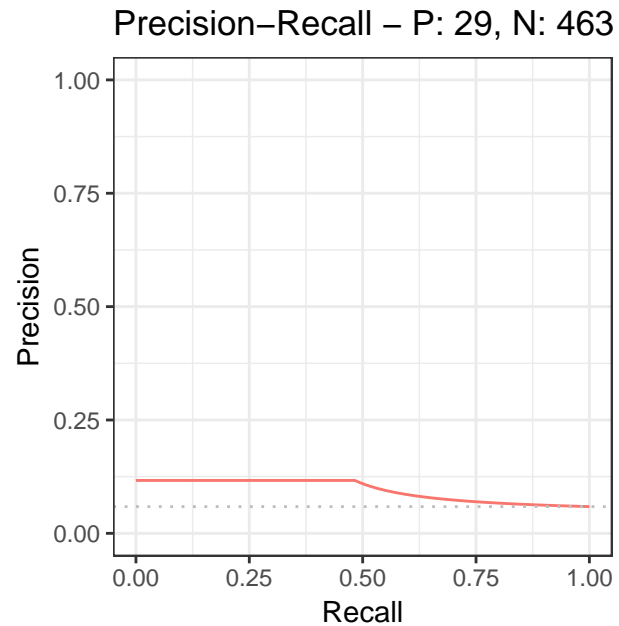
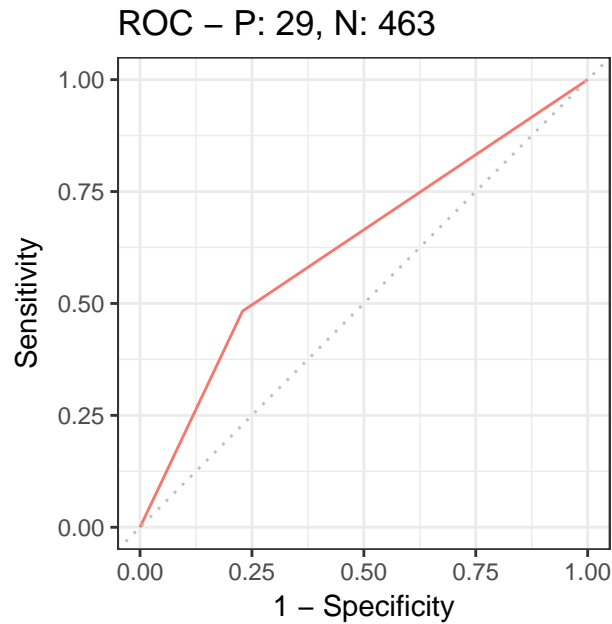
sscurves2_124<-evalmod(scores = C2, labels = EC1*EC2*EC3)
autoplot(sscurves2_124)
```



```
#
t_C3_EC1_EC2_EC3<-table(C3,EC1*EC2*EC3)
confusionMatrix(t_C3_EC1_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C3      0      1
##  0 357   15
##  1 106   14
##
##              Accuracy : 0.7541
##              95% CI   : (0.7135, 0.7915)
##    No Information Rate : 0.9411
##    P-Value [Acc > NIR] : 1
##
##              Kappa : 0.1027
##  Mcnemar's Test P-Value : 2.796e-16
##
##              Sensitivity : 0.7711
##              Specificity : 0.4828
##              Pos Pred Value : 0.9597
##              Neg Pred Value : 0.1167
##              Prevalence : 0.9411
##              Detection Rate : 0.7256
##              Detection Prevalence : 0.7561
##              Balanced Accuracy : 0.6269
##
##              'Positive' Class : 0
##

sscurves3_123<-evalmod(scores = C3, labels = EC1*EC2*EC3)
autoplot(sscurves3_123)
```



```
#
t_C4_EC1_EC2_EC3<-table(C4,EC1*EC2*EC3)
confusionMatrix(t_C4_EC1_EC2_EC3)

## Confusion Matrix and Statistics
##
##
## C4      0      1
##  0 309   13
##  1 154   16
##
##              Accuracy : 0.6606
##              95% CI   : (0.6168, 0.7024)
##    No Information Rate : 0.9411
##    P-Value [Acc > NIR] : 1
##
##              Kappa : 0.0668
##  Mcnemar's Test P-Value : <2e-16
##
##              Sensitivity : 0.66739
##              Specificity : 0.55172
##              Pos Pred Value : 0.95963
##              Neg Pred Value : 0.09412
##              Prevalence : 0.94106
##              Detection Rate : 0.62805
##              Detection Prevalence : 0.65447
##              Balanced Accuracy : 0.60956
##
##              'Positive' Class : 0
##

sscurves4_123<-evalmod(scores = C4, labels = EC1*EC2*EC3)
autoplot(sscurves4_123)
```

