Linear and Logistic Regression Questions

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## Spaceship Titanic

## Linear Regression

m1 = lm(Transported ~ CryoSleep,  
 data=train)  
  
summary(m1)

##   
## Call:  
## lm(formula = Transported ~ CryoSleep, data = train)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.8176 -0.3289 0.1824 0.1824 0.6711   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.32892 0.00599 54.91 <2e-16 \*\*\*  
## CryoSleepTRUE 0.48866 0.01001 48.84 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.4417 on 8474 degrees of freedom  
## (217 observations deleted due to missingness)  
## Multiple R-squared: 0.2196, Adjusted R-squared: 0.2195   
## F-statistic: 2385 on 1 and 8474 DF, p-value: < 2.2e-16

1. Please write an equation to predict the probability of being Transported from CryoSleep.
2. Can you reject the null hypothesis that there is no association between CryoSleep and Transported?
3. Please interpret the equation that you wrote in #1.

# Room Service?

# Note:   
# RoomService\_log = log(RoomService + 1)  
  
m2 = lm(Transported ~ RoomService\_log,  
 data=train)  
  
coef(m2)

## (Intercept) RoomService\_log   
## 0.62207810 -0.06629989

1. Please write an equation describing the relationship between room service and the chance of being transported.
2. Predict the chance of being transported for someone who spent 0 on room service.
3. Predict the chance of being transported for someone who spent 1000 on room service.

m3 = lm(Transported ~   
 RoomService\_log + CryoSleep,  
 data=train)  
  
coef(m3)

## (Intercept) RoomService\_log CryoSleepTRUE   
## 0.42014576 -0.03258604 0.39864845

1. Predict the chance of being transported for someone who spent 0 on room service and who was *not* in CryoSleep.
2. Predict the chance of being transported for someone who spent 1000 on room service and who was in CryoSleep.

# Logistic Regression

m4 = glm(Transported ~ CryoSleep,  
 data=train,  
 family="binomial")  
  
coef(m4)

## (Intercept) CryoSleepTRUE   
## -0.7130704 2.2131285

1. Write an equation to predict the *log odds* of being transported based on Cryosleep.

exp(coef(m4))

## (Intercept) CryoSleepTRUE   
## 0.490137 9.144279

1. Based on this logistic regression, write an equation to predict the odds of being transported based on Cryosleep.
2. Based on this logistic regression, predict the odds of being transported for someone who was in Cryosleep.
3. Based on this logistic regression, predict the probability of being transported for someone who was in Cryosleep.

# Bonus

m5 = glm(Transported ~ CryoSleep +   
 RoomService\_log,  
 data=train,  
 family="binomial")  
  
coef(m5)

## (Intercept) CryoSleepTRUE RoomService\_log   
## -0.3133030 1.8215024 -0.1570825

1. Based on the logistic regression above, predict the probabilty of being transported for someone who was not in cryosleep and who spent 1000 on room serive.