ABC

CABC

Please read all instructions carefully. Fill in all fields above (Espicially your student number) and remove square brackets. To allow this file to be knit, you might need to save it in a new location, as you do not have write permissions in the dropbox folder, and R does not work well with chinese characters. Do not comment out the lines that produce output. Check your html file before submission to ensure it has all relevant output. Ensure all answers are your own words and your own work. Do not delete anything below these instructions. Thank you!

Question 1A:

```
data<- read.csv("C:/Users/a9021/Desktop/rochester FALL A/marketing
analysis/0914 HW 2/Homework 2 Data - 436(R).csv", header=TRUE, sep=",")
data$PricePerCan <- data$totalRevenue/data$units
```

Question 1B:

```
lm(log(data$units)~PricePerCan,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan, data = data)
##
## Coefficients:
## (Intercept)   PricePerCan
##      1.7461       -0.8661
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan coefficient increase from -0.8661 to -0.8176; thus, isFeature is an ommitted variable.There is a positive coefficient between log(data$units) and isFeatureTRUE, and there is a negeative coefficient between PricePerCan and isFeatureTRUE.

Question 1C:

```
lm(log(data$units)~PricePerCan + isFeature,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan + isFeature, data = data)
##
## Coefficients:
##   (Intercept)     PricePerCan   isFeatureTRUE
##        1.6656         -0.8176          0.4603
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan coefficient increase from -0.8661 to -0.8176; thus, isFeature is an ommitted variable.There is a positive

coefficient between log(data$units) and isFeatureTRUE, and there is a negeative coefficient between PricePerCan and isFeatureTRUE.

Question 1D:

```r
lm(log(data$units)~PricePerCan + isFeature + isDisplay,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan + isFeature + isDisplay,
##     data = data)
##
## Coefficients:
##   (Intercept)    PricePerCan  isFeatureTRUE  isDisplayTRUE
##        1.5773        -0.7557         0.4090         0.6752

cor(log(data$units),data$isDisplay)

## [1] 0.218615
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan coefficient increase from -0.8176 to -0.7557; thus, isDisplay is an ommitted variable.There is a positive coefficient between log(data$units) and isDisplay, and there is a negeative coefficient between PricePerCan and isDisplay.

Question 1E:

```r
lm(log(data$units)~PricePerCan + isFeature + isDisplay +
factor(storeNum),data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan + isFeature + isDisplay +
##     factor(storeNum), data = data)
##
## Coefficients:
##        (Intercept)          PricePerCan       isFeatureTRUE
##            1.57929             -0.74455             0.44016
##      isDisplayTRUE    factor(storeNum)2   factor(storeNum)3
##            0.68254             -0.40835             0.10098
##  factor(storeNum)4    factor(storeNum)5   factor(storeNum)6
##           -0.32173              0.09899            -0.28129
##  factor(storeNum)7    factor(storeNum)8   factor(storeNum)9
##           -0.01219             -0.34785            -0.09880
## factor(storeNum)10   factor(storeNum)11  factor(storeNum)12
##           -0.29745             -0.26705             0.18310
## factor(storeNum)13   factor(storeNum)14
##            0.12518             -0.15537
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan coefficient increase from -0.7557 to -0.74455; thus, factor(storeNum) is an ommitted variable. Stores

are categorical variables, and we understand the stores as a whole, by calculating 1*(-0.40835* factor(storeNum)2 +...+-0.15537*factor(storeNum)14)*. There is a positive coefficient between log(data$units) and factor(storeNum), and there is a negeative coefficient between PricePerCan and factor(storeNum).

Question 1F:

```
lm(log(data$units)~PricePerCan + isFeature + isDisplay +
factor(storeNum) + factor(productNum) ,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan + isFeature + isDisplay +
##     factor(storeNum) + factor(productNum), data = data)
##
## Coefficients:
##          (Intercept)            PricePerCan           isFeatureTRUE
##            2.0900212             -0.4717587               0.4069057
##        isDisplayTRUE       factor(storeNum)2       factor(storeNum)3
##            0.5535269             -0.5119180               0.2369754
##    factor(storeNum)4       factor(storeNum)5       factor(storeNum)6
##           -0.4526235              0.0431891              -0.3483453
##    factor(storeNum)7       factor(storeNum)8       factor(storeNum)9
##            0.0009264             -0.6038339              -0.1266464
##   factor(storeNum)10      factor(storeNum)11      factor(storeNum)12
##           -0.4347174             -0.3273404               0.1720292
##   factor(storeNum)13      factor(storeNum)14     factor(productNum)2
##            0.2421395             -0.1751903              -0.7083026
##  factor(productNum)3     factor(productNum)4     factor(productNum)5
##           -0.5638484             -0.5464109              -1.1826064
##  factor(productNum)6     factor(productNum)7     factor(productNum)8
##           -1.2908031             -1.4566450              -1.3990758
##  factor(productNum)9    factor(productNum)10    factor(productNum)11
##           -0.4912163             -0.9646996              -0.5241649
## factor(productNum)12    factor(productNum)13    factor(productNum)14
##           -1.1962304             -1.2337425              -1.0154198
## factor(productNum)15    factor(productNum)16    factor(productNum)17
##           -1.0757688             -0.9889055              -0.9676520
## factor(productNum)18    factor(productNum)19    factor(productNum)20
##           -1.0652809             -1.2735495              -1.2652075
## factor(productNum)21    factor(productNum)22    factor(productNum)23
##           -1.0589367             -1.1805958              -1.2278221
## factor(productNum)24    factor(productNum)25    factor(productNum)26
##           -1.4141207             -1.3987606              -1.3285168
## factor(productNum)27    factor(productNum)28    factor(productNum)29
##           -1.4759214             -1.4039191              -1.3057266
## factor(productNum)30    factor(productNum)31    factor(productNum)32
##           -0.9778399             -1.1438631              -1.5906853
## factor(productNum)33    factor(productNum)34    factor(productNum)35
##           -0.9724852             -1.0513669              -1.0535855
```

```
##   factor(productNum)36   factor(productNum)37   factor(productNum)38
##            -1.0298895              0.2601007              0.0828605
##   factor(productNum)39   factor(productNum)40   factor(productNum)41
##            -0.8862480             -1.3690102             -1.1601242
##   factor(productNum)42   factor(productNum)43   factor(productNum)44
##            -0.8120844             -1.7322130              0.1366219
##   factor(productNum)45   factor(productNum)46   factor(productNum)47
##            -1.0002649             -1.8195128             -1.4647781
##   factor(productNum)48   factor(productNum)49   factor(productNum)50
##            -1.1648387             -1.4647781             -1.1345470
##   factor(productNum)51   factor(productNum)52   factor(productNum)53
##            -1.0369401             -0.8205508             -0.7034980
##   factor(productNum)54   factor(productNum)55   factor(productNum)56
##            -0.8337693             -0.8611111             -0.5052694
##   factor(productNum)57   factor(productNum)58   factor(productNum)59
##            -0.9807081             -0.4166763             -0.8043159
##   factor(productNum)60   factor(productNum)61   factor(productNum)62
##            -0.6333827             -0.6281875             -0.9235596
##   factor(productNum)63   factor(productNum)64   factor(productNum)65
##            -1.2308579             -1.7322130             -0.5876559
##   factor(productNum)66   factor(productNum)67   factor(productNum)68
##            -1.1287058             -0.9583908             -0.9019176
##   factor(productNum)69   factor(productNum)70   factor(productNum)71
##            -0.1431059             -1.1721884             -0.7367283
##   factor(productNum)72   factor(productNum)73   factor(productNum)74
##            -0.5160699             -1.3797701             -1.2365828
##   factor(productNum)75   factor(productNum)76   factor(productNum)77
##            -0.9099188             -1.2441327             -1.0126817
##   factor(productNum)78   factor(productNum)79   factor(productNum)80
##            -1.1384117             -0.2058240             -0.6424013
##   factor(productNum)81   factor(productNum)82   factor(productNum)83
##            -0.7429371             -1.0042509             -0.9173276
##   factor(productNum)84   factor(productNum)85   factor(productNum)86
##            -1.2085704             -0.9263673             -1.0014674
##   factor(productNum)87   factor(productNum)88   factor(productNum)89
##            -0.5746255             -1.0809504              0.0475199
##   factor(productNum)90   factor(productNum)91   factor(productNum)92
##            -0.3692049             -1.1015563             -1.2030680
##   factor(productNum)93   factor(productNum)94   factor(productNum)95
##            -1.4055457             -0.7930633             -0.7660855
##   factor(productNum)96   factor(productNum)97   factor(productNum)98
##            -0.9437893             -1.1761408             -1.0364993
##   factor(productNum)99  factor(productNum)100  factor(productNum)101
##            -0.3656341             -1.0664039             -1.0853448
## factor(productNum)102  factor(productNum)103  factor(productNum)104
##            -1.0745197             -1.2896903             -1.0212967
## factor(productNum)105  factor(productNum)106  factor(productNum)107
##            -1.1653142             -1.1514866             -1.1165621
## factor(productNum)108  factor(productNum)109  factor(productNum)110
##            -1.6127445             -1.3799240             -1.0632275
```

```
## factor(productNum)111   factor(productNum)112   factor(productNum)113
##             -0.4858743              -0.9138223              -0.7662259
## factor(productNum)114   factor(productNum)115   factor(productNum)116
##             -0.9385232              -1.0813291              -1.3014032
## factor(productNum)117   factor(productNum)118   factor(productNum)119
##             -0.6000514              -1.0186759              -1.3482370
## factor(productNum)120   factor(productNum)121   factor(productNum)122
##             -0.6623062              -1.3979304              -0.2529622
## factor(productNum)123   factor(productNum)124   factor(productNum)125
##             -0.8542333              -1.1322641              -1.0893784
## factor(productNum)126   factor(productNum)127   factor(productNum)128
##             -0.8811313              -1.1542632              -0.2552818
## factor(productNum)129   factor(productNum)130   factor(productNum)131
##             -0.3102632              -1.0434011              -0.4262045
## factor(productNum)132   factor(productNum)133   factor(productNum)134
##             -0.8590412              -1.0711102              -1.1010421
## factor(productNum)135   factor(productNum)136   factor(productNum)137
##             -0.8871913              -0.8894687              -1.1956637
## factor(productNum)138   factor(productNum)139   factor(productNum)140
##             -0.5087624              -0.9465546              -0.9878476
## factor(productNum)141   factor(productNum)142   factor(productNum)143
##             -1.4089803              -1.0543479              -1.2744741
## factor(productNum)144   factor(productNum)145   factor(productNum)146
##             -0.7880763              -1.1446409              -1.3121734
## factor(productNum)147   factor(productNum)148   factor(productNum)149
##             -1.4943282              -1.6421405              -1.1102552
## factor(productNum)150   factor(productNum)151
##             -1.1883290              -1.1199345
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan coefficient increase from -0.74455 to -0.4717587; thus, factor(productNum) is an ommitted variable. Products are categorical variables, and we understand the products as a whole. There is a positive coefficient between log(data$units) and factor(productNum), and there is a negeative coefficient between PricePerCan and factor(productNum).

Question 2A:

```
lm(log(data$units)~PricePerCan*isFeature + isDisplay + factor(storeNum)
+ factor(productNum) ,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan * isFeature + isDisplay +
##     factor(storeNum) + factor(productNum), data = data)
##
## Coefficients:
##             (Intercept)                  PricePerCan
##               2.0472691                   -0.4598484
##            isFeatureTRUE                isDisplayTRUE
##               0.6388465                    0.5522661
```

```
##          factor(storeNum)2          factor(storeNum)3
##              -0.5140113                  0.2378301
##          factor(storeNum)4          factor(storeNum)5
##              -0.4501206                  0.0402025
##          factor(storeNum)6          factor(storeNum)7
##              -0.3488393                  0.0009511
##          factor(storeNum)8          factor(storeNum)9
##              -0.6048241                 -0.1251596
##         factor(storeNum)10         factor(storeNum)11
##              -0.4341460                 -0.3275177
##         factor(storeNum)12         factor(storeNum)13
##               0.1732350                  0.2432037
##         factor(storeNum)14         factor(productNum)2
##              -0.1737187                 -0.6907363
##        factor(productNum)3        factor(productNum)4
##              -0.5584894                 -0.5321923
##        factor(productNum)5        factor(productNum)6
##              -1.1520754                 -1.2586379
##        factor(productNum)7        factor(productNum)8
##              -1.4254683                 -1.3652342
##        factor(productNum)9       factor(productNum)10
##              -0.4600890                 -0.9341795
##       factor(productNum)11       factor(productNum)12
##              -0.4933553                 -1.1650845
##       factor(productNum)13       factor(productNum)14
##              -1.2035625                 -0.9839771
##       factor(productNum)15       factor(productNum)16
##              -1.0445983                 -0.9592589
##       factor(productNum)17       factor(productNum)18
##              -0.9376436                 -1.0341181
##       factor(productNum)19       factor(productNum)20
##              -1.2410222                 -1.2331805
##       factor(productNum)21       factor(productNum)22
##              -1.0300367                 -1.1414078
##       factor(productNum)23       factor(productNum)24
##              -1.1979254                 -1.3853587
##       factor(productNum)25       factor(productNum)26
##              -1.3688965                 -1.2984631
##       factor(productNum)27       factor(productNum)28
##              -1.4466492                 -1.3738544
##       factor(productNum)29       factor(productNum)30
##              -1.2748310                 -0.9465649
##       factor(productNum)31       factor(productNum)32
##              -1.1119290                 -1.5588292
##       factor(productNum)33       factor(productNum)34
##              -0.9420011                 -1.0229342
##       factor(productNum)35       factor(productNum)36
##              -1.0201787                 -1.0004072
##       factor(productNum)37       factor(productNum)38
##               0.2719437                  0.0946481
```

```
##        factor(productNum)39        factor(productNum)40
##                  -0.8475885                  -1.3331338
##        factor(productNum)41        factor(productNum)42
##                  -1.1335878                  -0.7774878
##        factor(productNum)43        factor(productNum)44
##                  -1.6967838                   0.1720510
##        factor(productNum)45        factor(productNum)46
##                  -0.9818246                  -1.8034814
##        factor(productNum)47        factor(productNum)48
##                  -1.4433603                  -1.1263474
##        factor(productNum)49        factor(productNum)50
##                  -1.4433603                  -1.1214664
##        factor(productNum)51        factor(productNum)52
##                  -1.0109380                  -0.7910492
##        factor(productNum)53        factor(productNum)54
##                  -0.6726348                  -0.8038740
##        factor(productNum)55        factor(productNum)56
##                  -0.8290583                  -0.4989311
##        factor(productNum)57        factor(productNum)58
##                  -0.9408095                  -0.4115310
##        factor(productNum)59        factor(productNum)60
##                  -0.7995725                  -0.6342434
##        factor(productNum)61        factor(productNum)62
##                  -0.6198976                  -0.8919983
##        factor(productNum)63        factor(productNum)64
##                  -1.1949417                  -1.6967838
##        factor(productNum)65        factor(productNum)66
##                  -0.5444862                  -1.0976242
##        factor(productNum)67        factor(productNum)68
##                  -0.8678176                  -0.8874506
##        factor(productNum)69        factor(productNum)70
##                  -0.1020259                  -1.1307274
##        factor(productNum)71        factor(productNum)72
##                  -0.6976777                  -0.4389313
##        factor(productNum)73        factor(productNum)74
##                  -1.3457605                  -1.2033388
##        factor(productNum)75        factor(productNum)76
##                  -0.8748439                  -1.2125138
##        factor(productNum)77        factor(productNum)78
##                  -0.9828354                  -1.1120526
##        factor(productNum)79        factor(productNum)80
##                  -0.1761827                  -0.6142269
##        factor(productNum)81        factor(productNum)82
##                  -0.7140726                  -0.9724737
##        factor(productNum)83        factor(productNum)84
##                  -0.8889383                  -1.1779687
##        factor(productNum)85        factor(productNum)86
##                  -0.8954061                  -0.9716698
##        factor(productNum)87        factor(productNum)88
##                  -0.5453794                  -1.0488503
```

```
##         factor(productNum)89        factor(productNum)90
##                   0.0772991                  -0.3397265
##         factor(productNum)91        factor(productNum)92
##                  -1.0734120                  -1.1713095
##         factor(productNum)93        factor(productNum)94
##                  -1.3726626                  -0.7383267
##         factor(productNum)95        factor(productNum)96
##                  -0.7316587                  -0.9110295
##         factor(productNum)97        factor(productNum)98
##                  -1.1441391                  -1.0049897
##         factor(productNum)99       factor(productNum)100
##                  -0.3361659                  -1.0348438
##        factor(productNum)101       factor(productNum)102
##                  -1.0536106                  -1.0433980
##        factor(productNum)103       factor(productNum)104
##                  -1.2566269                  -0.9879188
##        factor(productNum)105       factor(productNum)106
##                  -1.1308905                  -1.1217252
##        factor(productNum)107       factor(productNum)108
##                  -1.0899096                  -1.5799027
##        factor(productNum)109       factor(productNum)110
##                  -1.3510579                  -1.0379444
##        factor(productNum)111       factor(productNum)112
##                  -0.4552547                  -0.8799147
##        factor(productNum)113       factor(productNum)114
##                  -0.7344402                  -0.9078549
##        factor(productNum)115       factor(productNum)116
##                  -1.0125768                  -1.2737993
##        factor(productNum)117       factor(productNum)118
##                  -0.5559946                  -0.9876091
##        factor(productNum)119       factor(productNum)120
##                  -1.3204803                  -0.6310169
##        factor(productNum)121       factor(productNum)122
##                  -1.3666972                  -0.2168924
##        factor(productNum)123       factor(productNum)124
##                  -0.8296456                  -1.1026133
##        factor(productNum)125       factor(productNum)126
##                  -1.0585930                  -0.8441920
##        factor(productNum)127       factor(productNum)128
##                  -1.1231136                  -0.2212153
##        factor(productNum)129       factor(productNum)130
##                  -0.2788469                  -1.0128615
##        factor(productNum)131       factor(productNum)132
##                  -0.3936167                  -0.8279124
##        factor(productNum)133       factor(productNum)134
##                  -1.0417349                  -1.0709027
##        factor(productNum)135       factor(productNum)136
##                  -0.8624545                  -0.8608333
##        factor(productNum)137       factor(productNum)138
##                  -1.1650595                  -0.4819680
```

```
##     factor(productNum)139       factor(productNum)140
##              -0.9160420                  -0.9480291
##     factor(productNum)141       factor(productNum)142
##              -1.3825024                  -1.0220372
##     factor(productNum)143       factor(productNum)144
##              -1.2423390                  -0.7544268
##     factor(productNum)145       factor(productNum)146
##              -1.1098652                  -1.2780504
##     factor(productNum)147       factor(productNum)148
##              -1.4617275                  -1.6096350
##     factor(productNum)149       factor(productNum)150
##              -1.0817940                  -1.1529975
##     factor(productNum)151    PricePerCan:isFeatureTRUE
##              -1.0873094                  -0.2835382
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan:isFeatureTRUE coefficient is -0.2835382. If the product is featured, when you increase PricePerCan by 1 dollar, your log(units) decreases by -0.4598484-0.2835382=-0.743386. If the product is not featured, when you increase PricePerCan by 1 dollar, your log(data$units) decreases by -0.4598484.

Question 2B:

```
lm(log(data$units)~PricePerCan*isDisplay + isFeature + factor(storeNum)
+ factor(productNum) ,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan * isDisplay + isFeature +
##     factor(storeNum) + factor(productNum), data = data)
##
## Coefficients:
##             (Intercept)                    PricePerCan
##                2.073113                      -0.467286
##            isDisplayTRUE                  isFeatureTRUE
##                0.753667                       0.407131
##        factor(storeNum)2              factor(storeNum)3
##               -0.516574                       0.238979
##        factor(storeNum)4              factor(storeNum)5
##               -0.450259                       0.043349
##        factor(storeNum)6              factor(storeNum)7
##               -0.350776                      -0.004233
##        factor(storeNum)8              factor(storeNum)9
##               -0.602459                      -0.125783
##       factor(storeNum)10             factor(storeNum)11
##               -0.431942                      -0.327000
##       factor(storeNum)12             factor(storeNum)13
##                0.173306                       0.244044
##       factor(storeNum)14             factor(productNum)2
##               -0.173439                      -0.701493
```

```
##         factor(productNum)3        factor(productNum)4
##                   -0.561751                  -0.541342
##         factor(productNum)5        factor(productNum)6
##                   -1.169799                  -1.278383
##         factor(productNum)7        factor(productNum)8
##                   -1.444666                  -1.387763
##         factor(productNum)9        factor(productNum)10
##                   -0.478550                  -0.952400
##        factor(productNum)11        factor(productNum)12
##                   -0.511548                  -1.184441
##        factor(productNum)13        factor(productNum)14
##                   -1.220767                  -1.002956
##        factor(productNum)15        factor(productNum)16
##                   -1.063662                  -0.975732
##        factor(productNum)17        factor(productNum)18
##                   -0.956061                  -1.050951
##        factor(productNum)19        factor(productNum)20
##                   -1.260636                  -1.252306
##        factor(productNum)21        factor(productNum)22
##                   -1.047266                  -1.166308
##        factor(productNum)23        factor(productNum)24
##                   -1.209496                  -1.397188
##        factor(productNum)25        factor(productNum)26
##                   -1.384125                  -1.312745
##        factor(productNum)27        factor(productNum)28
##                   -1.460549                  -1.387448
##        factor(productNum)29        factor(productNum)30
##                   -1.291825                  -0.963181
##        factor(productNum)31        factor(productNum)32
##                   -1.133076                  -1.578174
##        factor(productNum)33        factor(productNum)34
##                   -0.960789                  -1.039712
##        factor(productNum)35        factor(productNum)36
##                   -1.042361                  -1.018798
##        factor(productNum)37        factor(productNum)38
##                    0.278913                   0.102794
##        factor(productNum)39        factor(productNum)40
##                   -0.876057                  -1.358253
##        factor(productNum)41        factor(productNum)42
##                   -1.149947                  -0.816386
##        factor(productNum)43        factor(productNum)44
##                   -1.718359                   0.150475
##        factor(productNum)45        factor(productNum)46
##                   -0.993310                  -1.394605
##        factor(productNum)47        factor(productNum)48
##                   -1.456706                  -1.100934
##        factor(productNum)49        factor(productNum)50
##                   -1.456706                  -1.129605
##        factor(productNum)51        factor(productNum)52
##                   -0.967648                  -0.808636
```

```
##      factor(productNum)53      factor(productNum)54
##               -0.701542                 -0.833441
##      factor(productNum)55      factor(productNum)56
##               -0.844151                 -0.502819
##      factor(productNum)57      factor(productNum)58
##               -0.934853                 -0.414843
##      factor(productNum)59      factor(productNum)60
##               -0.802505                 -0.634534
##      factor(productNum)61      factor(productNum)62
##               -0.625195                 -0.910869
##      factor(productNum)63      factor(productNum)64
##               -1.217592                 -1.718359
##      factor(productNum)65      factor(productNum)66
##               -0.556177                 -1.114871
##      factor(productNum)67      factor(productNum)68
##               -0.325425                 -0.895936
##      factor(productNum)69      factor(productNum)70
##               -0.122794                 -1.161296
##      factor(productNum)71      factor(productNum)72
##               -0.724184                 -0.498800
##      factor(productNum)73      factor(productNum)74
##               -1.367426                 -1.218275
##      factor(productNum)75      factor(productNum)76
##               -0.892024                 -1.232405
##      factor(productNum)77      factor(productNum)78
##               -1.001217                 -1.127070
##      factor(productNum)79      factor(productNum)80
##               -0.193718                 -0.631373
##      factor(productNum)81      factor(productNum)82
##               -0.731219                 -0.992719
##      factor(productNum)83      factor(productNum)84
##               -0.907094                 -1.196291
##      factor(productNum)85      factor(productNum)86
##               -0.914647                 -0.989709
##      factor(productNum)87      factor(productNum)88
##               -0.568478                 -1.068577
##      factor(productNum)89      factor(productNum)90
##                0.059213                 -0.357083
##      factor(productNum)91      factor(productNum)92
##               -1.089632                 -1.191929
##      factor(productNum)93      factor(productNum)94
##               -1.392460                 -0.780444
##      factor(productNum)95      factor(productNum)96
##               -0.719786                 -0.931746
##      factor(productNum)97      factor(productNum)98
##               -1.164954                 -1.024817
##      factor(productNum)99     factor(productNum)100
##               -0.360865                 -1.054385
##     factor(productNum)101     factor(productNum)102
##               -1.071388                 -1.063093
```

```
##       factor(productNum)103       factor(productNum)104
##                  -1.277617                   -1.008625
##       factor(productNum)105       factor(productNum)106
##                  -1.147663                   -1.138791
##       factor(productNum)107       factor(productNum)108
##                  -1.106599                   -1.594389
##       factor(productNum)109       factor(productNum)110
##                  -1.368490                   -1.049446
##       factor(productNum)111       factor(productNum)112
##                  -0.473064                   -0.896365
##       factor(productNum)113       factor(productNum)114
##                  -0.752958                   -0.925960
##       factor(productNum)115       factor(productNum)116
##                  -1.071319                   -1.291172
##       factor(productNum)117       factor(productNum)118
##                  -0.589452                   -0.998321
##       factor(productNum)119       factor(productNum)120
##                  -1.337946                   -0.651856
##       factor(productNum)121       factor(productNum)122
##                  -1.377705                   -0.239710
##       factor(productNum)123       factor(productNum)124
##                  -0.847244                   -1.124796
##       factor(productNum)125       factor(productNum)126
##                  -1.078328                   -0.859682
##       factor(productNum)127       factor(productNum)128
##                  -1.140329                   -0.237765
##       factor(productNum)129       factor(productNum)130
##                  -0.288076                   -1.030233
##       factor(productNum)131       factor(productNum)132
##                  -0.414422                   -0.846851
##       factor(productNum)133       factor(productNum)134
##                  -1.059798                   -1.089983
##       factor(productNum)135       factor(productNum)136
##                  -0.878330                   -0.879143
##       factor(productNum)137       factor(productNum)138
##                  -1.184399                   -0.500847
##       factor(productNum)139       factor(productNum)140
##                  -0.932892                   -0.973323
##       factor(productNum)141       factor(productNum)142
##                  -1.399171                   -1.043625
##       factor(productNum)143       factor(productNum)144
##                  -1.257597                   -0.770716
##       factor(productNum)145       factor(productNum)146
##                  -1.133585                   -1.297721
##       factor(productNum)147       factor(productNum)148
##                  -1.482645                   -1.630431
##       factor(productNum)149       factor(productNum)150
##                  -1.100280                   -1.176416
##       factor(productNum)151 PricePerCan:isDisplayTRUE
##                  -1.108503                   -0.274403
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan:isDisplayTRUE coefficient is -0.274403. If the product is displayed, when you increase PricePerCan by 1 dollar, your log(units) decreases by -0.467286-0.274403=-0.741689. If the product is not displayed, when you increase PricePerCan by 1 dollar, your log(data$units) decreases by -0.467286.

Question 2C:

```
lm(log(data$units)~PricePerCan + isDisplay*isFeature + factor(storeNum)
+ factor(productNum) ,data=data)

##
## Call:
## lm(formula = log(data$units) ~ PricePerCan + isDisplay * isFeature +
##     factor(storeNum) + factor(productNum), data = data)
##
## Coefficients:
##              (Intercept)                    PricePerCan
##                 2.135345                      -0.483899
##            isDisplayTRUE                   isFeatureTRUE
##                 0.430705                       0.329693
##         factor(storeNum)2               factor(storeNum)3
##                -0.513380                       0.236279
##         factor(storeNum)4               factor(storeNum)5
##                -0.453762                       0.043615
##         factor(storeNum)6               factor(storeNum)7
##                -0.359122                       0.004154
##         factor(storeNum)8               factor(storeNum)9
##                -0.599207                      -0.126735
##        factor(storeNum)10              factor(storeNum)11
##                -0.431487                      -0.328698
##        factor(storeNum)12              factor(storeNum)13
##                 0.168818                       0.239719
##        factor(storeNum)14            factor(productNum)2
##                -0.175480                      -0.726645
##      factor(productNum)3            factor(productNum)4
##                -0.569486                      -0.562365
##      factor(productNum)5            factor(productNum)6
##                -1.210876                      -1.323963
##      factor(productNum)7            factor(productNum)8
##                -1.488274                      -1.428365
##      factor(productNum)9           factor(productNum)10
##                -0.513202                      -0.986810
##     factor(productNum)11           factor(productNum)12
##                -0.547024                      -1.224580
##     factor(productNum)13           factor(productNum)14
##                -1.260762                      -1.040507
##     factor(productNum)15           factor(productNum)16
##                -1.101032                      -1.020504
##     factor(productNum)17           factor(productNum)18
```

```
##                      -0.997367                       -1.094367
##             factor(productNum)19            factor(productNum)20
##                      -1.304945                       -1.295341
##             factor(productNum)21            factor(productNum)22
##                      -1.086915                       -1.219669
##             factor(productNum)23            factor(productNum)24
##                      -1.246446                       -1.439098
##             factor(productNum)25            factor(productNum)26
##                      -1.421945                       -1.356128
##             factor(productNum)27            factor(productNum)28
##                      -1.505411                       -1.427975
##             factor(productNum)29            factor(productNum)30
##                      -1.326379                       -1.001465
##             factor(productNum)31            factor(productNum)32
##                      -1.166282                       -1.626330
##             factor(productNum)33            factor(productNum)34
##                      -0.986209                       -1.066264
##             factor(productNum)35            factor(productNum)36
##                      -1.067883                       -1.056965
##             factor(productNum)37            factor(productNum)38
##                       0.172749                        0.003569
##             factor(productNum)39            factor(productNum)40
##                      -0.906648                       -1.390085
##             factor(productNum)41            factor(productNum)42
##                      -1.189078                       -0.815945
##             factor(productNum)43            factor(productNum)44
##                      -1.771500                        0.097335
##             factor(productNum)45            factor(productNum)46
##                      -1.018825                       -1.712157
##             factor(productNum)47            factor(productNum)48
##                      -1.486373                       -1.156039
##             factor(productNum)49            factor(productNum)50
##                      -1.486373                       -1.147644
##             factor(productNum)51            factor(productNum)52
##                      -1.026658                       -0.857279
##             factor(productNum)53            factor(productNum)54
##                      -0.742479                       -0.847893
##             factor(productNum)55            factor(productNum)56
##                      -0.881334                       -0.512198
##             factor(productNum)57            factor(productNum)58
##                      -0.979996                       -0.422434
##             factor(productNum)59            factor(productNum)60
##                      -0.808914                       -0.634425
##             factor(productNum)61            factor(productNum)62
##                      -0.637250                       -0.948186
##             factor(productNum)63            factor(productNum)64
##                      -1.244700                       -1.771500
##             factor(productNum)65            factor(productNum)66
##                      -0.578311                       -1.149520
##             factor(productNum)67            factor(productNum)68
```

```
##                                      -0.952080                               -0.919837
##             factor(productNum)69              factor(productNum)70
##                                      -0.193138                               -1.179654
##             factor(productNum)71              factor(productNum)72
##                                      -0.759573                               -0.569967
##             factor(productNum)73              factor(productNum)74
##                                      -1.413564                               -1.273496
##             factor(productNum)75              factor(productNum)76
##                                      -0.943822                               -1.272017
##             factor(productNum)77              factor(productNum)78
##                                      -1.039000                               -1.167375
##             factor(productNum)79              factor(productNum)80
##                                      -0.236094                               -0.677786
##             factor(productNum)81              factor(productNum)82
##                                      -0.773772                               -1.032036
##             factor(productNum)83              factor(productNum)84
##                                      -0.945393                               -1.237397
##             factor(productNum)85              factor(productNum)86
##                                      -0.956157                               -1.031943
##             factor(productNum)87              factor(productNum)88
##                                      -0.603208                               -1.110902
##             factor(productNum)89              factor(productNum)90
##                                       0.017691                               -0.398369
##             factor(productNum)91              factor(productNum)92
##                                      -1.137264                               -1.233073
##             factor(productNum)93              factor(productNum)94
##                                      -1.440371                               -0.808101
##             factor(productNum)95              factor(productNum)96
##                                      -0.820216                               -0.976205
##             factor(productNum)97              factor(productNum)98
##                                      -1.204222                               -1.067002
##             factor(productNum)99             factor(productNum)100
##                                      -0.397615                               -1.100102
##            factor(productNum)101             factor(productNum)102
##                                      -1.118295                               -1.104518
##            factor(productNum)103             factor(productNum)104
##                                      -1.318402                               -1.055737
##            factor(productNum)105             factor(productNum)106
##                                      -1.198554                               -1.183544
##            factor(productNum)107             factor(productNum)108
##                                      -1.143918                               -1.651219
##            factor(productNum)109             factor(productNum)110
##                                      -1.404785                               -1.091888
##            factor(productNum)111             factor(productNum)112
##                                      -0.519282                               -0.946536
##            factor(productNum)113             factor(productNum)114
##                                      -0.787183                               -0.964368
##            factor(productNum)115             factor(productNum)116
##                                      -1.092375                               -1.330230
##            factor(productNum)117             factor(productNum)118
```

```
##                       -0.621815                              -1.040462
##      factor(productNum)119            factor(productNum)120
##                       -1.377208                              -0.699661
##      factor(productNum)121            factor(productNum)122
##                       -1.410720                              -0.285485
##      factor(productNum)123            factor(productNum)124
##                       -0.887398                              -1.165619
##      factor(productNum)125            factor(productNum)126
##                       -1.120111                              -0.892439
##      factor(productNum)127            factor(productNum)128
##                       -1.190712                              -0.288157
##      factor(productNum)129            factor(productNum)130
##                       -0.320909                              -1.076166
##      factor(productNum)131            factor(productNum)132
##                       -0.456333                              -0.892927
##      factor(productNum)133            factor(productNum)134
##                       -1.099820                              -1.130670
##      factor(productNum)135            factor(productNum)136
##                       -0.911534                              -0.917785
##      factor(productNum)137            factor(productNum)138
##                       -1.228279                              -0.544082
##      factor(productNum)139            factor(productNum)140
##                       -0.979509                              -1.027563
##      factor(productNum)141            factor(productNum)142
##                       -1.436659                              -1.092771
##      factor(productNum)143            factor(productNum)144
##                       -1.311840                              -0.820527
##      factor(productNum)145            factor(productNum)146
##                       -1.175772                              -1.348704
##      factor(productNum)147            factor(productNum)148
##                       -1.528674                              -1.676736
##      factor(productNum)149            factor(productNum)150
##                       -1.135239                              -1.217125
##      factor(productNum)151   isDisplayTRUE:isFeatureTRUE
##                       -1.157949                               0.652937
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The isDisplayTRUE:isFeatureTRUE coefficient is 0.652937. If the product is displayed and featured, when you increase PricePerCan by 1 dollar, your log(units) increased by 0.430705+0.652937+0.329693=1.413335 . If the product is displayed but not featured, log(units) will increase by 0.430705; if the product is not displayed but featured, then log(units) will increase by 0.329693.

Question 2D:

```
lm(log(data$units)~PricePerCan * factor(storeNum) + isDisplay +
isFeature  + factor(productNum) ,data=data)

##
## Call:
```

```
## lm(formula = log(data$units) ~ PricePerCan * factor(storeNum) +
##     isDisplay + isFeature + factor(productNum), data = data)
##
## Coefficients:
##                (Intercept)                    PricePerCan
##                    2.51356                       -0.47958
##            factor(storeNum)2              factor(storeNum)3
##                   -0.35687                        1.18980
##            factor(storeNum)4              factor(storeNum)5
##                   -0.89473                        0.33406
##            factor(storeNum)6              factor(storeNum)7
##                   -0.21765                        1.11146
##            factor(storeNum)8              factor(storeNum)9
##                   -0.50932                       -0.22607
##           factor(storeNum)10             factor(storeNum)11
##                   -0.43842                       -0.56712
##           factor(storeNum)12             factor(storeNum)13
##                    0.12308                        0.95480
##           factor(storeNum)14                  isDisplayTRUE
##                   -0.09690                        0.47469
##                isFeatureTRUE             factor(productNum)2
##                    0.36827                       -1.00827
##          factor(productNum)3            factor(productNum)4
##                   -0.63219                       -1.13582
##          factor(productNum)5            factor(productNum)6
##                   -1.50714                       -1.74910
##          factor(productNum)7            factor(productNum)8
##                   -1.80883                       -1.77350
##          factor(productNum)9           factor(productNum)10
##                   -0.87206                       -1.34633
##         factor(productNum)11           factor(productNum)12
##                   -0.90325                       -1.55728
##         factor(productNum)13           factor(productNum)14
##                   -1.57210                       -1.38512
##         factor(productNum)15           factor(productNum)16
##                   -1.45166                       -1.42549
##         factor(productNum)17           factor(productNum)18
##                   -1.35744                       -1.43711
##         factor(productNum)19           factor(productNum)20
##                   -1.69986                       -1.63848
##         factor(productNum)21           factor(productNum)22
##                   -1.45598                       -1.75169
##         factor(productNum)23           factor(productNum)24
##                   -1.32225                       -1.69614
##         factor(productNum)25           factor(productNum)26
##                   -1.63732                       -1.54971
##         factor(productNum)27           factor(productNum)28
##                   -1.83754                       -1.75997
##         factor(productNum)29           factor(productNum)30
##                   -1.67818                       -1.32372
```

```
##           factor(productNum)31           factor(productNum)32
##                      -1.50527                      -2.00295
##           factor(productNum)33           factor(productNum)34
##                      -1.34424                      -1.42830
##           factor(productNum)35           factor(productNum)36
##                      -1.40936                      -1.37535
##           factor(productNum)37           factor(productNum)38
##                      -0.13089                      -0.29993
##           factor(productNum)39           factor(productNum)40
##                      -1.27516                      -1.69949
##           factor(productNum)41           factor(productNum)42
##                      -1.48842                      -1.48044
##           factor(productNum)43           factor(productNum)44
##                      -2.11101                      -0.24217
##           factor(productNum)45           factor(productNum)46
##                      -1.46410                      -1.01400
##           factor(productNum)47           factor(productNum)48
##                      -1.91711                      -1.59118
##           factor(productNum)49           factor(productNum)50
##                      -1.91711                      -1.61908
##           factor(productNum)51           factor(productNum)52
##                      -1.42386                      -1.25377
##           factor(productNum)53           factor(productNum)54
##                      -1.13145                      -1.25496
##           factor(productNum)55           factor(productNum)56
##                      -1.27933                      -0.94982
##           factor(productNum)57           factor(productNum)58
##                      -1.42407                      -0.91283
##           factor(productNum)59           factor(productNum)60
##                      -1.32105                       1.99442
##           factor(productNum)61           factor(productNum)62
##                      -1.38949                      -1.29600
##           factor(productNum)63           factor(productNum)64
##                      -1.59368                      -2.11101
##           factor(productNum)65           factor(productNum)66
##                      -1.08953                      -1.48885
##           factor(productNum)67           factor(productNum)68
##                      -1.49996                      -1.47710
##           factor(productNum)69           factor(productNum)70
##                      -0.56155                      -1.55688
##           factor(productNum)71           factor(productNum)72
##                      -1.16281                      -0.94540
##           factor(productNum)73           factor(productNum)74
##                      -1.83757                      -1.69405
##           factor(productNum)75           factor(productNum)76
##                      -1.36701                      -1.69920
##           factor(productNum)77           factor(productNum)78
##                      -1.46732                      -1.65035
##           factor(productNum)79           factor(productNum)80
##                      -0.66162                      -1.01820
```

```
##           factor(productNum)81         factor(productNum)82
##                      -1.20954                    -1.39086
##           factor(productNum)83         factor(productNum)84
##                      -1.25217                    -1.61591
##           factor(productNum)85         factor(productNum)86
##                      -1.35253                    -1.41903
##           factor(productNum)87         factor(productNum)88
##                      -1.11094                    -1.53678
##           factor(productNum)89         factor(productNum)90
##                      -0.41425                    -0.79431
##           factor(productNum)91         factor(productNum)92
##                      -1.61602                    -1.67355
##           factor(productNum)93         factor(productNum)94
##                      -1.80581                    -1.07453
##           factor(productNum)95         factor(productNum)96
##                      -1.17332                    -1.38391
##           factor(productNum)97         factor(productNum)98
##                      -1.67571                    -1.46779
##           factor(productNum)99        factor(productNum)100
##                      -0.90960                    -1.47361
##          factor(productNum)101        factor(productNum)102
##                      -1.46932                    -1.55718
##          factor(productNum)103        factor(productNum)104
##                      -1.80807                    -1.45923
##          factor(productNum)105        factor(productNum)106
##                      -1.61431                    -1.51169
##          factor(productNum)107        factor(productNum)108
##                      -1.55902                    -2.01769
##          factor(productNum)109        factor(productNum)110
##                      -1.81730                    -1.45210
##          factor(productNum)111        factor(productNum)112
##                      -0.91952                    -1.35640
##          factor(productNum)113        factor(productNum)114
##                      -1.18336                    -1.37749
##          factor(productNum)115        factor(productNum)116
##                      -1.39772                    -1.73250
##          factor(productNum)117        factor(productNum)118
##                      -0.95380                    -1.44096
##          factor(productNum)119        factor(productNum)120
##                      -1.77227                    -1.11452
##          factor(productNum)121        factor(productNum)122
##                      -1.81050                    -0.76243
##          factor(productNum)123        factor(productNum)124
##                      -1.38391                    -1.51462
##          factor(productNum)125        factor(productNum)126
##                      -1.49260                    -1.26078
##          factor(productNum)127        factor(productNum)128
##                      -1.48621                    -0.69983
##          factor(productNum)129        factor(productNum)130
##                      -0.73012                    -1.43737
```

```
##          factor(productNum)131           factor(productNum)132
##                     -0.85043                          -1.27844
##          factor(productNum)133           factor(productNum)134
##                     -1.51020                          -1.50688
##          factor(productNum)135           factor(productNum)136
##                     -1.14212                          -1.22969
##          factor(productNum)137           factor(productNum)138
##                     -1.63282                          -1.01157
##          factor(productNum)139           factor(productNum)140
##                     -1.33321                          -1.57274
##          factor(productNum)141           factor(productNum)142
##                     -1.86258                          -1.50603
##          factor(productNum)143           factor(productNum)144
##                     -1.65317                          -1.22744
##          factor(productNum)145           factor(productNum)146
##                     -1.59669                          -1.68432
##          factor(productNum)147           factor(productNum)148
##                     -2.00925                          -2.15037
##          factor(productNum)149           factor(productNum)150
##                     -1.55147                          -1.61978
##          factor(productNum)151    PricePerCan:factor(storeNum)2
##                     -1.57261                          -0.14029
##   PricePerCan:factor(storeNum)3    PricePerCan:factor(storeNum)4
##                     -1.10755                           0.44169
##   PricePerCan:factor(storeNum)5    PricePerCan:factor(storeNum)6
##                     -0.25275                          -0.11061
##   PricePerCan:factor(storeNum)7    PricePerCan:factor(storeNum)8
##                     -1.35257                          -0.05537
##   PricePerCan:factor(storeNum)9   PricePerCan:factor(storeNum)10
##                      0.11940                           0.03782
##  PricePerCan:factor(storeNum)11   PricePerCan:factor(storeNum)12
##                      0.22927                           0.05382
##  PricePerCan:factor(storeNum)13   PricePerCan:factor(storeNum)14
##                     -0.81646                          -0.08912
```

[WRITE ANSWER HERE. 3 SENTENCES MAX] The PricePerCan:factor(storeNum)4 coefficient is 0.44169. If the store is the 4th store, PricePerCan increase by 1 dollar decreases log(units) by -0.47958+0.44169=-0.03789.