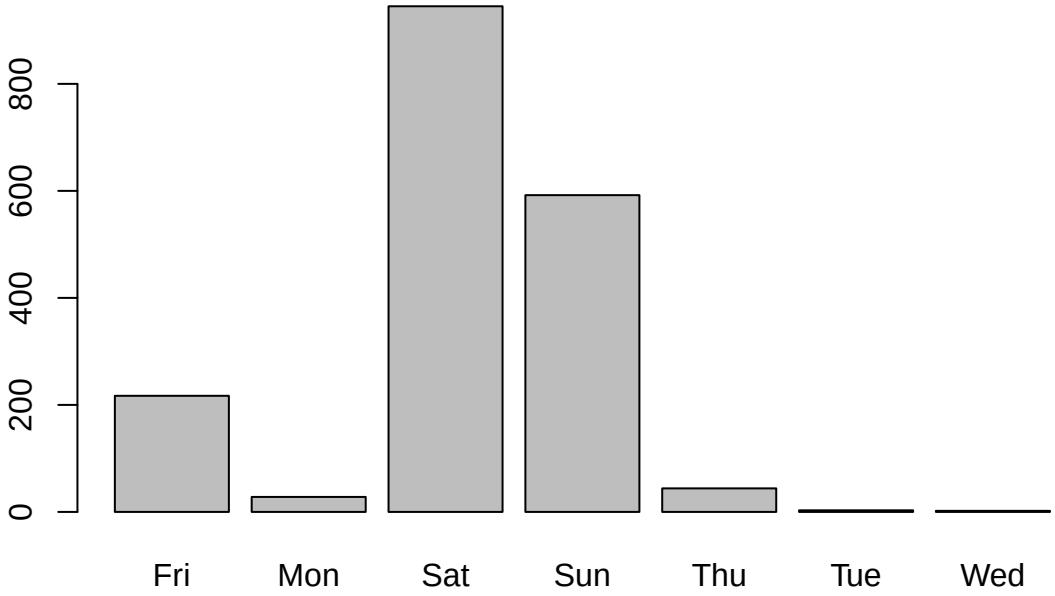
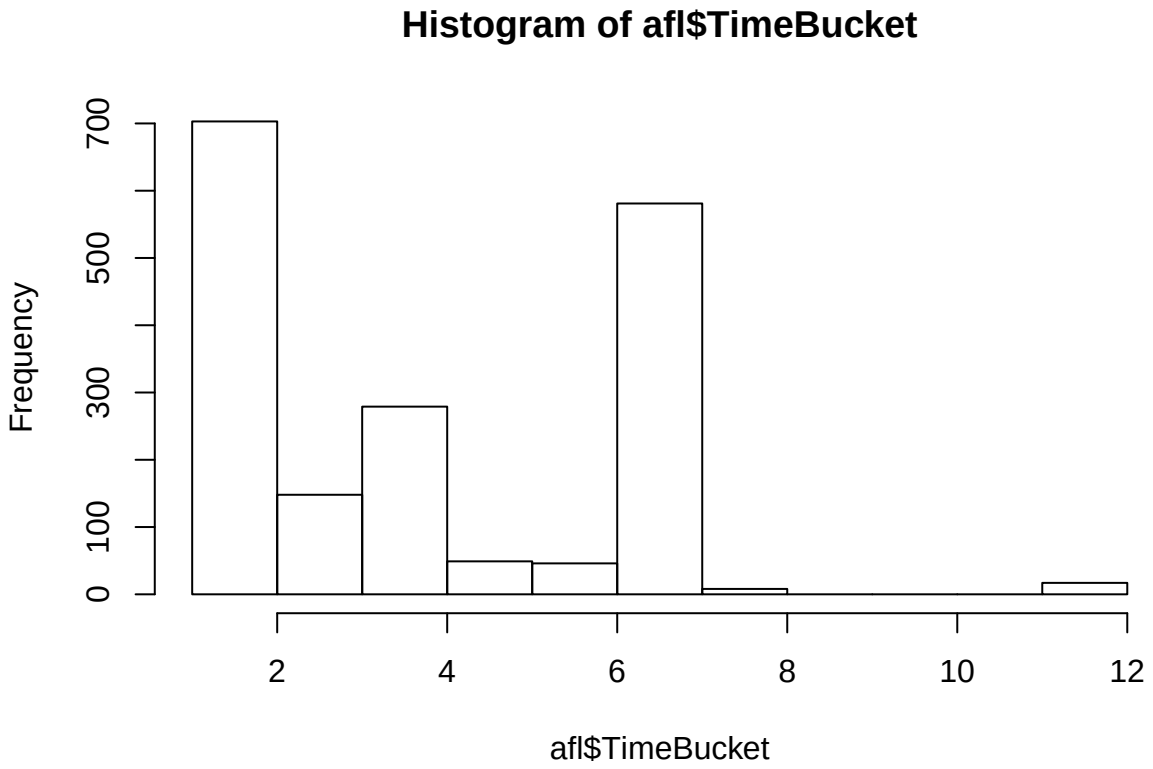
Basic_Analysis

```
plot(factor(afl$Day))
```



We see that the majority of games are on Saturdays and Sundays. We can perform further analysis to determine how day of week affects attendance.

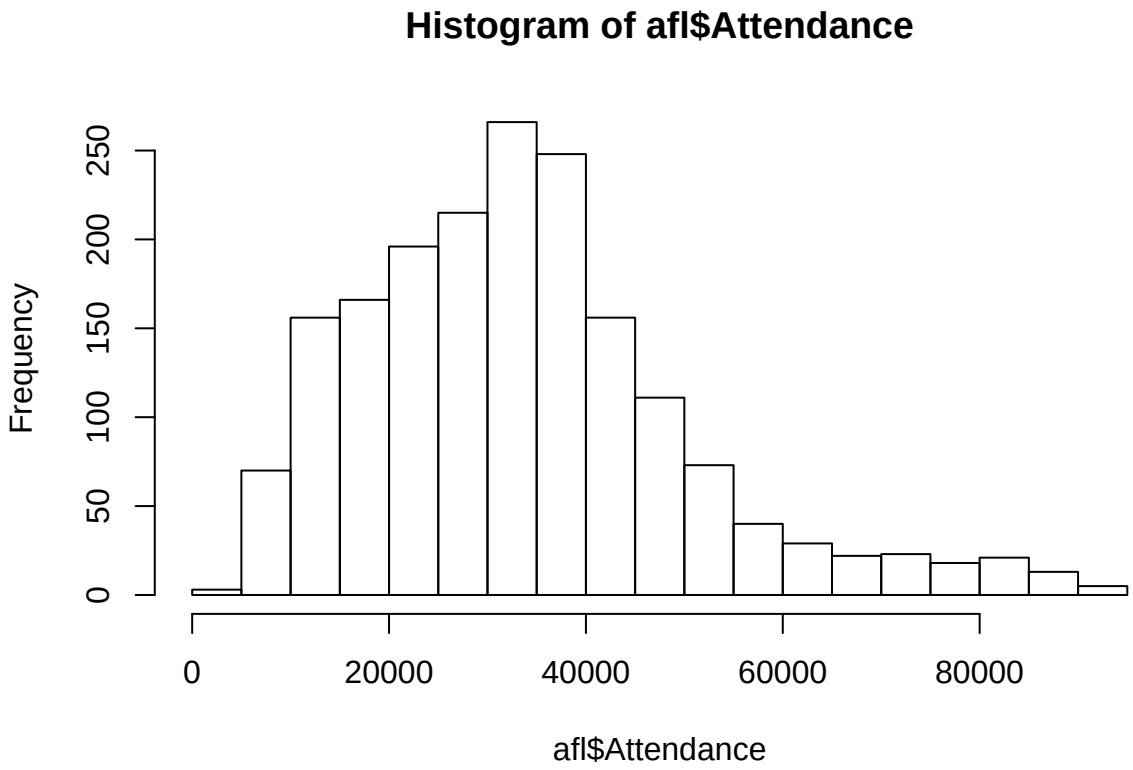
```
hist(afl$TimeBucket)
```



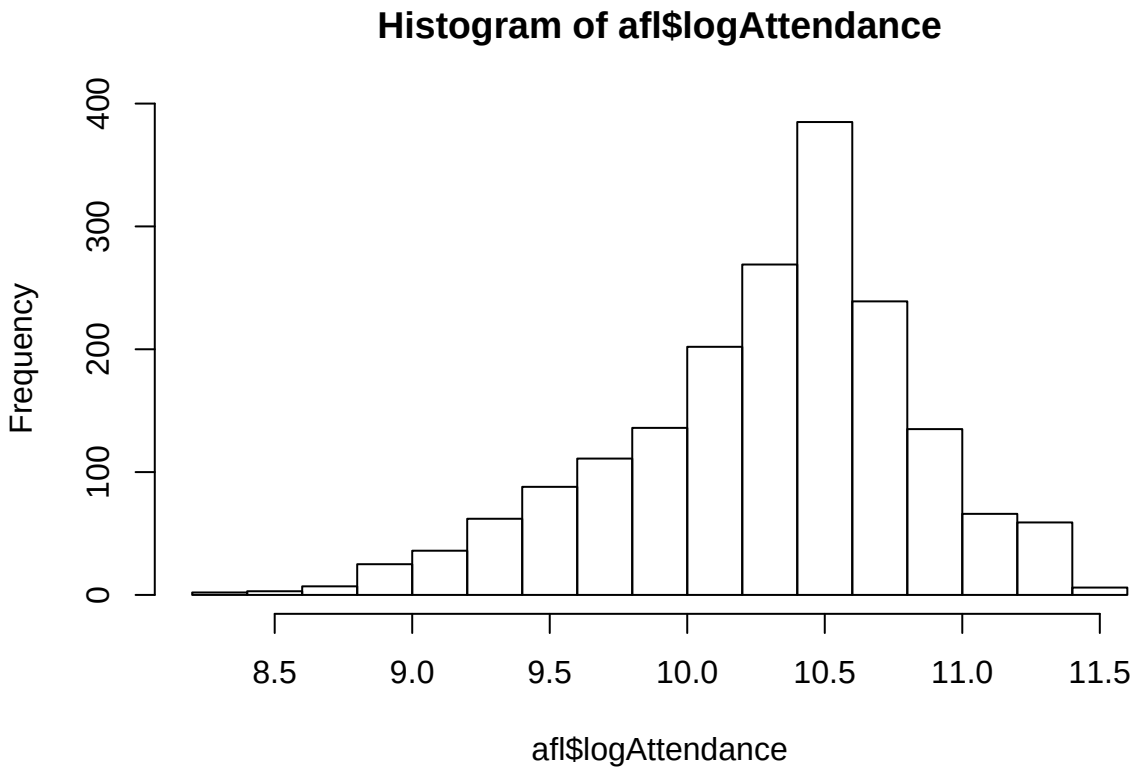
Time bucket allows us to split the times into more easily workable data. We can see here that most of the games occur in the 1 o'clock and the 7 o'clock hours (start between 1 and 2 and between 7 and 8). We can perform

further analysis to determine if time of day affects attendance. Possible interaction between time of day and day of week.

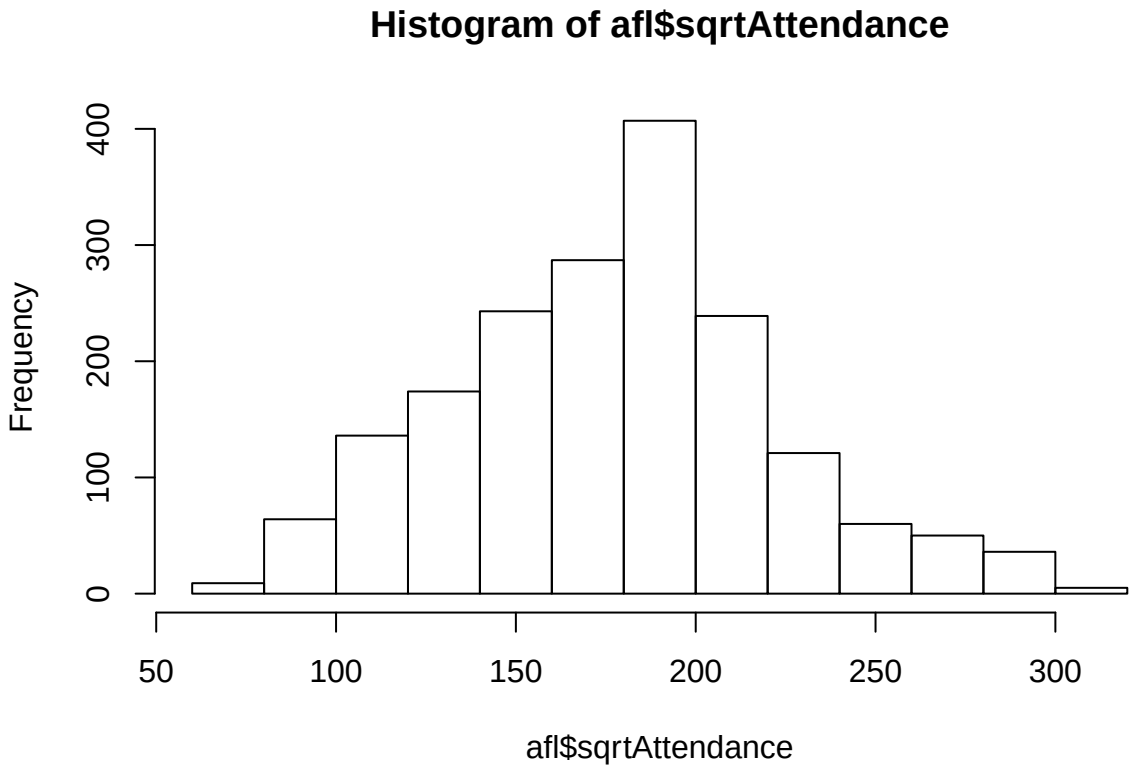
```
hist(afl$Attendance, breaks = 30)
```




```
afl$logAttendance = log(afl$Attendance)
hist(afl$logAttendance)
```



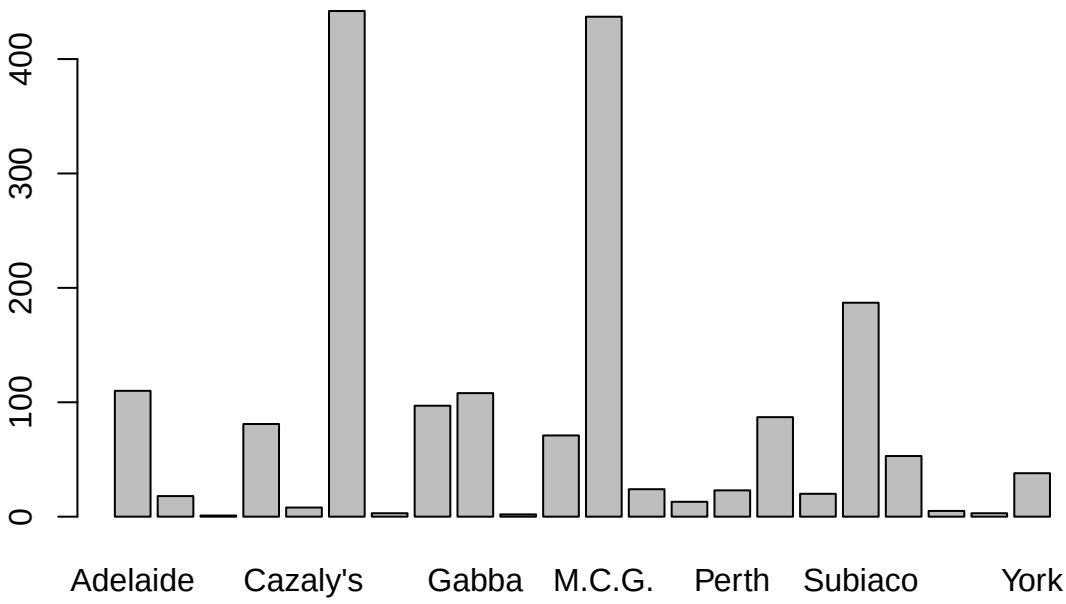

```
afl$sqrtAttendance = sqrt(afl$Attendance)
hist(afl$sqrtAttendance)
```



Attendance may be our response variable as we are trying to determine the factors which influence fans to attend games. The histogram shows a right skew, so I tried an exponential transformation. This results in a left-skewed histogram. As such, I tried a square root transformation which gives us the most normal

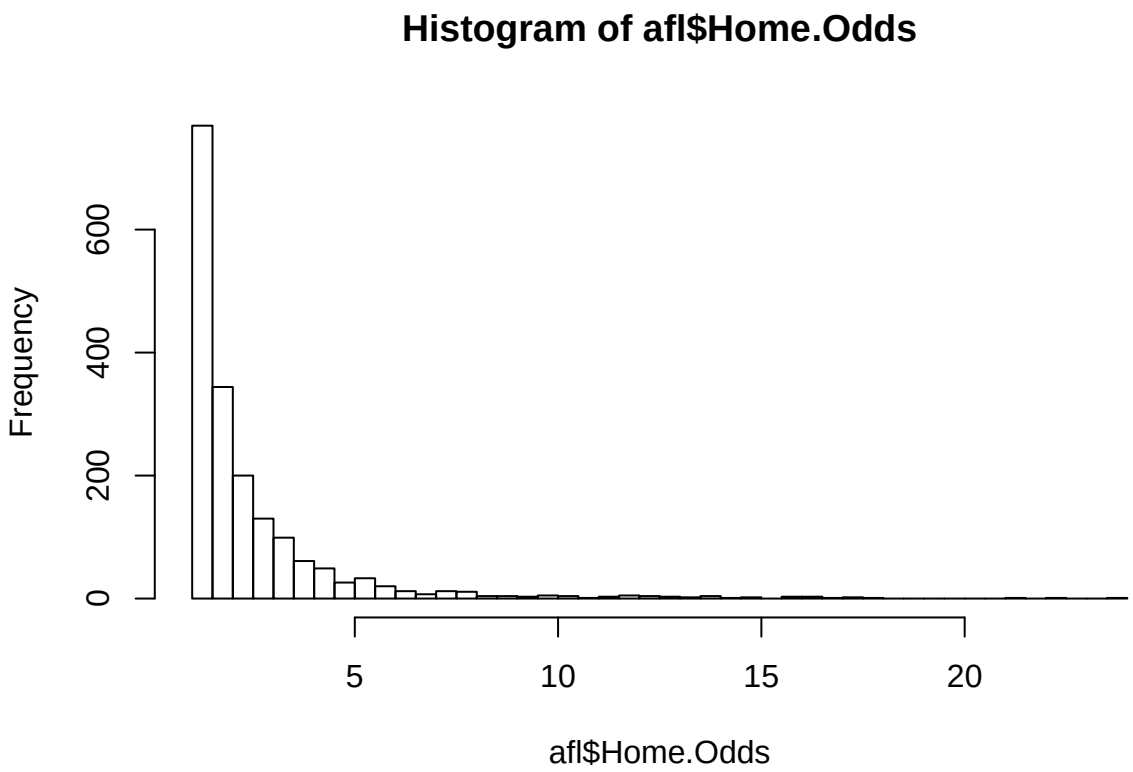
distribution of the three.

```
plot(factor(afl$Venue))
```

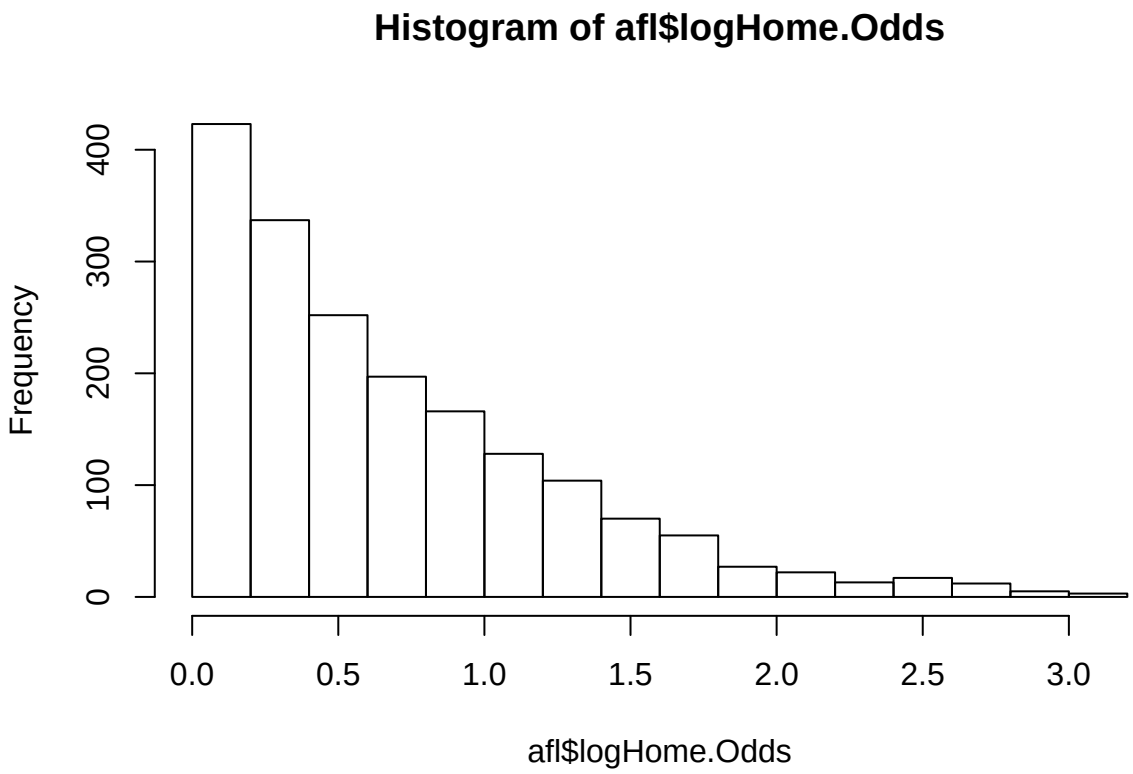


This plot simply shows which stadiums host the most games. We see that a majority of the games are played at M.C.G. and Docklands.

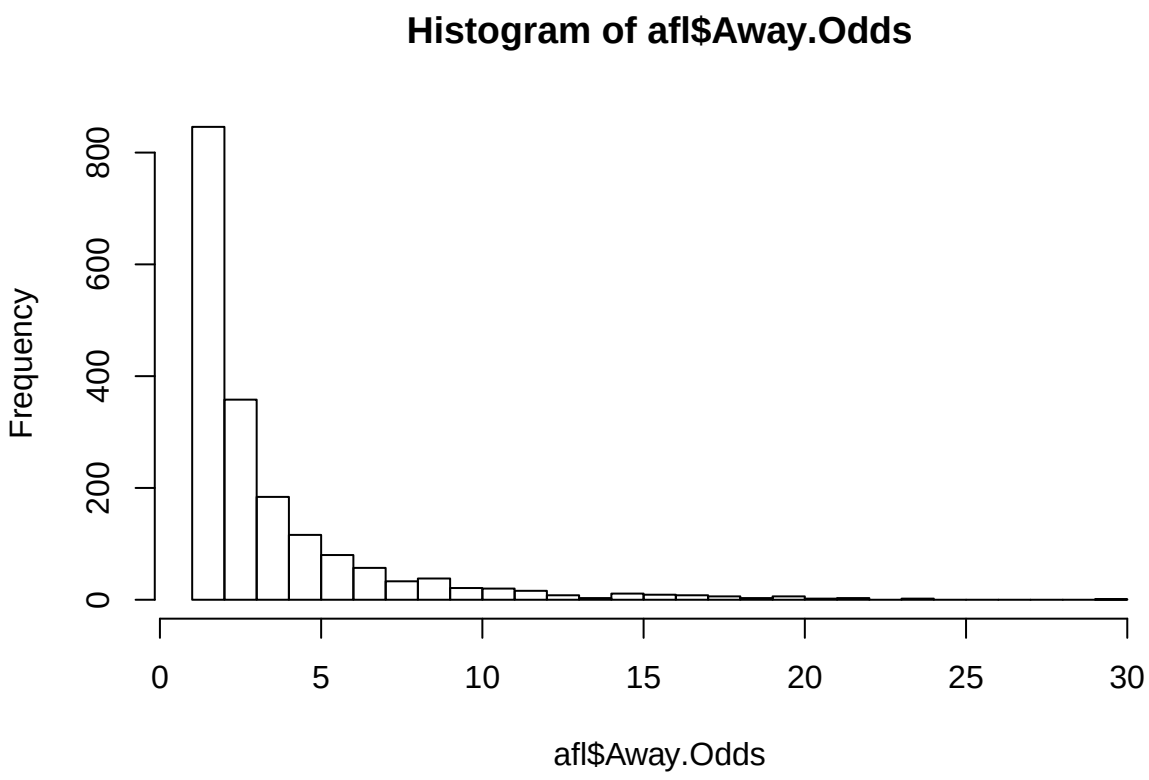
```
hist(afl$Home.Odds, breaks = 40)
```



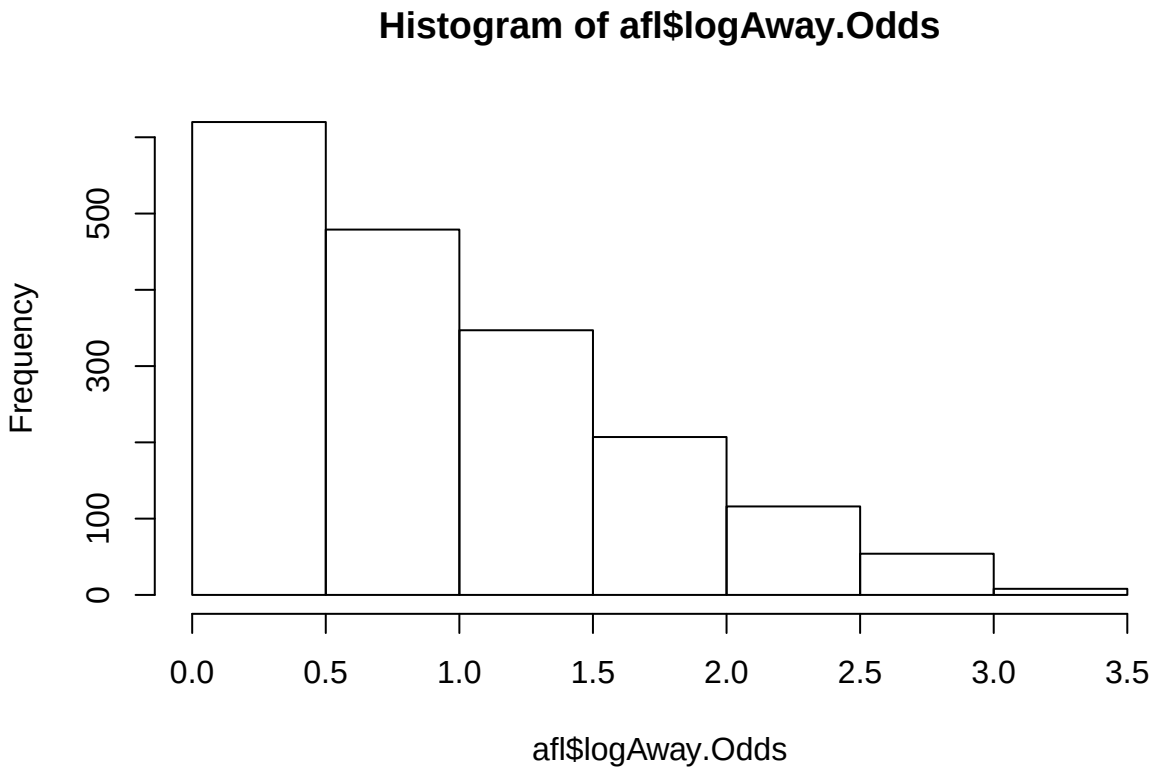

```
afl$logHome.Odds = log(afl$Home.Odds)
hist(afl$logHome.Odds)
```




```
hist(afl$Away.Odds, breaks = 40)
```




```
afl$logAway.Odds = log(afl$Away.Odds)
hist(afl$logAway.Odds)
```

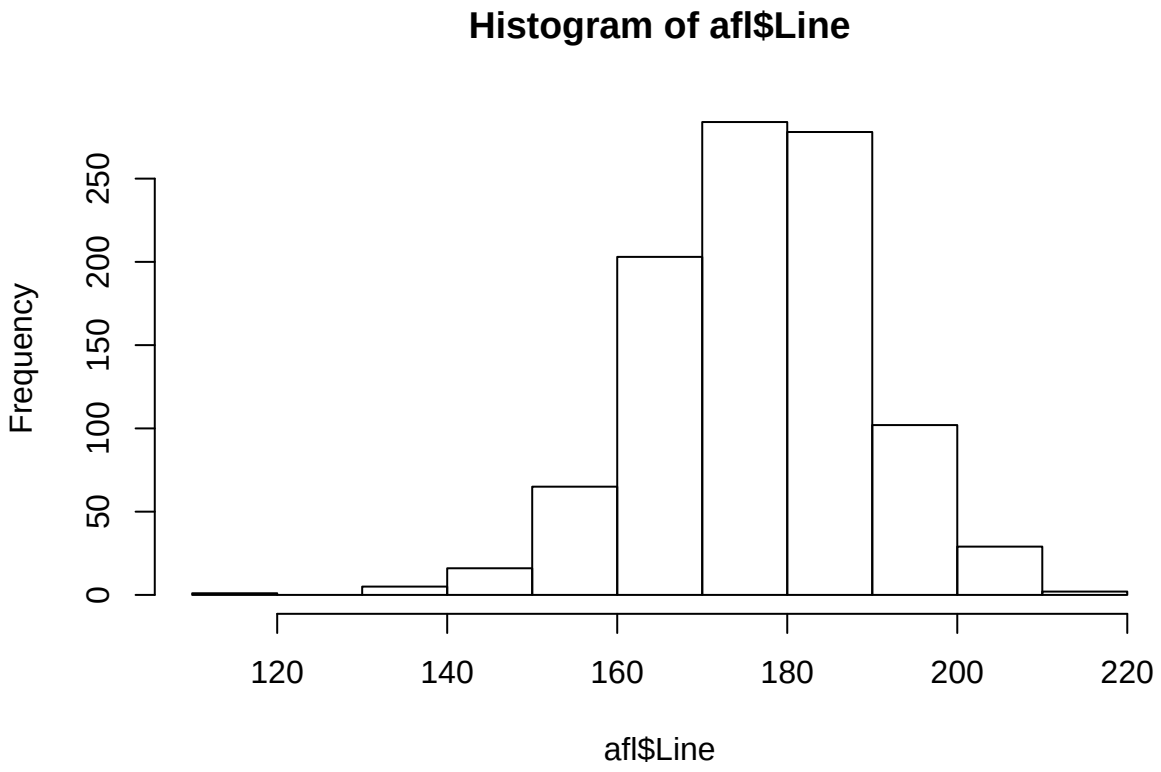


Both home odds and away odds are extremely skewed. Taking the log of the log creates a much more difficult result to interpret and still doesn't give us normally distributed data. These variables will be two of the most important of our data, but as they correlated we can only use one. I show other ways we can incorporate this data below.

```
afl$Line <- as.numeric(afl$Line)
```

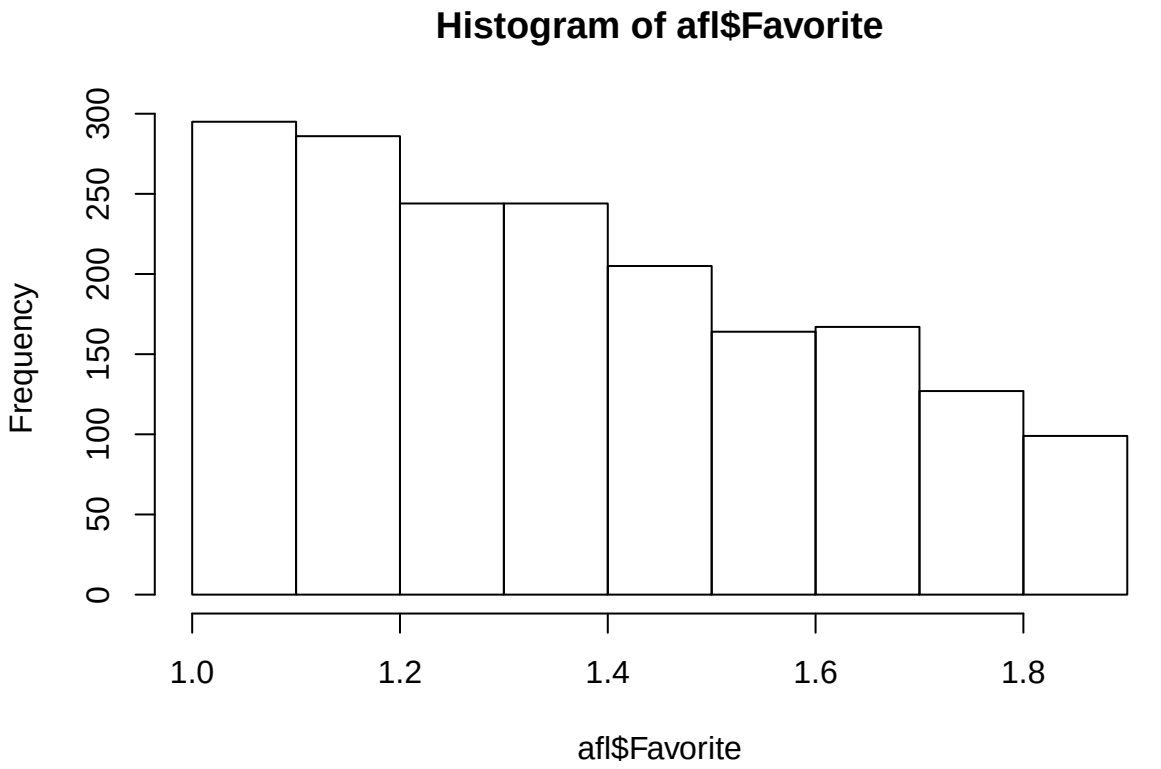
```
## Warning: NAs introduced by coercion
```

```
hist(afl$Line)
```

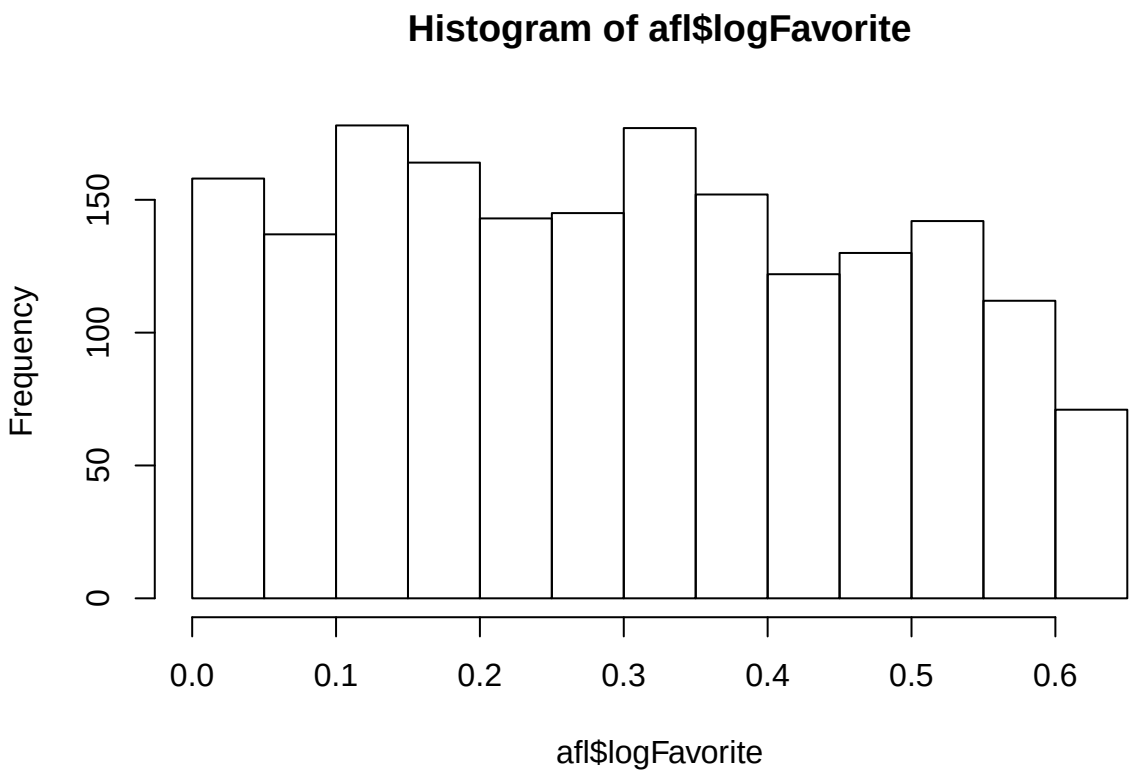


The data for the over-under of the games is relatively normally distributed. However, only games from 2014 and later have over-under data.

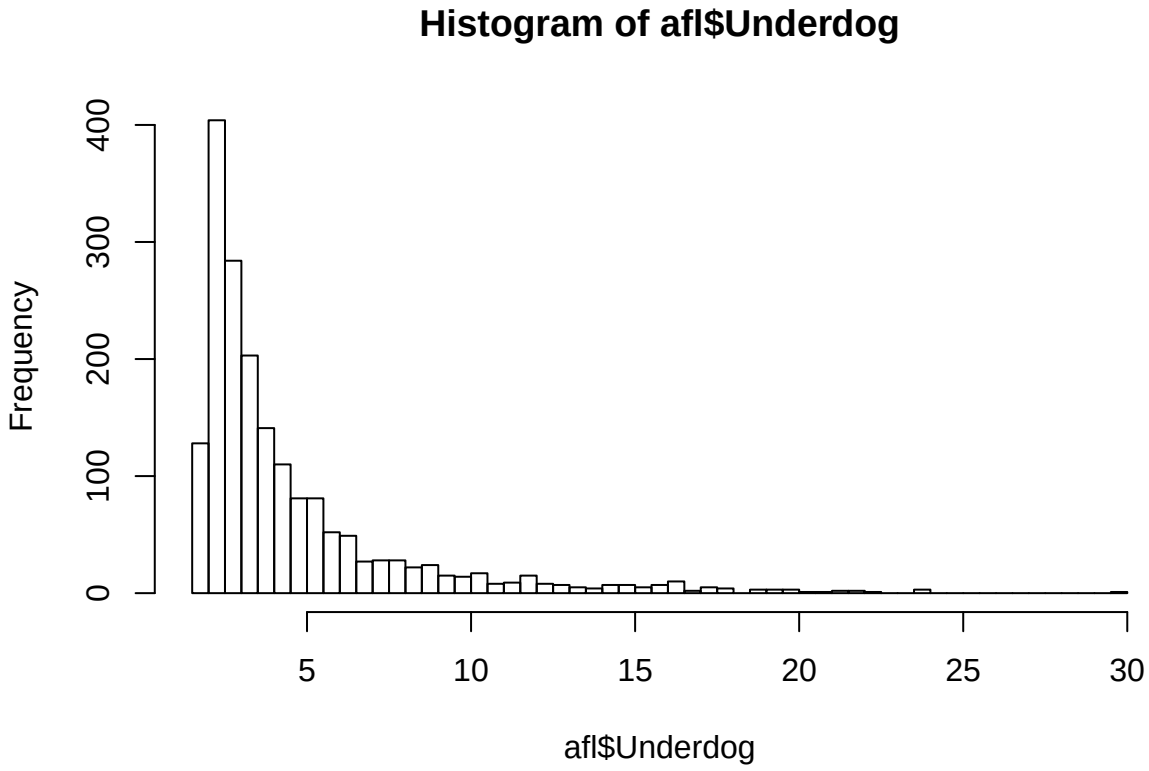
```
hist(afl$Favorite, breaks = 10)
```



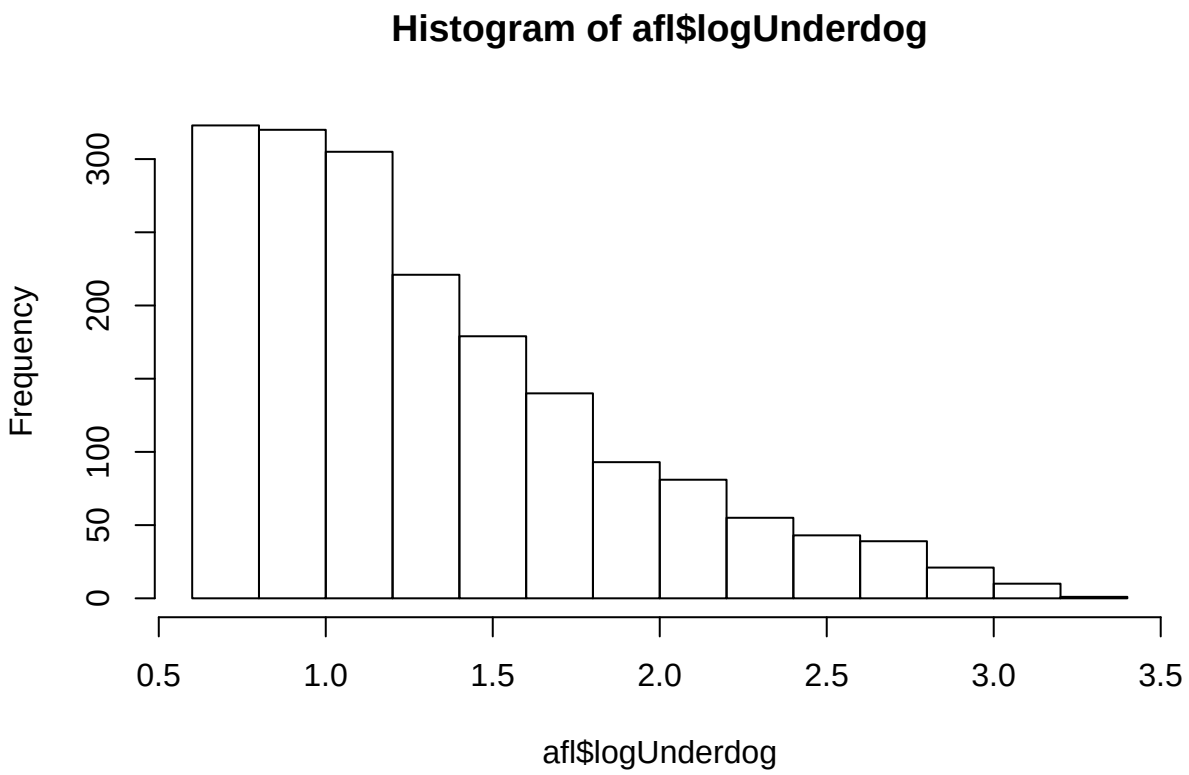
```r
afl$logFavorite = log(afl$Favorite)
hist(afl$logFavorite)
```




```r
hist(afl$Underdog, breaks = 40)
```

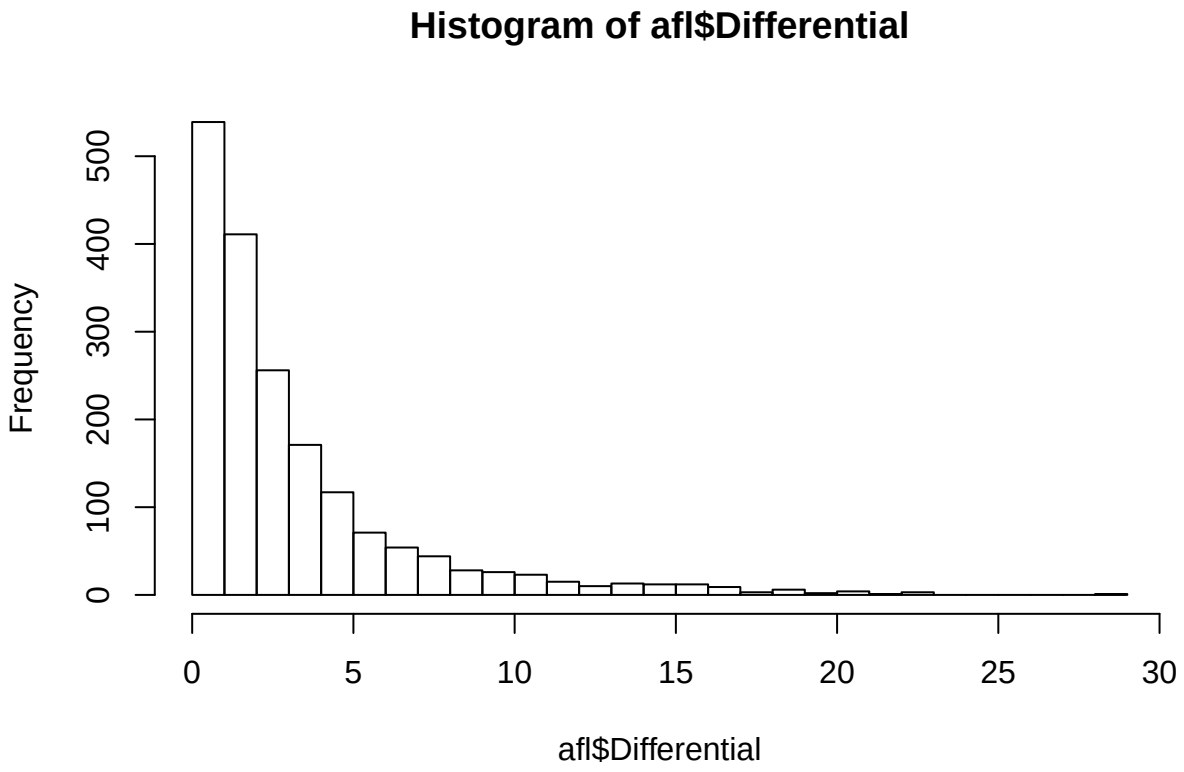


```
afl$logUnderdog = log(afl$Underdog)
hist(afl$logUnderdog)
```

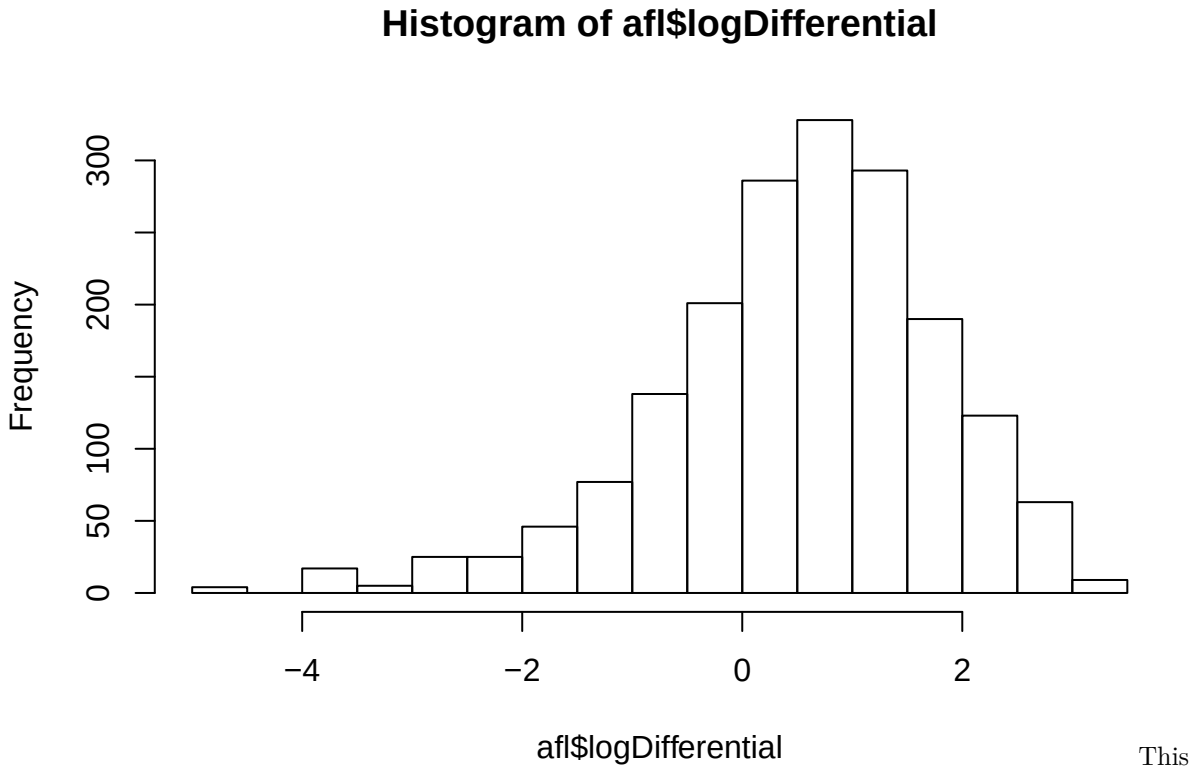


The favorite odds and the underdog odds also aren't great to work with as they have huge amounts of right skewness as well. These variables will also require further transformation if we are to use them.

```
hist(afl$Differential, breaks = 25)
```



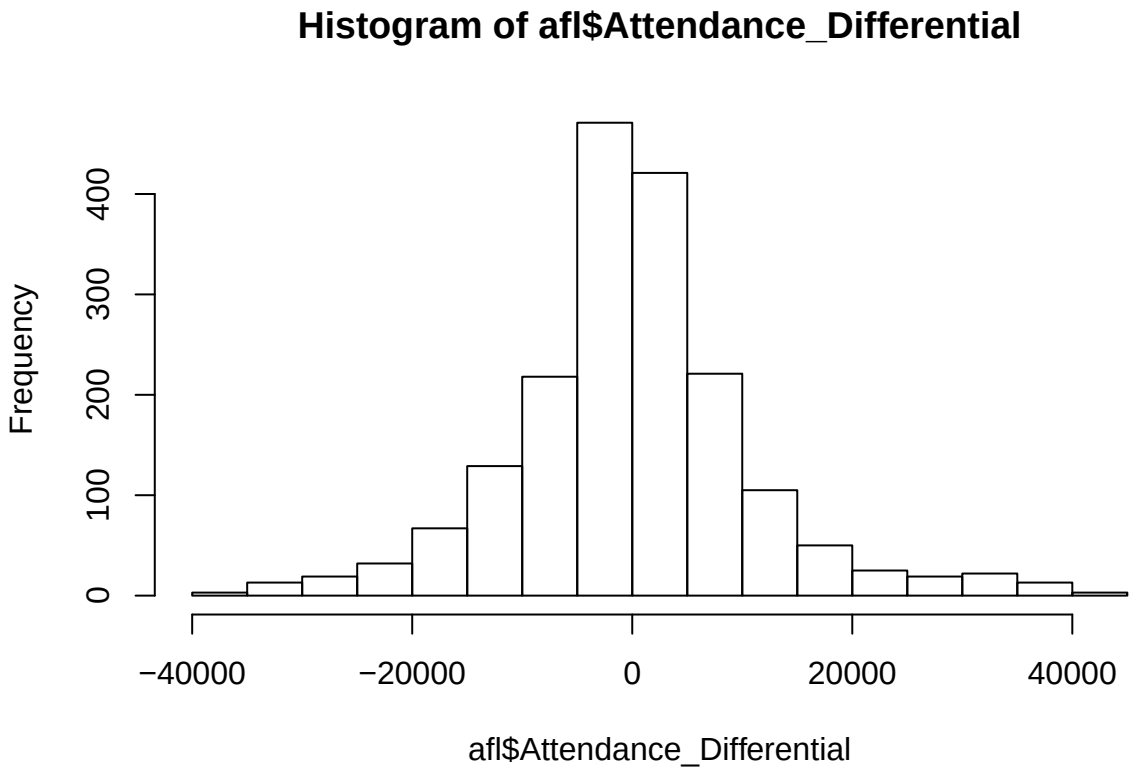

```
afl$logDifferential = log(afl$Differential)
hist(afl$logDifferential)
```



This is my personal favorite of the odds variables. It shows the difference between the odds of the favorite and the odds of the underdog. It also has a severe right skew but the log transformation works to perfection and creates an almost perfectly normal histogram (with slight left skew). I believe this variable provides the

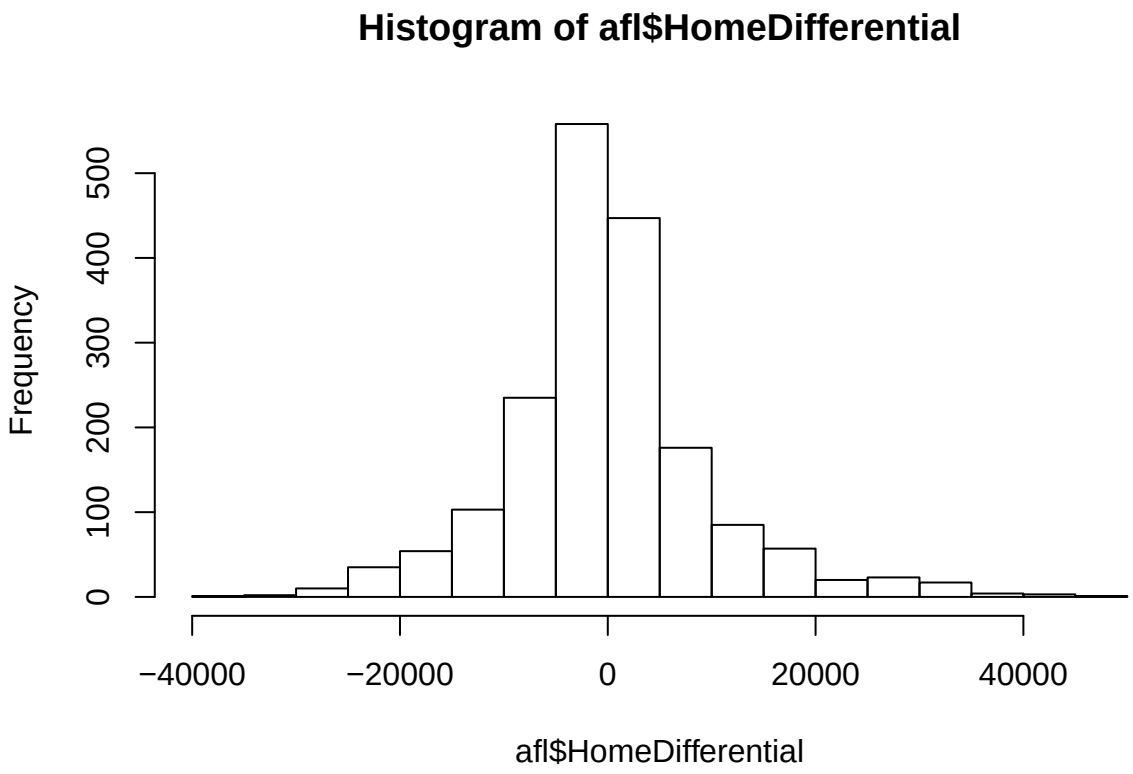
most pertinent information regarding how far apart the teams are in chances of winning the game. It could potentially be used in conjunction with home odds to create a model as the two may be able to provide different information.

```
hist(afl$Attendance_Differential)
```



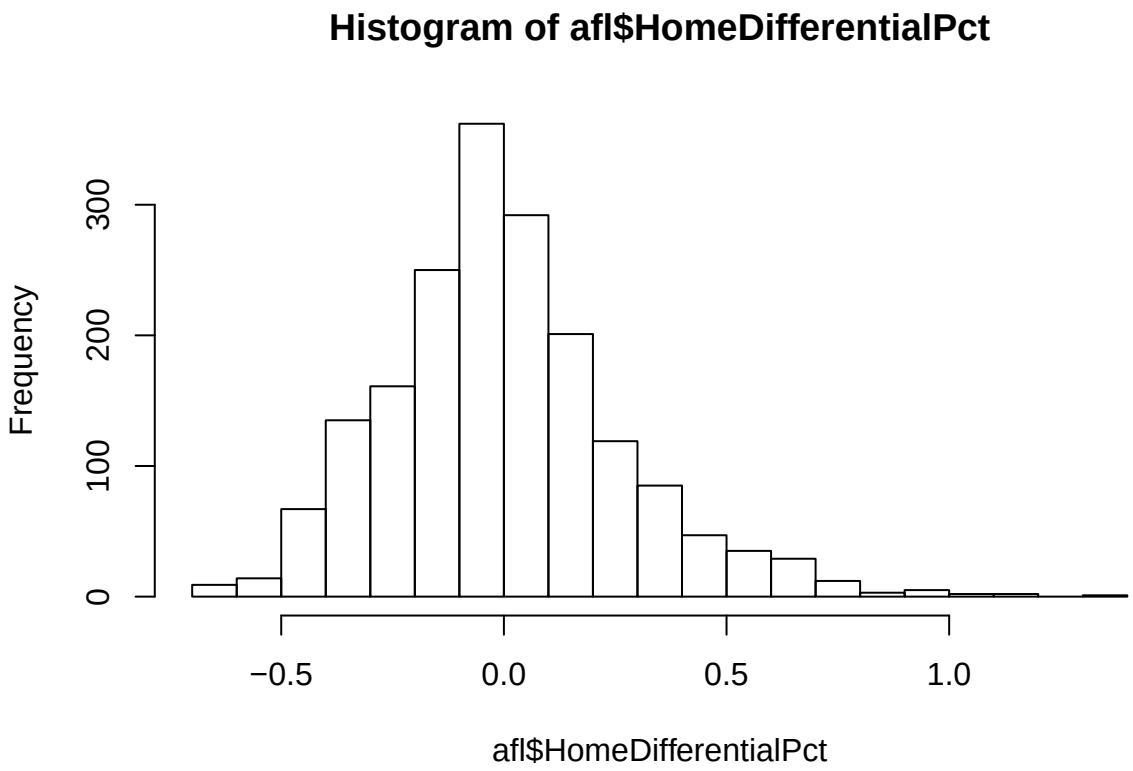
Attendance differential shows the difference in attendance between the actual versus the average attendance (for that venue) for each game. The data are relatively normal although the tails are slightly long.

```
hist(afl$HomeDifferential, breaks = 14)
```



This is the same as differential but it shows the difference between the actual versus average attendance at the venue but only for the home team's games (teases out variance due to home team).

```
hist(afl$HomeDifferentialPct, breaks = 20)
```



This is my favorite attendance statistic because it shows the percentage difference between the team's average

home attendance at a specific venue and the actual attendance for every individual game. This gives better information than strictly numerical values because it scales the change based on how many people generally attend that team's home games at that stadium.

```
mean_by_round <- data.frame()
for (i in 1:24){
  newrow = data.frame(i, mean(afl$Attendance[afl$Round==i]), mean(afl$Home.Odds[afl$Round==i]), mean(afl
  mean_by_round <- rbind(mean_by_round, newrow)
}
names(mean_by_round) = c("Round", "Attendance", "Home.Odds", "Away.Odds", "Favorite", "Underdog", "Diffe
mean_by_round
```

```
##    Round Attendance Home.Odds Away.Odds Favorite Underdog Differential
## 1      1   39606.00  2.369114  2.547848 1.466582 3.450380     1.983797
## 2      2   36413.97  2.228987  3.219114 1.385570 4.062532     2.676962
## 3      3   35516.82  2.490759  3.235063 1.398734 4.327089     2.928354
## 4      4   33409.82  2.222308  3.111410 1.395385 3.938333     2.542949
## 5      5   39335.21  2.565385  2.905385 1.399487 4.071282     2.671795
## 6      6   32940.67  2.140385  3.964615 1.365000 4.740000     3.375000
## 7      7   32052.15  2.583544  3.054430 1.351646 4.286329     2.934684
## 8      8   32169.08  2.072368  3.562500 1.375263 4.259605     2.884342
## 9      9   34165.17  2.823333  3.225200 1.402533 4.646000     3.243467
## 10    10   30985.83  2.796933  3.929333 1.330267 5.396000     4.065733
## 11    11   32960.16  3.016866  2.988507 1.365821 4.639552     3.273731
## 12    12   33627.35  2.564638  2.982319 1.371449 4.175507     2.804058
## 13    13   32326.81  2.328841  3.353043 1.367681 4.314203     2.946522
## 14    14   32183.44  2.032000  4.426250 1.314625 5.143625     3.829000
## 15    15   34507.17  2.622262  3.034167 1.369048 4.287381     2.918333
## 16    16   31596.49  2.395465  3.351163 1.350930 4.395698     3.044767
## 17    17   32186.93  2.592414  3.150920 1.404943 4.338391     2.933448
## 18    18   31556.08  2.950345  3.340920 1.336322 4.954943     3.618621
## 19    19   32316.70  2.196744  3.142558 1.407558 3.931744     2.524186
## 20    20   33478.99  2.394138  3.813218 1.373448 4.833908     3.460460
## 21    21   32394.80  2.508276  3.799885 1.325747 4.982414     3.656667
## 22    22   31875.09  2.788966  3.740345 1.356092 5.173218     3.817126
## 23    23   33055.82  2.308028  4.815070 1.312113 5.810986     4.498873
## 24    24   38095.75  2.016250  3.391250 1.358750 4.048750     2.690000
##    VenueAvg Attendance_Diff HVenueAvg      HDiff      HDiffPct     Time
## 1  35668.81      3937.19405  34905.86  4700.1414  0.1149456692 4.721519
## 2  35451.81       962.16302  36093.42   320.5540  0.0123025125 4.139241
## 3  34486.05      1030.76807  33814.93  1701.8961  0.0394251389 3.759494
## 4  32789.01       620.80676  32955.74   454.0799 -0.0006393384 3.910256
## 5  36053.88      3281.32836  35447.75  3887.4575  0.0706739205 4.435897
## 6  32980.47       -39.80734  33325.45  -384.7862 -0.0081574369 3.923077
## 7  33755.64     -1703.48503  33655.68 -1603.5243 -0.0488534368 4.164557
## 8  32980.79      -811.71097  32943.97  -774.8943 -0.0332632994 3.868421
## 9  33201.45       963.71998  33637.04   528.1325 -0.0126315209 3.986667
## 10 31304.42      -318.59784  31576.10  -590.2706  0.0038752704 4.146667
## 11 33457.73      -497.56421  34084.90 -1124.7381 -0.0262221512 4.208955
## 12 32876.38       750.96533  32160.77  1466.5729  0.0507782282 4.159420
## 13 34843.36     -2516.54475  34526.78 -2199.9683 -0.0602299336 4.188406
## 14 33806.14     -1622.70393  33753.01 -1569.5745 -0.0456430301 4.200000
## 15 33747.95       759.21452  33396.45  1110.7172  0.0403638556 4.023810
## 16 31241.55       354.94010  31483.55   112.9427  0.0067498367 4.034884
## 17 31450.89       736.03901  31765.36   421.5677  0.0248718177 3.919540
```

```
## 18 33229.52     -1673.44118  33170.10 -1614.0150 -0.0433164251 4.390805
## 19 32751.69      -434.98917  32951.89  -635.1962 -0.0124426077 3.860465
## 20 34472.10      -993.11109  34597.41 -1118.4235 -0.0207820669 3.781609
## 21 33786.63     -1391.82537  33567.72 -1172.9161 -0.0148119374 4.022989
## 22 32662.43      -787.34069  32508.39  -633.2996 -0.0078697079 3.965517
## 23 34722.77     -1666.95585  34987.02 -1931.2016 -0.0601612789 3.915493
## 24 35717.95      2377.80151  36552.56  1543.1933  0.0248567953 4.000000
```

From this table we see that Week 1 is generally an outlier. Attendances are far higher than normal based on all metrics while odds are much closer together than in any other week. Week 23 generally shows the opposite results. Week 1 games are also generally played later at night. On average, 11% more fans show up on Week 1 for teams that host games at that particular venue. 6% less fans than average attend games in Week 23 and Week 13. Week 24 likely doesn't provide good data as the sample size is extremely small (only one season had a 'Week 24').

```
i=2
j=2009
mean_by_round_by_season <- data.frame()
for (i in 1:24){
  for (j in 2009:2018){
    newrow = data.frame(i, j, mean(afl$Attendance[afl$Round==i & afl$Year==j]), mean(afl$Home.Odds[afl$
    mean_by_round_by_season <- rbind(mean_by_round_by_season, newrow)
  }
}
names(mean_by_round_by_season) = c("Round", "Season", "Attendance", "Home.Odds", "Away.Odds", "Favorite
mean_by_round_by_season
```

```
##     Round Season Attendance Home.Odds Away.Odds Favorite Underdog
## 1       1   2009        NaN       NaN       NaN      NaN      NaN
## 2       1   2010   42138.62  2.150000  2.367500 1.433750 3.083750
## 3       1   2011   39706.38  1.768750  2.833750 1.583750 3.018750
## 4       1   2012   40865.78  3.658889  1.691111 1.476667 3.873333
## 5       1   2013   40651.89  3.301111  1.786667 1.524444 3.563333
## 6       1   2014   27281.22  2.667778  2.983333 1.383333 4.267778
## 7       1   2015   39941.11  2.107778  2.163333 1.478889 2.792222
## 8       1   2016   39993.22  1.526667  4.263333 1.381111 4.408889
## 9       1   2017   44489.00  2.336667  2.048889 1.447778 2.937778
## 10      1   2018   41679.33  1.713333  2.804444 1.498889 3.018889
## 11      2   2009        NaN       NaN       NaN      NaN      NaN
## 12      2   2010   39736.88  2.560000  3.671250 1.337500 4.893750
## 13      2   2011   33811.62  2.417500  2.813750 1.378750 3.852500
## 14      2   2012   34519.11  1.588889  6.068889 1.243333 6.414444
## 15      2   2013   38970.67  1.818889  3.684444 1.396667 4.106667
## 16      2   2014   35093.56  2.803333  2.474444 1.404444 3.873333
## 17      2   2015   32932.56  2.014444  2.866667 1.392222 3.488889
## 18      2   2016   39233.44  3.103333  1.752222 1.428889 3.426667
## 19      2   2017   35782.44  1.592222  3.735556 1.350000 3.977778
## 20      2   2018   37725.56  2.220000  1.910000 1.532222 2.597778
## 21      3   2009        NaN       NaN       NaN      NaN      NaN
## 22      3   2010   36102.38  1.710000  2.833750 1.530000 3.013750
## 23      3   2011   40148.25  1.676250  4.862500 1.365000 5.173750
## 24      3   2012   33628.78  5.331111  2.757778 1.286667 6.802222
## 25      3   2013   32450.78  3.348889  1.970000 1.405556 3.913333
## 26      3   2014   36420.33  1.840000  3.088889 1.514444 3.414444
## 27      3   2015   32918.56  2.022222  4.156667 1.307778 4.871111
```

```
## 28      3   2016   33193.00  1.490000  4.632222 1.378889 4.743333
## 29      3   2017   31637.11  2.706667  2.154444 1.361111 3.500000
## 30      3   2018   43731.89  2.114444  2.795556 1.450000 3.460000
## 31      4   2009        NaN       NaN       NaN      NaN      NaN
## 32      4   2010   37447.62  1.906250  2.522500 1.493750 2.935000
## 33      4   2011   36644.43  3.944286  2.601429 1.344286 5.201429
## 34      4   2012   33441.33  1.524444  5.443333 1.342222 5.625556
## 35      4   2013   32230.89  1.663333  3.132222 1.431111 3.364444
## 36      4   2014   30185.22  2.044444  2.980000 1.398889 3.625556
## 37      4   2015   34939.00  2.203333  2.111111 1.445556 2.868889
## 38      4   2016   30849.56  3.295556  2.866667 1.353333 4.808889
## 39      4   2017   34558.89  2.054444  2.538889 1.411111 3.182222
## 40      4   2018   31558.89  1.712222  3.627778 1.337778 4.002222
## 41      5   2009        NaN       NaN       NaN      NaN      NaN
## 42      5   2010   41354.62  2.142500  4.046250 1.207500 4.981250
## 43      5   2011   46236.29  2.251429  3.228571 1.438571 4.041429
## 44      5   2012   31369.78  3.666667  3.334444 1.325556 5.675556
## 45      5   2013   35248.11  3.473333  2.486667 1.363333 4.596667
## 46      5   2014   38310.67  2.240000  2.684444 1.484444 3.440000
## 47      5   2015   36666.78  2.820000  2.052222 1.451111 3.421111
## 48      5   2016   40604.11  1.821111  2.983333 1.437778 3.366667
## 49      5   2017   43553.33  2.210000  3.437778 1.405556 4.242222
## 50      5   2018   42431.11  2.346667  2.093333 1.468889 2.971111
## 51      6   2009        NaN       NaN       NaN      NaN      NaN
## 52      6   2010   43478.00  2.061250  3.060000 1.486250 3.635000
## 53      6   2011   34167.29  1.425714  4.448571 1.425714 4.448571
## 54      6   2012   28265.78  2.755556  5.934444 1.208889 7.481111
## 55      6   2013   30971.56  1.884444  7.502222 1.193333 8.193333
## 56      6   2014   36392.11  2.664444  2.365556 1.412222 3.617778
## 57      6   2015   27616.11  2.504444  2.611111 1.332222 3.783333
## 58      6   2016   31285.22  1.877778  3.811111 1.408889 4.280000
## 59      6   2017   30418.67  2.171111  2.772222 1.395556 3.547778
## 60      6   2018   35314.67  1.751111  3.183333 1.448889 3.485556
## 61      7   2009        NaN       NaN       NaN      NaN      NaN
## 62      7   2010   36377.88  1.742500  2.965000 1.390000 3.317500
## 63      7   2011   26307.12  2.698750  2.775000 1.392500 4.081250
## 64      7   2012   31321.44  3.585556  2.204444 1.366667 4.423333
## 65      7   2013   29424.11  3.834444  1.682222 1.394444 4.122222
## 66      7   2014   33094.89  2.857778  4.067778 1.198889 5.726667
## 67      7   2015   32700.33  2.270000  3.440000 1.315556 4.394444
## 68      7   2016   32402.11  2.224444  3.384444 1.432222 4.176667
## 69      7   2017   33064.00  2.110000  2.973333 1.350000 3.733333
## 70      7   2018   33619.78  1.847778  3.956667 1.333333 4.471111
## 71      8   2009        NaN       NaN       NaN      NaN      NaN
## 72      8   2010   30703.38  2.257500  2.080000 1.496250 2.841250
## 73      8   2011   38635.50  2.020000  2.900000 1.453750 3.466250
## 74      8   2012   33744.33  1.455556  3.913333 1.325556 4.043333
## 75      8   2013   32121.89  1.488889  7.923333 1.271111 8.141111
## 76      8   2014   31947.83  2.433333  2.906667 1.386667 3.953333
## 77      8   2015   32377.22  2.195556  2.847778 1.313333 3.730000
## 78      8   2016   29703.67  2.875556  3.582222 1.358889 5.098889
## 79      8   2017   29647.00  1.776667  3.454444 1.328889 3.902222
## 80      8   2018   31122.78  2.283333  1.997778 1.468889 2.812222
## 81      9   2009        NaN       NaN       NaN      NaN      NaN
```

```
## 82      9   2010   41566.25  2.107500  2.131250 1.537500 2.701250
## 83      9   2011   38103.25  1.950000  2.911250 1.521250 3.340000
## 84      9   2012   30364.11  3.895556  3.000000 1.324444 5.571111
## 85      9   2013   34587.44  3.528889  5.300000 1.293333 7.535556
## 86      9   2014   37066.83  2.316667  3.348333 1.346667 4.318333
## 87      9   2015   32448.22  1.971111  4.937778 1.447778 5.461111
## 88      9   2016   32881.78  3.175556  2.707778 1.345556 4.537778
## 89      9   2017   29839.75  2.658750  2.322500 1.503750 3.477500
## 90      9   2018   32375.44  3.442222  2.152222 1.323333 4.271111
## 91     10   2009        NaN       NaN       NaN      NaN      NaN
## 92     10   2010   31441.75  1.726250  4.415000 1.210000 4.931250
## 93     10   2011   32261.88  3.603750  2.461250 1.318750 4.746250
## 94     10   2012   27534.67  1.955556  6.687778 1.285556 7.357778
## 95     10   2013   26559.11  4.034444  5.300000 1.285556 8.048889
## 96     10   2014   31278.17  1.838333  2.613333 1.426667 3.025000
## 97     10   2015   31750.78  4.712222  2.687778 1.296667 6.103333
## 98     10   2016   33611.67  3.492222  3.254444 1.351111 5.395556
## 99     10   2017   36830.67  1.610000  3.726667 1.383333 3.953333
## 100    10   2018   27507.12  1.732500  3.637500 1.445000 3.925000
## 101    11   2009        NaN       NaN       NaN      NaN      NaN
## 102    11   2010   32815.12  2.881250  1.895000 1.418750 3.357500
## 103    11   2011   34176.62  1.691250  4.380000 1.302500 4.768750
## 104    11   2012   39606.67  4.283333  1.970000 1.256667 4.996667
## 105    11   2013   35723.83  7.388333  1.378333 1.348333 7.418333
## 106    11   2014   32772.89  3.316667  3.410000 1.328889 5.397778
## 107    11   2015   32181.83  2.968333  2.583333 1.408333 4.143333
## 108    11   2016   27356.11  1.977778  2.991111 1.411111 3.557778
## 109    11   2017   27300.00  1.736667  2.716667 1.600000 2.853333
## 110    11   2018   35818.00  2.182222  4.503333 1.266667 5.418889
## 111    12   2009   38780.67  3.473333  2.253333 1.356667 4.370000
## 112    12   2010   36635.88  2.590000  2.082500 1.438750 3.233750
## 113    12   2011   40036.38  2.135000  3.121250 1.382500 3.873750
## 114    12   2012   23309.00  3.566667  3.373333 1.243333 5.696667
## 115    12   2013   32162.50  2.170000  4.443333 1.190000 5.423333
## 116    12   2014   31018.11  2.454444  4.084444 1.195556 5.343333
## 117    12   2015   29823.17  2.240000  2.708333 1.405000 3.543333
## 118    12   2016   35807.78  2.967778  2.251111 1.537778 3.681111
## 119    12   2017   33435.71  2.314286  2.307143 1.498571 3.122857
## 120    12   2018   34759.43  2.268571  3.010000 1.410000 3.868571
## 121    13   2009   38948.00  1.987500  4.782500 1.201250 5.568750
## 122    13   2010   37129.50  2.011250  2.136250 1.476250 2.671250
## 123    13   2011   29507.12  1.726250  4.673750 1.375000 5.025000
## 124    13   2012   30667.67  1.826667  2.495000 1.440000 2.881667
## 125    13   2013   27167.17  3.823333  3.056667 1.156667 5.723333
## 126    13   2014   33779.56  2.045556  3.782222 1.383333 4.444444
## 127    13   2015   35348.00  1.875000  3.600000 1.326667 4.148333
## 128    13   2016   26262.00  5.038333  1.770000 1.291667 5.516667
## 129    13   2017   32987.00  1.693333  3.618333 1.556667 3.755000
## 130    13   2018   27877.67  1.823333  2.890000 1.478333 3.235000
## 131    14   2009   35029.38  2.103750  2.040000 1.488750 2.655000
## 132    14   2010   36016.75  1.462500  4.462500 1.311250 4.613750
## 133    14   2011   36216.38  2.537500  3.242500 1.331250 4.448750
## 134    14   2012   34520.56  1.415556  8.265556 1.178889 8.502222
## 135    14   2013   26454.44  1.967778  4.903333 1.327778 5.543333
```

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## 136    14   2014   29638.78  2.803333  3.373333 1.277778 4.898889
## 137    14   2015   33614.50  2.317500  3.527500 1.313750 4.531250
## 138    14   2016   22719.00  1.926667  5.770000 1.235000 6.461667
## 139    14   2017   33708.89  1.728889  3.973333 1.387778 4.314444
## 140    14   2018   32073.50  2.065000  4.776667 1.275000 5.566667
## 141    15   2009   33371.25  2.122500  2.537500 1.403750 3.256250
## 142    15   2010   35758.50  2.706250  1.825000 1.423750 3.107500
## 143    15   2011   39454.38  2.772500  2.523750 1.387500 3.908750
## 144    15   2012   34402.67  3.476667  4.620000 1.211111 6.885556
## 145    15   2013   41245.78  3.432222  3.206667 1.352222 5.286667
## 146    15   2014   31774.56  2.405556  3.450000 1.275556 4.580000
## 147    15   2015   28631.00  2.155556  2.458889 1.494444 3.120000
## 148    15   2016   33952.00  1.940000  4.491667 1.400000 5.031667
## 149    15   2017   34079.22  1.887778  2.940000 1.416667 3.411111
## 150    15   2018   32779.78  3.066667  2.527778 1.347778 4.246667
## 151    16   2009   35336.50  1.790000  3.693750 1.330000 4.153750
## 152    16   2010   35599.50  1.735000  2.900000 1.416250 3.218750
## 153    16   2011   33681.14  2.657143  3.311429 1.285714 4.682857
## 154    16   2012   26725.78  4.726667  1.872222 1.376667 5.222222
## 155    16   2013   28453.67  2.442222  6.088889 1.228889 7.302222
## 156    16   2014   26359.11  2.522222  3.170000 1.277778 4.414444
## 157    16   2015   33057.89  1.892222  2.688889 1.473333 3.107778
## 158    16   2016   26163.22  2.414444  3.238889 1.294444 4.358889
## 159    16   2017   35578.89  2.108889  2.440000 1.477778 3.071111
## 160    16   2018   36332.78  1.583333  4.086667 1.338889 4.331111
## 161    17   2009   45181.25  1.712500  2.708750 1.451250 2.970000
## 162    17   2010   37477.75  1.761250  3.520000 1.417500 3.863750
## 163    17   2011   29954.00  2.868750  2.557500 1.347500 4.078750
## 164    17   2012   36157.33  2.040000  4.172222 1.514444 4.697778
## 165    17   2013   23150.67  4.371111  3.008889 1.363333 6.016667
## 166    17   2014   29971.56  2.424444  4.825556 1.328889 5.921111
## 167    17   2015   29392.00  3.575556  2.120000 1.451111 4.244444
## 168    17   2016   29226.89  2.725556  3.060000 1.294444 4.491111
## 169    17   2017   33889.89  2.017778  2.753333 1.463333 3.307778
## 170    17   2018   29251.56  2.267778  2.708889 1.417778 3.558889
## 171    18   2009   31591.88  2.698750  3.023750 1.276250 4.446250
## 172    18   2010   35131.75  2.461250  2.468750 1.353750 3.576250
## 173    18   2011   34853.38  3.818750  3.588750 1.240000 6.167500
## 174    18   2012   24802.67  5.235556  3.053333 1.257778 7.031111
## 175    18   2013   27067.11  3.104444  5.062222 1.252222 6.914444
## 176    18   2014   34115.67  3.943333  2.357778 1.406667 4.894444
## 177    18   2015   33718.00  2.666667  3.417778 1.225556 4.858889
## 178    18   2016   30333.56  1.548889  3.690000 1.490000 3.748889
## 179    18   2017   29898.56  1.731111  2.677778 1.543333 2.865556
## 180    18   2018   34815.89  2.308889  3.964444 1.302222 4.971111
## 181    19   2009   32886.00  1.947500  2.772500 1.492500 3.227500
## 182    19   2010   39504.62  1.881250  2.236250 1.600000 2.517500
## 183    19   2011   35299.86  2.778571  3.514286 1.325714 4.967143
## 184    19   2012   34280.67  3.060000  2.413333 1.325556 4.147778
## 185    19   2013   36056.11  2.482222  2.353333 1.492222 3.343333
## 186    19   2014   28270.44  1.484444  4.080000 1.362222 4.202222
## 187    19   2015   28634.33  2.138889  2.194444 1.511111 2.822222
## 188    19   2016   27445.56  2.156667  5.577778 1.233333 6.501111
## 189    19   2017   30447.78  2.265556  3.260000 1.336667 4.188889
```

```
## 190    19   2018   31866.44  1.838889  2.964444 1.408889 3.394444
## 191    20   2009   35467.25  2.987500  1.711250 1.487500 3.211250
## 192    20   2010   36390.50  2.617500  2.090000 1.435000 3.272500
## 193    20   2011   28319.00  2.777500  5.713750 1.260000 7.231250
## 194    20   2012   29795.00  1.401111  5.733333 1.341111 5.793333
## 195    20   2013   31098.78  2.441111  5.407778 1.262222 6.586667
## 196    20   2014   33039.22  2.540000  3.162222 1.404444 4.297778
## 197    20   2015   32546.89  1.900000  3.340000 1.324444 3.915556
## 198    20   2016   33867.44  3.102222  5.058889 1.260000 6.901111
## 199    20   2017   34035.44  2.056667  2.227778 1.513333 2.771111
## 200    20   2018   40201.44  2.251111  3.473333 1.453333 4.271111
## 201    21   2009   37805.25  1.597500  4.366250 1.310000 4.653750
## 202    21   2010   31904.88  1.530000  4.608750 1.395000 4.743750
## 203    21   2011   31872.25  3.767500  3.278750 1.258750 5.787500
## 204    21   2012   28660.44  3.356667  4.406667 1.261111 6.502222
## 205    21   2013   32341.00  3.293333  4.857778 1.305556 6.845556
## 206    21   2014   31378.33  1.742222  4.335556 1.398889 4.678889
## 207    21   2015   32777.89  2.172222  3.475556 1.348889 4.298889
## 208    21   2016   30263.78  3.085556  2.194444 1.292222 3.987778
## 209    21   2017   32680.67  1.782222  3.538889 1.384444 3.936667
## 210    21   2018   34752.22  2.685556  3.031111 1.301111 4.415556
## 211    22   2009   38554.75  2.857500  3.133750 1.445000 4.546250
## 212    22   2010   37264.62  1.882500  3.748750 1.451250 4.180000
## 213    22   2011   30919.62  2.466250  3.816250 1.356250 4.926250
## 214    22   2012   25421.56  3.391111  5.516667 1.348889 7.558889
## 215    22   2013   30734.44  3.292222  4.328889 1.312222 6.308889
## 216    22   2014   33526.78  2.102222  4.052222 1.335556 4.818889
## 217    22   2015   28911.33  2.452222  4.026667 1.312222 5.166667
## 218    22   2016   28172.22  4.555556  3.194444 1.262222 6.487778
## 219    22   2017   30173.44  2.282222  2.673333 1.386667 3.568889
## 220    22   2018   36307.00  2.478889  2.854444 1.371111 3.962222
## 221    23   2009        NaN       NaN       NaN      NaN      NaN
## 222    23   2010        NaN       NaN       NaN      NaN      NaN
## 223    23   2011   30479.62  3.068750  5.246250 1.210000 7.105000
## 224    23   2012   30997.78  3.384444  5.558889 1.244444 7.698889
## 225    23   2013   34406.56  1.810000  4.063333 1.466667 4.406667
## 226    23   2014   32049.56  2.425556  4.495556 1.266667 5.654444
## 227    23   2015   29328.89  1.695556  6.675556 1.223333 7.147778
## 228    23   2016   33023.11  1.924444  4.461111 1.275556 5.110000
## 229    23   2017   41022.78  1.691111  4.316667 1.437778 4.570000
## 230    23   2018   32852.00  2.548889  3.751111 1.361111 4.938889
## 231    24   2009        NaN       NaN       NaN      NaN      NaN
## 232    24   2010        NaN       NaN       NaN      NaN      NaN
## 233    24   2011   38095.75  2.016250  3.391250 1.358750 4.048750
## 234    24   2012        NaN       NaN       NaN      NaN      NaN
## 235    24   2013        NaN       NaN       NaN      NaN      NaN
## 236    24   2014        NaN       NaN       NaN      NaN      NaN
## 237    24   2015        NaN       NaN       NaN      NaN      NaN
## 238    24   2016        NaN       NaN       NaN      NaN      NaN
## 239    24   2017        NaN       NaN       NaN      NaN      NaN
## 240    24   2018        NaN       NaN       NaN      NaN      NaN
##     Differential VenueAvg Attendance_Diff HVenueAvg         HDiff
## 1            NaN      NaN             NaN       NaN           NaN
## 2       1.650000 37660.88      4477.74263  36141.55   5997.070921
```

```
## 3       1.435000 37332.09      2374.28181  39441.89    264.481310
## 4       2.396667 36197.52      4668.25336  32629.42   8236.359226
## 5       2.038889 36197.52      4454.36447  34373.11   6278.778829
## 6       2.884444 24882.36      2398.86115  25145.11   2136.110337
## 7       1.313333 38515.33      1425.78212  37011.09   2930.025891
## 8       3.027778 37348.67      2644.54768  36180.81   3812.412494
## 9       1.490000 37348.67      7140.32546  39430.83   5058.170681
## 10      1.520000 35942.34      5736.99182  34440.22   7239.114776
## 11           NaN      NaN             NaN       NaN          NaN
## 12      3.556250 37332.09      2404.78181  39593.14    143.735062
## 13      2.473750 35256.32     -1444.69532  32228.60   1583.025039
## 14      5.171111 32310.12      2208.99403  35818.62  -1299.507157
## 15      2.710000 36512.50      2458.16876  37702.63   1268.034537
## 16      2.468889 36377.94     -1284.38495  34533.46    560.099643
## 17      2.096667 32335.84       596.71862  33431.20   -498.643222
## 18      1.997778 35911.04      3322.40341  38188.92   1044.527384
## 19      2.627778 35961.15      -178.70237  34616.99   1165.452884
## 20      1.065556 37256.51       469.04547  38686.67   -961.109822
## 21           NaN      NaN             NaN       NaN          NaN
## 22      1.483750 36086.94        15.43769  32751.87   3350.500274
## 23      3.808750 37857.65      2290.59611  37368.36   2779.890937
## 24      5.515556 33207.16       421.62003  31880.10   1748.682366
## 25      2.507778 29390.86      3059.92214  28747.57   3703.203776
## 26      1.900000 35220.33      1200.00049  36998.91   -578.579589
## 27      3.563333 33399.45      -480.89521  34490.91  -1572.357020
## 28      3.364444 30311.90      2881.09640  29194.61   3998.394829
## 29      2.138889 33146.29     -1509.18261  33767.51  -2130.403548
## 30      2.010000 42306.40      1425.48396  39411.20   4320.687901
## 31           NaN      NaN             NaN       NaN          NaN
## 32      1.441250 34143.40      3304.22070  35399.37   2048.255528
## 33      3.857143 32908.45      3735.97385  31715.99   4928.438521
## 34      4.283333 33678.11      -236.77445  33517.10    -75.765298
## 35      1.933333 31778.65       452.24107  30471.73   1759.158661
## 36      2.226667 32202.25     -2017.03129  31919.71  -1734.484192
## 37      1.423333 31395.39      3543.60685  31942.66   2996.335068
## 38      3.455556 31918.00     -1068.44936  34153.76  -3304.208267
## 39      1.771111 33773.65       785.23634  32717.65   1841.234251
## 40      2.664444 33480.24     -1921.34645  34759.70  -3200.812749
## 41           NaN      NaN             NaN       NaN          NaN
## 42      3.773750 36403.90      4950.72922  34410.31   6944.319831
## 43      2.602857 35466.04     10770.24820  35612.29  10623.996267
## 44      4.350000 30341.01      1028.76347  29879.07   1490.709105
## 45      3.233333 32652.79      2595.31845  33020.32   2227.788278
## 46      1.955556 38089.49       221.17816  39363.06  -1052.396176
## 47      1.970000 37348.67      -681.89676  35930.46    736.314349
## 48      1.928889 37348.67      3255.43657  35592.58   5011.528436
## 49      2.836667 37348.67      6204.65879  37765.08   5788.258074
## 50      1.502222 39393.90      3037.21254  37377.85   5053.259552
## 51           NaN      NaN             NaN       NaN          NaN
## 52      2.148750 35302.81      8175.18952  37237.05   6240.952605
## 53      3.022857 36791.07     -2623.78742  39025.07  -4857.785145
## 54      6.272222 30799.91     -2534.12754  29762.42  -1496.640321
## 55      7.000000 31569.30      -597.74756  33675.75  -2704.193436
## 56      2.205556 35801.00       591.11090  34272.62   2119.492164
```

```
## 57      2.451111 31017.95     -3401.84091  29516.84  -1900.730482
## 58      2.871111 33126.76     -1841.53447  31840.49   -555.267838
## 59      2.152222 31918.00     -1499.33825  34236.95  -3818.279663
## 60      2.036667 31602.30      3712.36933  32063.10   3251.570164
## 61           NaN      NaN             NaN       NaN          NaN
## 62      1.927500 34143.40      2234.47070  34633.22   1744.650320
## 63      2.688750 31042.95     -4735.82373  28771.93  -2464.807859
## 64      3.056667 32196.66      -875.21749  31249.09     72.359073
## 65      2.727778 32246.77     -2822.65661  30257.74   -833.626687
## 66      4.527778 35911.04     -2816.15214  38162.03  -5067.145543
## 67      3.078889 36377.94     -3677.60717  37239.67  -4539.340290
## 68      2.744444 34514.28     -2112.17331  34468.51  -2066.400906
## 69      2.383333 33146.29       -82.29372  31458.15   1605.850132
## 70      3.137778 33963.07      -343.28773  36226.71  -2606.936003
## 71           NaN      NaN             NaN       NaN          NaN
## 72      1.345000 32326.50     -1623.12136  29213.04   1490.335345
## 73      2.012500 34777.25      3858.25022  36504.13   2131.368530
## 74      2.717778 30080.63      3663.69911  31615.10   2129.235435
## 75      6.870000 31778.65       343.24107  34035.61  -1913.718904
## 76      2.566667 35781.83     -3834.00144  32908.91   -961.071865
## 77      2.416667 33082.94      -705.72213  32312.05     65.168732
## 78      3.740000 31968.11     -2264.44404  31450.48  -1746.815306
## 79      2.573333 30826.22     -1179.22334  32094.03  -2447.034681
## 80      1.343333 37265.56     -6142.77910  36331.74  -5208.965125
## 81           NaN      NaN             NaN       NaN          NaN
## 82      1.163750 33343.26      8222.99370  36230.22   5336.031465
## 83      1.818750 32372.69      5730.56227  32252.20   5851.045244
## 84      4.246667 31505.95     -1141.84264  31866.91  -1502.796641
## 85      6.242222 34384.16       203.28824  33753.48    833.962111
## 86      2.971667 37089.70       -22.86590  37610.70   -543.862695
## 87      4.013333 31250.63      1197.59055  32189.26    258.961123
## 88      3.192222 35220.33     -2338.55507  33334.16   -452.379068
## 89      1.973750 31828.05     -1988.30128  31259.00  -1419.246814
## 90      2.947778 32885.46      -510.01925  35432.03  -3056.584046
## 91           NaN      NaN             NaN       NaN          NaN
## 92      3.721250 31738.84      -297.09225  31446.42     -4.665618
## 93      3.427500 31350.43       911.44059  30568.30   1693.579931
## 94      6.072222 31822.46     -4287.79349  32950.47  -5415.808101
## 95      6.763333 29101.89     -2542.78062  28018.17  -1459.059352
## 96      1.598333 32334.03     -1055.85976  33327.37  -2049.204497
## 97      4.806667 31017.95       732.82575  29670.88   2079.902193
## 98      4.044444 33106.28       505.38737  35674.46  -2062.789784
## 99      2.570000 33573.44      3257.22230  34628.25   2202.414543
## 100     2.480000 27689.40      -182.27723  27955.67   -448.540215
## 101          NaN      NaN             NaN       NaN          NaN
## 102     1.938750 36086.94     -3271.81231  37580.67  -4765.549045
## 103     3.466250 36547.97     -2371.34135  37616.72  -3440.092998
## 104     3.740000 34406.93      5199.73602  31813.32   7793.343031
## 105     6.070000 31014.04      4709.79037  31425.13   4298.705111
## 106     4.068889 33106.28      -333.39041  34475.28  -1702.392768
## 107     2.735000 34232.23     -2050.39490  34336.90  -2155.062877
## 108     2.146667 32582.88     -5226.76441  33382.59  -6026.473909
## 109     1.253333 26587.76       712.24464  25334.71   1965.288677
## 110     4.152222 34660.05      1157.95152  37103.13  -1285.128935
```

```
## 111     3.013333 33366.55      5414.12018  34867.56   3913.103231
## 112     1.795000 34149.62      2486.25991  31208.31   5427.563662
## 113     2.491250 33943.83      6092.54094  34417.36   5619.011788
## 114     4.453333 28473.85     -5164.85463  29240.66  -5931.658620
## 115     4.233333 31637.08       525.42404  33187.47  -1024.971806
## 116     4.147778 29089.91      1928.20287  27227.27   3790.844943
## 117     2.138333 35191.50     -5368.33076  35681.81  -5858.646263
## 118     2.143333 33823.76      1984.01945  33319.75   2488.027985
## 119     1.624286 36751.08     -3315.36582  35892.13  -2456.416167
## 120     2.458571 32618.29      2141.13838  29236.81   5522.618626
## 121     4.367500 36547.97      2400.03365  37340.45   1607.545810
## 122     1.195000 35256.32      1873.17968  34912.44   2217.061787
## 123     3.650000 33069.24     -3562.11531  30862.70  -1355.572424
## 124     1.441667 38035.67     -7368.00457  35519.71  -4852.040350
## 125     4.566667 32977.96     -5810.79661  30584.85  -3417.684040
## 126     3.061111 37392.49     -3612.93132  39841.95  -6062.394567
## 127     2.821667 33083.34      2264.66154  32939.53   2408.467848
## 128     4.225000 29877.26     -3615.25573  29625.44  -3363.439050
## 129     2.198333 34232.23     -1245.22823  32879.70    107.300077
## 130     1.756667 36572.04     -8694.37475  38258.36 -10380.695052
## 131     1.166250 33943.83      1085.54094  31241.29   3788.082912
## 132     3.302500 35453.09       563.65816  36640.62   -623.872237
## 133     3.117500 33638.78      2577.59723  32767.19   3449.185117
## 134     7.323333 34103.95       416.60729  36499.72  -1979.160526
## 135     4.215556 31081.65     -4627.20174  28373.02  -1918.580178
## 136     3.621111 35220.33     -5581.55507  33522.39  -3883.614096
## 137     3.217500 31429.47      2185.03420  32443.82   1170.683622
## 138     5.226667 33453.53    -10734.52844  34976.67 -12257.665451
## 139     2.926667 35255.10     -1546.20950  36134.66  -2425.767911
## 140     4.291667 34516.59     -2443.09284  35811.58  -3738.083272
## 141     1.852500 32689.65       681.60380  31759.27   1611.984574
## 142     1.683750 34777.25       981.25022  34184.05   1574.451017
## 143     2.521250 34927.53      4526.84386  36360.28   3094.092107
## 144     5.674444 33706.69       695.97506  31813.31   2589.360672
## 145     3.934444 34334.05      6911.72735  35131.92   6113.853373
## 146     3.304444 31959.06      -184.50835  33547.31  -1772.752509
## 147     1.625556 29530.83      -899.83442  30175.32  -1544.319630
## 148     3.631667 37237.94     -3285.93582  34772.69   -820.694193
## 149     1.994444 35220.33     -1141.11062  33606.96    472.259190
## 150     2.898889 34387.35     -1607.57664  33307.05   -527.269422
## 151     2.823750 35453.09      -116.59184  36032.25   -695.748958
## 152     1.802500 31405.93      4193.56591  33696.10   1903.399341
## 153     3.397143 32127.73      1553.41311  33593.69     87.450918
## 154     3.845556 27672.10      -946.32517  26406.80    318.975840
## 155     6.073333 29103.44      -649.77635  29300.60   -846.932854
## 156     3.136667 27809.73     -1450.61556  27264.71   -905.594653
## 157     1.634444 32802.74       255.15247  30741.39   2316.493892
## 158     3.064444 27809.73     -1646.50445  28123.60  -1960.375140
## 159     1.593333 34096.45      1482.43649  35128.84    450.045698
## 160     2.992222 34817.68      1515.09526  35767.65    565.132661
## 161     1.518750 34731.06     10450.19159  38291.03   6890.223545
## 162     2.446250 35453.09      2024.65816  32915.17   4562.583243
## 163     2.731250 26387.65      3566.34990  27188.80   2765.202030
## 164     3.183333 31195.47      4961.86545  33145.90   3011.436840
```

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## 165     4.653333 25074.09    -1923.42341  25408.10  -2257.433947
## 166     4.592222 31449.83    -1478.27586  31547.50  -1575.945852
## 167     2.793333 33773.65    -4381.65254  32994.62  -3602.618682
## 168     3.196667 33514.82    -4287.93485  33560.68  -4333.786901
## 169     1.844444 30644.12     3245.77210  31994.87   1895.016318
## 170     2.141111 32531.71    -3280.15123  30951.30  -1699.743405
## 171     3.170000 35302.81    -3710.93548  32831.34  -1239.465290
## 172     2.222500 35256.32     -124.57032  35521.11   -389.357732
## 173     4.927500 34173.15      680.22819  34122.39    730.988685
## 174     5.773333 28671.56    -3868.89696  28430.28  -3627.616530
## 175     5.662222 30799.91    -3732.79421  29415.01  -2347.897273
## 176     3.487778 33823.76      291.90834  34091.48    24.190370
## 177     3.633333 34514.28     -796.28442  35446.14  -1728.137982
## 178     2.258889 32376.90    -2043.34037  32863.54  -2529.982135
## 179     1.322222 33514.82    -3616.26819  33123.46  -3224.907761
## 180     3.668889 34422.12      393.76893  36185.61  -1369.719139
## 181     1.735000 36554.18    -3668.17714  38212.07  -5326.074478
## 182     0.917500 38491.50     1013.12564  40061.82   -557.196729
## 183     3.641429 30869.35     4430.51061  31793.95   3505.910000
## 184     2.822222 34384.16     -103.48954  33889.00    391.663242
## 185     1.851111 32246.77     3809.34339  33252.12   2803.990045
## 186     2.840000 33355.64    -5085.19398  32333.37  -4062.924511
## 187     1.311111 33126.76    -4492.42336  32363.94  -3729.610318
## 188     5.267778 31221.00    -3775.44773  30164.82  -2719.268457
## 189     2.852222 31017.95     -570.17425  31336.90   -889.122444
## 190     1.985556 26891.53     4974.91543  27228.07   4638.374929
## 191     1.723750 37660.88    -2193.63237  35667.06   -199.805027
## 192     1.837500 37332.09     -941.59319  37314.11   -923.613904
## 193     5.971250 29651.24    -1332.23867  29824.56  -1505.557152
## 194     4.452222 32204.49    -2409.48830  32893.01  -3098.005568
## 195     5.324444 31225.75     -126.96803  32494.51  -1395.728577
## 196     2.893333 33076.65      -37.42869  32824.68    214.544552
## 197     2.591111 33887.11    -1340.21880  35139.72  -2592.826566
## 198     5.641111 37348.67    -3481.23009  36801.03  -2933.589052
## 199     1.257778 33076.65      958.79353  34133.89    -98.448760
## 200     2.817778 39393.90      807.54587  38771.95   1429.494620
## 201     3.343750 34927.53     2877.71886  36228.14   1577.111242
## 202     3.348750 31594.77      310.10332  33318.56  -1413.687373
## 203     4.528750 34927.53    -3055.28114  33363.47  -1491.224725
## 204     5.241111 32196.66    -3536.21749  33675.98  -5015.531868
## 205     5.540000 36512.50    -4171.49790  34447.71  -2106.706602
## 206     3.280000 35211.29    -3832.95272  34853.07  -3474.737161
## 207     2.950000 33082.94     -305.05547  34461.91  -1684.023635
## 208     2.695556 33823.76    -3559.98055  33545.88  -3282.106275
## 209     2.552222 31262.06     1418.60439  29687.20   2993.466731
## 210     3.114444 34337.25      414.97359  32340.51   2411.716863
## 211     3.101250 35302.81     3251.93952  33311.42   5243.334076
## 212     2.728750 34143.40     3121.22070  32859.03   4405.598056
## 213     3.570000 34422.90    -3503.27960  32428.89  -1509.266179
## 214     6.210000 32937.29    -7515.73826  30169.60  -4748.045675
## 215     4.996667 31549.77     -815.32164  32730.73  -1996.287288
## 216     3.483333 31758.77     1768.01178  31758.33   1768.450679
## 217     3.854444 31227.30    -2315.96340  33711.42  -4800.087494
## 218     5.225556 31758.77    -3586.54378  32806.99  -4634.765573
```

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## 219     2.182222 30486.50      -313.05696  29882.86    290.582448
## 220     2.591111 33690.35      2616.64722  35544.00    762.998458
## 221          NaN      NaN             NaN       NaN           NaN
## 222          NaN      NaN             NaN       NaN           NaN
## 223     5.895000 34143.40     -3663.77930  33472.04  -2992.419261
## 224     6.454444 33687.15     -2689.37680  35621.91  -4624.132976
## 225     2.940000 33363.13      1043.42126  34479.34    -72.784493
## 226     4.387778 34940.12     -2890.56935  35583.05  -3533.493584
## 227     5.924444 35255.10     -5926.20950  34334.03  -5005.137275
## 228     3.834444 34514.28     -1491.17331  35527.00  -2503.886384
## 229     3.132222 35255.10      5767.67939  36680.29   4342.487732
## 230     3.577778 36559.51     -3707.50845  34030.16  -1178.159831
## 231          NaN      NaN             NaN       NaN           NaN
## 232          NaN      NaN             NaN       NaN           NaN
## 233     2.690000 35717.95      2377.80151  36552.56   1543.193348
## 234          NaN      NaN             NaN       NaN           NaN
## 235          NaN      NaN             NaN       NaN           NaN
## 236          NaN      NaN             NaN       NaN           NaN
## 237          NaN      NaN             NaN       NaN           NaN
## 238          NaN      NaN             NaN       NaN           NaN
## 239          NaN      NaN             NaN       NaN           NaN
## 240          NaN      NaN             NaN       NaN           NaN
##          HDiffPct     Time
## 1             NaN      NaN
## 2    0.1882446733 6.125000
## 3    0.0350333309 4.625000
## 4    0.1885060296 4.555556
## 5    0.1293855022 4.222222
## 6    0.1311669143 5.888889
## 7    0.0416367741 3.888889
## 8    0.0778199039 3.888889
## 9    0.0841932078 4.777778
## 10   0.1577898715 4.666667
## 11            NaN      NaN
## 12   0.0584663630 5.125000
## 13   0.0880244929 3.625000
## 14  -0.0511643956 3.777778
## 15   0.0048280455 3.666667
## 16  -0.0050440988 5.444444
## 17  -0.0343955155 3.888889
## 18   0.0524277399 3.555556
## 19   0.0322119765 4.111111
## 20  -0.0210891253 4.111111
## 21            NaN      NaN
## 22   0.0812378058 3.750000
## 23   0.0404870982 3.875000
## 24   0.0416395806 3.666667
## 25   0.1238914411 3.888889
## 26  -0.0399999726 3.888889
## 27  -0.0303885975 3.666667
## 28   0.1205295812 3.777778
## 29  -0.0702964254 3.777778
## 30   0.0924895859 3.555556
## 31            NaN      NaN
```

```
## 32   0.0789224232 3.875000
## 33   0.0972905601 4.142857
## 34  -0.0297820561 3.777778
## 35   0.0035647168 3.666667
## 36  -0.0492179516 3.666667
## 37  -0.0196833319 4.000000
## 38  -0.0563560735 3.888889
## 39   0.0442812503 4.333333
## 40  -0.0441711878 3.888889
## 41            NaN      NaN
## 42   0.1389435290 4.750000
## 43   0.2328916689 4.285714
## 44  -0.0019410814 3.888889
## 45   0.0344711786 4.555556
## 46  -0.0553614853 5.111111
## 47   0.0022427504 3.777778
## 48   0.1030127230 4.333333
## 49   0.1137046003 4.555556
## 50   0.1117353014 4.666667
## 51            NaN      NaN
## 52   0.1547120814 3.750000
## 53  -0.1311944122 4.857143
## 54  -0.0679264068 3.555556
## 55  -0.0966817281 3.777778
## 56  -0.0168951524 3.888889
## 57  -0.0092721587 4.333333
## 58   0.0744909993 3.666667
## 59  -0.0616029300 3.888889
## 60   0.0717078387 3.777778
## 61            NaN      NaN
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## 63  -0.0377592304 4.000000
## 64   0.0108420409 5.333333
## 65  -0.0717943926 4.222222
## 66  -0.1444738871 3.777778
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## 71            NaN      NaN
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## 74  -0.0278387885 3.777778
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## 81            NaN      NaN
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## 85  -0.0317587721 3.777778
```

```
## 86  -0.0486715066 4.666667
## 87  -0.0486311850 3.666667
## 88  -0.0387597491 3.777778
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## 91             NaN      NaN
## 92   0.0328992067 3.750000
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## 95  -0.0374962603 4.333333
## 96  -0.0463461571 4.333333
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```

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## 194 -0.0553558983 3.777778
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## 225  0.0369418170 3.888889
## 226 -0.1228803620 3.777778
## 227 -0.1436715056 3.555556
## 228 -0.0860909372 3.777778
## 229  0.1153840643 3.777778
## 230 -0.0488345005 3.777778
## 231           NaN      NaN
## 232           NaN      NaN
## 233  0.0248567953 4.000000
## 234           NaN      NaN
## 235           NaN      NaN
## 236           NaN      NaN
## 237           NaN      NaN
## 238           NaN      NaN
## 239           NaN      NaN
## 240           NaN      NaN
```

```
fit <- lm(HomeDifferentialPct ~ Day + TimeBucket + Home.Odds + Differential, data = afl)
library(car)
```

```
## Loading required package: carData
```

```r
vif(fit)
```

```
##                   GVIF Df GVIF^(1/(2*Df))
## Day           1.402855  6        1.028611
## TimeBucket    1.410950  1        1.187834
## Home.Odds     1.136787  1        1.066202
## Differential 1.162119  1        1.078016
```

```r
fit1 <- step(fit)
```

```
## Start:  AIC=-5204.18
## HomeDifferentialPct ~ Day + TimeBucket + Home.Odds + Differential
##
##                 Df Sum of Sq    RSS     AIC
## - Home.Odds      1    0.0193 105.59 -5205.8
## <none>                       105.58 -5204.2
## - TimeBucket     1    0.7773 106.35 -5192.8
## - Differential   1    2.8846 108.46 -5156.8
## - Day            6   12.6276 118.20 -5009.3
##
## Step:  AIC=-5205.85
## HomeDifferentialPct ~ Day + TimeBucket + Differential
##
##                 Df Sum of Sq    RSS     AIC
## <none>                       105.59 -5205.8
## - TimeBucket     1    0.7648 106.36 -5194.6
## - Differential   1    3.4490 109.04 -5149.0
## - Day            6   12.6083 118.20 -5011.3
```

```r
summary(fit1)
```

```
##
## Call:
## lm(formula = HomeDifferentialPct ~ Day + TimeBucket + Differential,
##     data = afl)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.81788 -0.15454 -0.01082  0.13458  1.01813
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.107492   0.025117   4.280 1.97e-05 ***
## DayMon        0.372805   0.049008   7.607 4.47e-14 ***
## DaySat       -0.122153   0.019502  -6.264 4.68e-10 ***
## DaySun       -0.167773   0.022135  -7.580 5.48e-14 ***
## DayThu        0.009741   0.039808   0.245 0.806721
## DayTue        0.587504   0.140195   4.191 2.91e-05 ***
## DayWed        0.435080   0.171456   2.538 0.011246 *
## TimeBucket    0.009682   0.002665   3.633 0.000288 ***
## Differential -0.012014   0.001557  -7.714 1.99e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2407 on 1822 degrees of freedom
```

```
## Multiple R-squared:  0.1774, Adjusted R-squared:  0.1738
## F-statistic: 49.11 on 8 and 1822 DF,  p-value: < 2.2e-16
```

```
fit <- lm(HomeDifferentialPct ~ Day + TimeBucket + Differential, data = afl)
summary(fit)
```

```
##
## Call:
## lm(formula = HomeDifferentialPct ~ Day + TimeBucket + Differential,
##     data = afl)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.81788 -0.15454 -0.01082  0.13458  1.01813
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.107492   0.025117   4.280 1.97e-05 ***
## DayMon        0.372805   0.049008   7.607 4.47e-14 ***
## DaySat       -0.122153   0.019502  -6.264 4.68e-10 ***
## DaySun       -0.167773   0.022135  -7.580 5.48e-14 ***
## DayThu        0.009741   0.039808   0.245 0.806721
## DayTue        0.587504   0.140195   4.191 2.91e-05 ***
## DayWed        0.435080   0.171456   2.538 0.011246 *
## TimeBucket    0.009682   0.002665   3.633 0.000288 ***
## Differential -0.012014   0.001557  -7.714 1.99e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2407 on 1822 degrees of freedom
## Multiple R-squared:  0.1774, Adjusted R-squared:  0.1738
## F-statistic: 49.11 on 8 and 1822 DF,  p-value: < 2.2e-16
```