**BREAKOUT #1**

**A. Understanding the Sigmoid Transformation**

Run the below code in R:

x=seq(from=-50, to=50, by=.5)

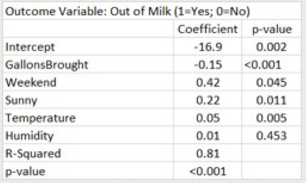
y=1/(1+exp(-x))

plot(x,y, main="Sigmoid Function (1/(1+e^-x))")

Answer: Do you see the effect of the transformation?

**B. Interpreting the logistic regression model**

From the week’s knowledge check, review the below logistic regression model for whether or not an ice cream stand will run out of milk.



1. Interpret the Gallons Brought coefficient in terms of: 1) its effect on the log-odds of running out of milk and 2) its effect on the odds of running out of milk. How impactful is this factor?
2. Interpret the Weekend coefficient in terms of: 1) its effect on the log-odds of running out of milk and 2) its effect on the odds of running out of milk. How impactful is this factor?
3. BONUS: Calculate the probability of running out of milk when the temp is 80F and GallonsBrought, Weekend, Sunny, and Humidity are all 0.

**BREAKOUT #2**

**Creating an ROC Plot**

**Run through code and then answer: Where would you set your lambda threshold?**

attach(Caravan)

head(Caravan)

?Caravan

standardized.X=scale(Caravan[,-86])

test=1:1000

glm.fit=glm(Purchase~.,data=Caravan,family=binomial,subset=-test)

glm.probs=predict(glm.fit,Caravan[test,],type="response")

head(glm.probs)

ROCdata=NULL

for(i in seq(from=0, to=1, by=.05)) {

glm.pred = ifelse(glm.probs>i, "Yes", "No")

conf.mat <- table(glm.pred,Purchase[test])

#conf.mat

glm.error.rate=length(which(glm.pred!=Purchase[test]))/length(glm.pred)

glm.sensitivity=length(intersect(which(glm.pred=="Yes"),which(Purchase[test]=="Yes")))/

length(which(Purchase[test]=="Yes"))

glm.specificity=length(intersect(which(glm.pred=="No"),which(Purchase[test]=="No")))/

length(which(Purchase[test]=="No"))

glm.false.pos <- 1 - glm.specificity

glm.fit.stats=c(i,glm.error.rate, glm.sensitivity, glm.specificity, glm.false.pos)

ROCdata=rbind(ROCdata,glm.fit.stats)

}

ROCdata=as.data.frame(ROCdata)

names(ROCdata)=

c("Lambda","Error Rate", "Sensitivity", "Specificity", "FalsePositiveRt")

head(ROCdata)

plot(ROCdata$FalsePositiveRt, ROCdata$Sensitivity, xlab="False Positive Rt", ylab="Sensitivity", main="ROC Plot", type="o")