Assigment 07 Torres Estrada

Torres Gloria

2023-05-14

```
## Set the working directory to the root of your DSC 520 directory
setwd('C:/Users/glori/OneDrive/Documents/Gloria GIT/Gloria_Torres_DSC_520')
## Load the `data/r4ds/heights.csv` to
heights_df <- read.csv("data/r4ds/heights.csv")
new_data<- read.csv("data/r4ds/heights.csv")

# Fit a linear model
library(ggplot2)
library(caTools)

earn_lm <-  lm(earn ~ age +height + sex+ ed + race, data=heights_df)

# View the summary of your model
summary(earn_lm)
```

```
##
## Call:
## lm(formula = earn ~ age + height + sex + ed + race, data = heights_df)
##
## Residuals:
##     Min    1Q  Median    3Q    Max
## -39423  -9827  -2208   6157 158723
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -41478.4    12409.4  -3.342 0.000856 ***
## age              178.3       32.2   5.537 3.78e-08 ***
## height           202.5      185.6   1.091 0.275420
## sexmale        10325.6     1424.5   7.249 7.57e-13 ***
## ed              2768.4      209.9  13.190  < 2e-16 ***
## racehispanic   -1414.3     2685.2  -0.527 0.598507
## raceother        371.0     3837.0   0.097 0.922983
## racewhite       2432.5     1723.9   1.411 0.158489
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 17250 on 1184 degrees of freedom
## Multiple R-squared:  0.2199, Adjusted R-squared:  0.2153
## F-statistic: 47.68 on 7 and 1184 DF,  p-value: < 2.2e-16
```

```
predicted_df <- data.frame(
  earn = predict(earn_lm),
  ed=new_data$ed, race=new_data$race, height= new_data$height,
  age=new_data$age, sex=new_data$sex
  )
predicted_df
```

```
##            earn ed     race   height age    sex
## 1    38666.1091 16    white 74.42444  45    male
## 2    28859.0888 16    white 65.53754  58 female
## 3    23301.9009 16    white 63.62920  29 female
## 4    32189.8351 16    other 63.10856  91 female
## 5    27807.3900 17    white 63.40248  39 female
## 6    20154.5994 15    white 64.39951  26 female
## 7    15395.0698 12    white 61.65633  49 female
## 8    41263.3218 17    white 72.69854  46    male
## 9    27288.8369 15 hispanic 72.03947  21    male
## 10   23761.5861 12    white 72.23493  26    male
## 11   41237.5589 16    white 69.51215  65    male
## 12   21568.5845 11    white 68.03161  34    male
## 13   22992.7118 12    white 67.55693  27    male
## 14   16515.8698 12    white 65.43059  51 female
## 15   24783.4853 16    white 65.66285  35 female
## 16   28560.9807 12    white 67.75877  58    male
## 17   18721.3982 14    white 68.35184  29 female
## 18   29207.8357 13    white 69.60957  44    male
## 19   14544.3151 12    black 64.18457  55 female
## 20   25872.2095 13    black 73.07461  35    male
## 21   18665.6566 13    white 62.37553  51 female
## 22   16216.2029 14    white 63.02393  21 female
## 23   27571.6999 14    white 67.22990  22    male
## 24   14757.2392 12    white 65.55111  41 female
## 25   27117.9070 12    white 72.07965  45    male
## 26   10756.8557 12    black 63.09113  35 female
## 27   28969.8920 16    white 64.32355  60 female
## 28   36854.7844 16    white 71.64285  38    male
## 29   37006.0629 16    white 76.79309  33    male
## 30   17105.5662 14    white 63.89391  25 female
## 31   12976.7884 12    white 63.80262  33 female
## 32   39791.1982 17    white 71.59223  39    male
## 33   37540.6444 17    white 67.52196  31    male
## 34   11848.4754 12    white 64.39435  26 female
## 35   26005.7817 14    white 61.17822  78 female
## 36   16368.5465 14    black 66.98388  31 female
## 37   17562.5809 12    white 65.31646  57 female
## 38   17219.1323 14    white 63.57419  26 female
## 39   27556.2002 15    white 66.61100  65 female
## 40   12666.4499 12    white 64.91176  30 female
## 41   14603.0691 12    white 64.78968  41 female
## 42   29508.5079 18    white 66.93769  29 female
## 43   27168.5325 17    white 68.17281  30 female
## 44    6311.7243 12 hispanic 60.45066  21 female
## 45   15767.4229 13    white 64.79325  32 female
```

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## 46   11861.1148 12     white 61.81492  29 female
## 47   16664.2418 10     white 71.57215  18   male
## 48   14608.4818  8     black 67.31441  56   male
## 49   30242.6239 12     white 69.89987  65   male
## 50   39777.1684 17     white 69.76170  41   male
## 51   30469.9717 17     white 67.74647  49 female
## 52   17951.0732 12     white 60.19022  65 female
## 53   23869.4658 12     white 71.00650  28   male
## 54   24615.1354 12     white 71.16680  32   male
## 55   25204.8983 13     white 72.73563  18   male
## 56   23314.0315 14     white 68.13822  55 female
## 57   17777.8837 12     white 66.37981  57 female
## 58   34762.0762 16     white 69.23278  29   male
## 59   17336.6430 14     white 63.27394  27 female
## 60   23700.9856 14 hispanic 61.82776  28   male
## 61   20381.2946 14     white 64.22121  43 female
## 62   10920.1480  9     white 63.84127  68 female
## 63    8701.7514  9     white 66.97477  52 female
## 64   25920.9013 12     white 71.45149  39   male
## 65   26767.9291 16     white 59.61265  53 female
## 66   23384.7030 16     white 65.79939  27 female
## 67   19679.8843 15     white 66.45804  21 female
## 68   19745.3603 14     white 64.60288  39 female
## 69   15127.8122 13     white 70.44048  22 female
## 70   22415.0495 13     white 65.92281  68 female
## 71   15079.0596 12     white 61.85683  47 female
## 72   27745.4491 15     white 65.78444  67 female
## 73   25997.7994 12     white 71.83128  39   male
## 74    -217.0009  8 hispanic 67.04533  39 female
## 75   20189.0596 12 hispanic 68.30551  32   male
## 76   24562.3463 12     white 70.02546  33   male
## 77   13464.9267 12     white 61.81039  38 female
## 78   14324.6073 13     white 62.95107  26 female
## 79   21502.9460 13     white 65.82114  63 female
## 80   13767.8680 10     white 70.39755  61 female
## 81   14438.0539 12     white 68.37778  36 female
## 82   28297.2517 14     white 69.93270  23   male
## 83   11138.5456 12     white 66.17181  20 female
## 84   24814.1909 16     white 68.45636  32 female
## 85   34541.3451 16     white 69.90386  27   male
## 86    6631.5572 12 hispanic 61.14966  22 female
## 87   20019.9780 12     white 63.36335  73 female
## 88   22684.2290 14     white 64.14708  56 female
## 89   33999.2175 12     white 67.31839  89   male
## 90   34387.2621 17     white 60.67494  79 female
## 91   35956.1730 18     white 68.84090  63 female
## 92   19646.4220 12     white 67.68273  66 female
## 93   13117.3354 12     white 64.49677  33 female
## 94   16155.5240 14     black 66.81240  30 female
## 95   36362.1434 17     white 68.74644  23   male
## 96   18189.2674 13     white 67.06765  43 female
## 97   13319.6823 12     white 68.13799  30 female
## 98   13596.9185 12     white 63.34290  37 female
## 99   22876.6202 12     white 71.38667  22   male
```

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## 100   26206.7441 17    black 63.98834  43 female
## 101   22195.5757 11    white 68.48639  37   male
## 102   29531.8197 17    white 67.51614  44 female
## 103   16813.9003 14 hispanic 65.60084  43 female
## 104   36472.5904 16    white 76.80019  30   male
## 105   18103.0967 12    white 67.10538  58 female
## 106   14603.8427 12    white 62.15164  44 female
## 107   30564.1411 18    white 66.86762  35 female
## 108   30811.0654 18    white 61.04220  43 female
## 109   12150.1980 12    white 64.12329  28 female
## 110   24484.5954 16    white 61.54482  38 female
## 111   13972.5494 12    white 62.55624  40 female
## 112   33654.1101 16    white 68.16377  24   male
## 113   20003.8811 15    white 63.65513  26 female
## 114   31203.2095 15    white 72.37352  21   male
## 115   24476.5794 16    white 64.14708  35 female
## 116   14887.2293 13    white 61.32670  31 female
## 117   26332.7938 12    white 74.36640  38   male
## 118   30493.0705 14    white 70.21016  35   male
## 119   37281.0332 16    white 71.10619  41   male
## 120   13802.0632 12    white 62.59484  39 female
## 121   20347.6343 14    white 64.05496  43 female
## 122   24847.0340 16    white 61.57362  40 female
## 123   29775.3602 17    white 70.48020  42 female
## 124   43809.9036 17    white 71.18591  62   male
## 125   30027.5806 14    white 71.43364  31   male
## 126   26590.1837 14    white 70.22885  71 female
## 127   29186.7466 14    white 67.28086  31   male
## 128   12789.5900 12    white 63.75869  32 female
## 129   13106.7845 12    white 67.08652  30 female
## 130    7892.4078  8    white 61.67960  69 female
## 131   15692.3100 13 hispanic 62.28600  56 female
## 132   26508.6772 13    black 68.29248  44   male
## 133   17594.2594 14    black 61.58948  44 female
## 134   32189.8893 18    black 68.41774  56 female
## 135   30273.3202 13    white 73.99126  45   male
## 136   14707.4816 12    other 67.56107  50 female
## 137   21792.3283 16    white 62.33793  22 female
## 138   20883.8615 15    white 66.24001  28 female
## 139   23102.3598 12    white 68.09847  27   male
## 140   12958.9270 14 hispanic 59.77087  28 female
## 141   14874.6673  8    white 68.06338  43   male
## 142   23649.2561 12    white 71.68015  26   male
## 143   15099.2638 12    white 66.35971  42 female
## 144   18509.3514 10    white 68.35626  32   male
## 145   11244.5410 12    white 68.45654  18 female
## 146   18800.0077 12    white 68.78610  60 female
## 147   26428.8368 16    white 64.10224  46 female
## 148   19848.7450 14    white 65.11349  39 female
## 149   14656.2392 12    white 60.64919  46 female
## 150   27840.4458 12    white 72.12570  49   male
## 151   24574.3806 16    white 65.51073  34 female
## 152   35202.5749 14    white 67.93190  64   male
## 153   23042.5474 12    white 70.44492  24   male
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## 154    30192.1593 14    white 71.36585    32    male
## 155    40850.9230 16    white 71.12507    61    male
## 156    37932.6547 16    white 68.16014    48    male
## 157    20619.3713 14    white 60.11333    49 female
## 158    13306.3025 12    white 62.78820    36 female
## 159    28268.9541 12    white 68.07772    56    male
## 160    13740.2597 12    white 64.05084    37 female
## 161    31810.0826 12    white 69.71580    74    male
## 162    37588.3050 16    white 68.22067    46    male
## 163    17734.9109 12    white 60.88386    63 female
## 164    46194.0171 18    white 68.40754    63    male
## 165    29046.9362 17    white 66.00198    43 female
## 166    34163.2827 16    white 69.79789    25    male
## 167    27792.9912 12    white 71.01071    50    male
## 168    14852.7915 12    white 65.14241    42 female
## 169    16267.8954 12    white 65.96711    49 female
## 170    28036.8476 13    white 69.99053    37    male
## 171    18292.5383 12    white 61.87668    65 female
## 172    23259.7471 14    white 66.10888    57 female
## 173    21616.9194 15    white 61.05431    38 female
## 174    32193.5272 14    white 71.56357    43    male
## 175    44185.8584 18    white 74.34062    45    male
## 176    16034.7741 12    white 66.57699    47 female
## 177    23625.9877 16    white 66.11044    28 female
## 178    14031.2808 12    white 61.96569    41 female
## 179    30269.0304 14    white 71.74551    32    male
## 180    23931.9140 15    white 64.56222    47 female
## 181    17417.9044 12    white 60.19882    62 female
## 182    21969.7698 15    white 61.91637    39 female
## 183    14396.9526 12    white 66.41355    38 female
## 184    14025.5302 12    white 63.69852    39 female
## 185    31059.1848 12    white 71.29091    68    male
## 186    16301.7626 12    white 65.25376    50 female
## 187    44807.0382 18    white 73.00546    50    male
## 188    24722.9399 11    white 68.64007    51    male
## 189    16669.3705 14    white 64.38145    22 female
## 190    20266.8747 12    white 61.06026    77 female
## 191    33401.1483 18    white 66.78936    51 female
## 192    15167.2962 13    white 61.82930    32 female
## 193    19583.8326 14    black 62.60956    54 female
## 194    15533.9087 10    other 67.36466    28    male
## 195    12225.3586 12    white 68.01697    24 female
## 196    38366.5124 16    white 72.06415    46    male
## 197    25470.7014 12    white 70.10862    38    male
## 198    43098.8196 18    white 69.85249    44    male
## 199    26967.8803 14    black 67.45525    32    male
## 200    10473.5447 12    black 63.45313    33 female
## 201    28386.3322 18    other 66.29297    35 female
## 202    30261.2088 17    white 65.83480    50 female
## 203    43511.4977 18    white 71.01003    45    male
## 204    34946.1494 16    white 66.61942    33    male
## 205    35217.1679 16    black 75.56859    38    male
## 206    29346.8480 14    white 68.95220    30    male
## 207    11328.5008 12    white 65.34873    22 female
```

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## 208   17113.0052 13    white 61.75212  43 female
## 209   12207.4384 12    white 61.76413  31 female
## 210   10555.4750 12    white 62.41147  21 female
## 211   30798.0036 16    white 61.90433  73 female
## 212   11801.2450 12    white 60.63861  30 female
## 213   17828.9120 14    white 64.82458  28 female
## 214   28592.3457 14    white 72.27075  22   male
## 215   34355.1778 14    white 71.67228  55   male
## 216   14040.1908 12    white 63.77093  39 female
## 217   33462.6362 14    white 70.78659  51   male
## 218   34776.6209 15    white 72.40979  41   male
## 219   23943.4083 12    white 66.08798  34   male
## 220   25174.7302 14    white 64.99933  69 female
## 221   20066.3422 15    black 64.52930  39 female
## 222   18087.1040 12    white 61.74268  64 female
## 223   16671.9125 14    black 65.84031  34 female
## 224   34916.5028 14    white 67.39964  63   male
## 225   17750.9584 13    white 64.02227  44 female
## 226   13751.5818 12    white 63.22614  38 female
## 227   24976.0035 16    white 67.49430  34 female
## 228   31507.0613 18    white 68.00212  39 female
## 229   14126.6688 10    other 63.85791  82 female
## 230   14502.4429 13    black 64.39506  39 female
## 231   19620.6667 12    black 66.43901  23   male
## 232   12993.4187 12    white 64.76538  32 female
## 233   22559.8703 12    white 64.53856  28   male
## 234   26304.7281 12    white 71.58593  41   male
## 235   14788.6748 12    white 68.34822  38 female
## 236   41530.0543 18    white 74.43320  30   male
## 237   23183.9446 12    white 63.21770  33   male
## 238   18072.8860 12    white 64.31432  61 female
## 239   24896.1214 12    white 68.15146  37   male
## 240   29621.3400 18    white 67.49495  29 female
## 241   12974.9809 12    white 67.31617  29 female
## 242   23022.2883 12    white 72.98672  21   male
## 243   21606.8465  8    white 70.49116  78   male
## 244   18639.7662 16 hispanic 64.88575  23 female
## 245   37194.0874 16 hispanic 68.54049  65   male
## 246   30555.0627 14    white 76.68067  28   male
## 247   13764.6871 12    white 67.69396  33 female
## 248   24843.0689 17    white 61.97134  24 female
## 249   12346.6060 12    white 64.21270  29 female
## 250   21752.8060 12 hispanic 67.22247  42   male
## 251   33649.4813 16    white 69.90214  22   male
## 252   15954.5038 12    white 61.77745  52 female
## 253   13543.9621 12    white 63.08135  37 female
## 254   17503.1117 14    white 62.33487  29 female
## 255   17092.5079 13    white 68.69584  35 female
## 256   15711.1467 12    white 64.09801  48 female
## 257   20820.8553 14    white 69.03400  40 female
## 258   18992.5571 15    white 58.66032  26 female
## 259   11762.6637 12    other 66.22625  35 female
## 260    8058.1599 12    black 62.09126  21 female
## 261   20575.0625 11    black 75.13845  34   male
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## 262   25471.5877 17    white 63.31428  26 female
## 263   15005.7870 13    white 64.55410  28 female
## 264   24338.4659 12    white 69.80036  32   male
## 265   26473.0834 16    white 67.84325  42 female
## 266   24808.1504 14    white 64.95007  67 female
## 267   16891.5440  8    white 69.21831  53   male
## 268   39578.5901 16    white 71.88612  53   male
## 269   29615.0789 17    white 63.52426  49 female
## 270   29256.9870 18 hispanic 62.67856  54 female
## 271   22611.3479 14    white 73.47394  45 female
## 272   23983.8837 12    white 75.09407  24   male
## 273   14064.7948 12    white 64.77306  38 female
## 274   26066.7117 17    white 66.25353  26 female
## 275   18146.5814 14    white 66.39351  28 female
## 276   25160.6785 16    white 64.00329  39 female
## 277   32976.7524 18    white 65.57394  50 female
## 278   23432.8955 16    white 64.27616  29 female
## 279   15332.7915 13    white 62.64666  32 female
## 280   23292.4408 12    white 72.55974  23   male
## 281   18302.2076  8    white 71.78231  58   male
## 282   30398.4050 14    white 71.50386  33   male
## 283   16971.3658 12    white 64.15775  55 female
## 284   15296.3033 13    white 64.22769  30 female
## 285   32951.3276 15    white 67.79798  36   male
## 286   18908.8997 12    white 62.27896  68 female
## 287   20976.3581 13    white 68.50410  57 female
## 288   12764.5772 12    white 60.11268  36 female
## 289   23556.6329 12    white 64.97933  91 female
## 290   26835.6871 12    white 75.96951  39   male
## 291   15059.5504 12    white 72.32790  35 female
## 292   31670.7588 18    white 61.76565  47 female
## 293   15837.4031 13    white 61.61640  36 female
## 294   29661.8707 12    white 70.55408  61   male
## 295   26988.2608 12    white 74.08120  42   male
## 296   24210.0166 16    white 65.47242  32 female
## 297   10470.1824 12    other 63.36531  31 female
## 298   14663.6266 12    white 66.85000  39 female
## 299   12511.5481 12    white 63.26609  31 female
## 300   10493.1490 12    white 64.74551  18 female
## 301   28004.6366 15    white 63.54206  71 female
## 302   13738.5688 12    white 64.92311  36 female
## 303   23936.7178 16    white 63.24201  33 female
## 304   13065.5178 12    white 69.52456  27 female
## 305   23612.8961 12    white 67.97809  30   male
## 306   31178.1500 14    white 66.54874  43   male
## 307   12244.4335 12    white 64.58870  28 female
## 308   31805.5324 14    white 68.76669  44   male
## 309   17953.9306 14    white 68.08389  25 female
## 310   28117.7459 17    white 65.81591  38 female
## 311   24654.2781 13 hispanic 71.40238  38   male
## 312   28738.1351 16 hispanic 63.76354  23   male
## 313   23666.2634 12    white 73.52538  24   male
## 314   16802.5365 13    white 61.97999  41 female
## 315   17897.7382 12    white 65.21052  59 female
```

```
## 316   30314.7483 12    white 69.37547  66   male
## 317   27187.2182 16    white 66.08656  48 female
## 318   26434.4194 11    white 66.52544  63   male
## 319   24486.2620 12    white 73.17216  29   male
## 320   30088.7539 12    white 76.18488  57   male
## 321   37664.9053 14    white 69.52563  76   male
## 322   16700.3760 15    black 62.87571  22 female
## 323   13819.4161 13    black 62.78291  37 female
## 324   22496.6895 12    black 70.07592  35   male
## 325   24772.4377 12    white 71.06308  33   male
## 326   18435.2526 12    white 65.22338  62 female
## 327   43196.3109 16    white 70.38000  75   male
## 328   17594.0362 13    white 63.24725  44 female
## 329   11039.3950 12    white 63.92087  22 female
## 330   30941.7474 18    white 64.32948  40 female
## 331   28896.9865 14    white 66.73039  30   male
## 332   35454.9541 16    white 66.49049  36   male
## 333   15529.0212 13    white 68.01891  27 female
## 334   11303.4913 12    white 65.22522  22 female
## 335   11331.3908 12    white 67.12425  20 female
## 336   37210.4002 17    white 72.93588  23   male
## 337   18993.9457 12    white 63.57961  67 female
## 338   31269.2374 12    white 71.44772  69   male
## 339   23588.4396 16    white 63.28314  31 female
## 340   38424.5506 16    white 70.58955  48   male
## 341   40423.4603 18    white 73.37096  25   male
## 342   24042.0538 14    white 64.68889  63 female
## 343   35236.9418 13    white 65.92309  82   male
## 344   21949.5488 12    white 65.84832  81 female
## 345   16240.2405 13    white 59.20287  41 female
## 346   35093.7214 16    white 69.99012  30   male
## 347   35076.3661 16    white 71.66564  28   male
## 348   20011.4459 12    white 64.20183  72 female
## 349   28252.5810 16    white 66.06455  54 female
## 350   45379.1831 18    white 69.66688  57   male
## 351   26143.1111 13    white 68.56316  28   male
## 352   14126.6899 12    white 67.72061  35 female
## 353   40957.7259 17    white 73.83110  43   male
## 354   43455.1062 16    white 72.53878  74   male
## 355   27386.6842 12    white 67.24277  52   male
## 356   10237.0591 12 hispanic 63.98628  39 female
## 357   41398.8390 18    white 66.74020  38   male
## 358   24332.9842 12    white 69.77329  32   male
## 359   20915.9951 15    white 63.75686  31 female
## 360   24309.2611 16    white 61.55948  37 female
## 361   47443.9648 18    white 69.29717  69   male
## 362   39517.2932 17    white 68.47821  41   male
## 363   31591.0278 14    white 72.11037  39   male
## 364   13549.0364 12    white 63.10641  37 female
## 365   14150.0657 12    white 68.71668  34 female
## 366   30163.1118 18    white 64.00637  36 female
## 367   13009.6015 12    white 71.00964  25 female
## 368   20556.3105 16    black 63.84402  27 female
## 369   18756.5541  8    white 66.10071  67   male
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## 370   19282.9171 15    white 60.97499  25 female
## 371   24672.2021 16    white 67.75510  32 female
## 372   38265.1413 17    white 68.45831  34   male
## 373   14497.2642 13    white 63.80380  26 female
## 374   26970.8926 14    black 65.70889  34   male
## 375   11685.7068 13    black 61.93158  26 female
## 376   21390.5907 16    black 65.32257  30 female
## 377   41063.5858 18    white 65.96504  37   male
## 378   23714.0389 13 hispanic 72.04236  32   male
## 379   23519.2693 13    white 62.57023  78 female
## 380   22861.5081 12    white 70.43141  23   male
## 381   11963.6455 12    white 62.32131  29 female
## 382   25235.5021 12    white 70.70824  36   male
## 383   43541.4908 18    white 70.27755  46   male
## 384   13431.6674 11    white 63.87068  51 female
## 385   13267.5736 12    white 63.47754  35 female
## 386   15454.8599 12    white 64.59348  46 female
## 387   23591.3297 12    white 70.51344  27   male
## 388   20856.2451 15    white 61.70052  33 female
## 389   30958.2055 12    white 72.55343  66   male
## 390   39158.6045 17    white 67.58731  40   male
## 391   33929.5669 15    white 76.15187  32   male
## 392   20111.7316 12    white 65.57775  71 female
## 393   22438.0422 15    white 64.22912  39 female
## 394   24760.9132 14    white 60.31368  72 female
## 395   31490.5104 12    white 68.13747  74   male
## 396   16583.6340 11    white 60.94487  72 female
## 397   22860.3058 12    white 66.02238  28   male
## 398   17971.1735 14    white 62.88533  31 female
## 399   20874.7259 15    white 62.67241  32 female
## 400   40741.0372 15    white 73.68754  73   male
## 401   24399.5328 12    white 70.10196  32   male
## 402   17726.2301 13    white 68.30324  39 female
## 403   33062.5542 18    white 69.52018  46 female
## 404   30463.0151 15    white 68.71778  21   male
## 405   26609.3650 10    white 70.49465  75   male
## 406   19732.3926 14    white 62.77760  41 female
## 407   12710.0245 12    white 65.12696  30 female
## 408   26741.9694 12    white 69.34231  46   male
## 409   32449.5362 14    white 67.54425  49   male
## 410   16687.9737 11    white 62.34081  71 female
## 411   11674.3244 12    white 66.17610  23 female
## 412   25334.7993 13    white 65.45162  27   male
## 413   30585.3615 14    white 69.78536  36   male
## 414   27146.7351 12    white 70.46079  47   male
## 415   15762.9729 14    black 65.75426  29 female
## 416   34076.9000 16    white 68.49064  26   male
## 417   35253.3821 16    white 68.13681  33   male
## 418   44146.6915 18    white 69.74409  50   male
## 419   18394.0823 13    white 64.55673  47 female
## 420   22649.2109 15    white 64.39143  40 female
## 421   23818.3093 16    white 65.29906  30 female
## 422   38380.7980 16    white 76.53780  41   male
## 423   29207.3103 14    white 70.02428  28   male
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## 424   22934.3737 16      white 64.45588   26 female
## 425   16271.6292 14      white 64.17829   20 female
## 426   17906.3761 12      white 64.37256   60 female
## 427    4553.3658  8      white 63.68146   48 female
## 428   22908.3689 16      white 62.56621   28 female
## 429   13369.8129 12      black 57.50322   56 female
## 430   25651.9685 16      white 62.02662   44 female
## 431   18363.9273 14 hispanic 64.45005   53 female
## 432   12051.6281 12      white 63.63646   28 female
## 433   13371.9936 12      white 62.23202   37 female
## 434   17120.3691 12      white 64.01304   56 female
## 435   16345.5695 13      white 65.88741   34 female
## 436   13082.6907 12      black 69.29444   41 female
## 437   15497.5505 13      white 64.34100   31 female
## 438   31662.7839 14      white 70.70352   41   male
## 439   19761.9842 12      white 62.08915   73 female
## 440   18225.8073  9      white 68.29980   46   male
## 441   20265.1386  9      white 67.80439   58   male
## 442    8991.1191 10      white 61.77627   44 female
## 443   16994.9240 12      white 62.51287   57 female
## 444   38583.2140 16      white 68.73132   51   male
## 445   15594.8965 12      white 67.04634   44 female
## 446   28973.8554 18      white 64.29710   29 female
## 447   22674.0488 12      white 70.38619   22   male
## 448   16491.0570 10      white 68.95557   20   male
## 449   22413.2261 11      black 69.24640   51   male
## 450   22485.0287 12      white 68.57202   23   male
## 451   12417.6732 12      black 59.84566   48 female
## 452   12679.2956 12      black 66.42150   42 female
## 453   37801.6257 16      white 66.63238   49   male
## 454   29784.9667 15      white 66.24960   20   male
## 455    9172.8812 12      black 70.23859   18 female
## 456    2819.2228  8      black 64.48861   51 female
## 457   27106.4276 18      other 59.97167   35 female
## 458   41350.9676 18      white 68.26500   36   male
## 459   21074.4603 12      black 72.73850   24   male
## 460   14395.5886  8      white 71.86160   36   male
## 461   13858.0399 12      white 63.75193   38 female
## 462   32849.3114 13      white 67.34015   67   male
## 463   17689.3048 13      white 67.24025   40 female
## 464   17146.8933  9      black 71.46243   50   male
## 465   35828.2159 16      white 72.73708   31   male
## 466   34262.0793 16      white 70.28583   25   male
## 467   36178.3833 16      white 70.06343   36   male
## 468   18927.6406 14      white 71.13169   27 female
## 469   12879.6650 12      white 65.96480   30 female
## 470   23389.9836 12      white 74.80273   21   male
## 471   18510.0861 14      white 60.26324   37 female
## 472   24163.7511 12      white 72.45994   28   male
## 473   18711.8231  9      black 74.78834   55   male
## 474   13593.7593 12      white 59.80482   41 female
## 475   24780.8166 12      black 73.43138   44   male
## 476   10526.9526 12      black 64.59752   32 female
## 477   34689.2159 16      white 67.11170   31   male
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## 478    18839.1795 12     white 61.05400  69 female
## 479    29711.0852 17     white 69.28213  43 female
## 480    18816.0021 14     white 64.41598  34 female
## 481    24626.3120 12     white 70.34138  33   male
## 482     6610.8866 10     white 67.63296  24 female
## 483    16216.0656 12     white 62.18865  53 female
## 484    22883.6066 15     white 63.78785  42 female
## 485    15881.5469 12     white 67.58146  45 female
## 486    15677.6565 11     white 63.51531  64 female
## 487    31341.7070 14     white 72.64024  37   male
## 488    36915.7598 16     white 72.82462  37   male
## 489    25413.9825 14 hispanic 69.40743  29   male
## 490    14157.7057 13     white 68.29110  19 female
## 491    16812.4475 11     black 70.64524  18   male
## 492    25948.8021 16     white 66.13450  41 female
## 493    28102.1464 12     white 66.37326  57   male
## 494    16281.3051 12 hispanic 68.30015  68 female
## 495    24617.1799 12     white 70.29628  33   male
## 496    20599.2759 12     white 61.82134  78 female
## 497    20691.8489 14     white 65.75500  43 female
## 498    21638.8034 16     black 63.02599  34 female
## 499    23867.2018 12     white 74.51779  24   male
## 500    12829.2731 12     white 66.59654  29 female
## 501     3009.0652  9     white 62.63598  25 female
## 502    33044.9612 18     black 64.71526  65 female
## 503    11994.0965 12     black 69.20172  35 female
## 504    35384.4631 14     white 71.47208  61   male
## 505    16514.5877 12     white 61.90178  55 female
## 506    11091.8256 12     black 64.74551  35 female
## 507    38023.5596 18 hispanic 71.71052  35   male
## 508    14448.9315 12     white 64.90903  40 female
## 509    10349.2422 12     white 63.15415  19 female
## 510    15423.8022 13     white 63.97677  31 female
## 511    23630.7982 12     white 71.58899  26   male
## 512    13113.3075 12     white 63.59626  34 female
## 513    17013.7510 13     white 70.06810  33 female
## 514    12144.2942 12     white 64.97475  27 female
## 515    12367.0567 12     white 64.31371  29 female
## 516    20107.4858 16 hispanic 64.20908  32 female
## 517    28054.7962 14     white 66.97400  25   male
## 518    17525.4740 10     white 73.18381  21   male
## 519    24621.5927 14 hispanic 72.53887  21   male
## 520    24780.2172 14     other 64.50500  21   male
## 521    25324.3555 16     white 63.93105  40 female
## 522    14689.8817 13     black 67.08204  37 female
## 523    34587.8845 16     white 66.61123  31   male
## 524    23384.6202 12     white 73.89562  22   male
## 525    15315.6473 13     white 63.44261  31 female
## 526    25838.9524 12     white 73.68861  36   male
## 527    11477.2523  6     black 73.91113  62   male
## 528    18976.6337 16     black 63.08713  19 female
## 529     5635.2845 11     black 62.03633  23 female
## 530    10028.8694 12     white 62.45248  18 female
## 531    23635.4705 16     white 67.03790  27 female
```

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## 532   28551.6510 12    white 68.59331 57   male
## 533   25276.9639 12    white 72.67425 34   male
## 534   13144.8235 12    white 62.87129 35 female
## 535   19027.8165 14    white 67.22335 32 female
## 536   21937.5714 12    white 69.39067 19   male
## 537   24130.1363 12    white 71.41330 29   male
## 538   34260.6348 14    white 72.08596 54   male
## 539   38695.9601 14    white 70.21479 81   male
## 540   22002.6379 14    white 64.30326 52 female
## 541   23581.7259 16    white 64.13060 30 female
## 542   30196.5575 12    white 67.91112 67   male
## 543   25258.8220 12    white 74.34589 32   male
## 544   12303.0319 11    white 61.81896 47 female
## 545   26814.9709 16    white 65.12869 47 female
## 546   -2008.7172  5    white 59.96125 62 female
## 547   42647.9218 18    white 69.38679 42   male
## 548   21549.3010 16    other 60.75150 34 female
## 549   27047.3255 17    white 64.93233 33 female
## 550   23644.8091 16    white 66.20340 28 female
## 551   34008.8586 16    white 69.91583 24   male
## 552   30211.8988 15    black 71.56571 30   male
## 553    4242.8588 11 hispanic 63.90538 21 female
## 554   25625.5705 14 hispanic 71.33306 28   male
## 555   24708.7495 12    white 73.39039 30   male
## 556   21214.9862 15    black 64.03798 46 female
## 557   30370.2464 14    white 67.84231 37   male
## 558    8495.8229 12    black 64.25282 21 female
## 559   33030.1826 16    black 65.64795 37   male
## 560   29063.4319 16    white 66.54677 58 female
## 561    8124.9845 12 hispanic 64.12242 27 female
## 562   16678.2959 14    black 64.11060 36 female
## 563   15865.5343 12    white 62.21866 51 female
## 564   25056.9992 12    white 68.94602 37   male
## 565   18212.1489 12    white 63.24088 63 female
## 566   35486.1117 15    white 72.39141 45   male
## 567   28337.3897 12    white 74.58005 49   male
## 568   42320.1496 18    white 69.52920 40   male
## 569   27631.9562 12    white 69.33476 51   male
## 570   22658.0177 14    white 64.01763 56 female
## 571   23701.1839 12    white 71.93661 26   male
## 572   39632.0570 18    white 69.46231 25   male
## 573   15317.2150 10    white 63.07907 78 female
## 574   37995.8977 16    white 71.11434 45   male
## 575    5992.6316  8    white 59.34178 61 female
## 576   24666.4100 13    white 68.31486 20   male
## 577   41431.4291 17    white 77.05128 42   male
## 578   25867.2656 14    white 68.41968 69 female
## 579   39559.9783 18    black 69.67201 38   male
## 580   42804.9915 18    white 69.28192 43   male
## 581   12761.4293 12    white 62.73899 33 female
## 582   39300.7266 18    black 72.79469 33   male
## 583   31264.7016 15    other 66.12674 40   male
## 584   41581.1624 17    black 72.19215 62   male
## 585   22218.4736 12    black 72.22432 31   male
```

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## 586   15075.0462 13      black 68.98432   37 female
## 587   14729.7447 12      white 67.17655   39 female
## 588   22551.6751 15      white 65.67095   38 female
## 589   12446.1609 12      white 67.34625   26 female
## 590   31412.0315 18      white 67.53278   39 female
## 591   20611.0094 15      black 64.57749   42 female
## 592   23936.9644 17      black 61.58435   33 female
## 593   37561.2803 17      white 69.38512   29   male
## 594   36978.0554 16      white 69.60982   41   male
## 595   26292.7186 16      white 66.07183   43 female
## 596   21935.1390 12      white 65.85618   23   male
## 597   19751.6241 14      white 66.39505   37 female
## 598   26535.3159 12      white 71.84415   42   male
## 599   24690.8592 12      white 68.89893   35   male
## 600   23876.1458 12      white 65.75578   34   male
## 601   29090.9234 14      white 69.44946   28   male
## 602   11601.2226 12 hispanic 60.15630   51 female
## 603   28756.7391 17      white 64.56873   43 female
## 604   13776.4890 12      white 61.58792   40 female
## 605   13105.4221 12      white 67.07979   30 female
## 606   28103.0129 14      white 67.21214   25   male
## 607    8227.4802  9      black 67.83994   62 female
## 608   23768.2854 16      black 65.61768   43 female
## 609   35483.7745 16      black 74.24347   41   male
## 610   34918.6892 18      white 65.47813   61 female
## 611   23028.3538 14      black 62.88988   73 female
## 612   36589.4398 17      white 68.10779   25   male
## 613   22436.0990 16      white 66.39806   21 female
## 614   23145.1293 16      white 65.49678   26 female
## 615   15738.6145 14      white 61.54580   20 female
## 616   42412.9035 18      white 72.62916   37   male
## 617   22142.8505 15      white 61.89058   40 female
## 618   26124.2232 12      white 69.81381   42   male
## 619   13882.8767 12      black 58.27594   58 female
## 620   21909.5117 12      white 68.37147   20   male
## 621   17448.8725 14      white 67.35070   23 female
## 622   20294.2879 12      white 63.83751   74 female
## 623   30523.7178 14      white 70.36153   35   male
## 624   36483.2725 14      white 72.49588   66   male
## 625   27764.7635 17      white 63.19196   39 female
## 626   23979.1054 12      white 66.26428   34   male
## 627   14622.0070 12      white 64.88321   41 female
## 628   21046.4251 12      white 60.58631   24   male
## 629    6029.3004 12 hispanic 60.81704   19 female
## 630   13308.3751 12      white 67.20153   31 female
## 631   25722.8558 12      white 73.11522   36   male
## 632   17263.0368 14      black 70.52104   32 female
## 633   17931.7054 12      white 64.49766   60 female
## 634   15335.9451 12      white 66.64803   43 female
## 635   12354.1644 11      white 62.07149   47 female
## 636   15845.6803 12      white 67.40431   45 female
## 637   24114.8411 12      white 68.69590   32   male
## 638   14033.6501 12      black 66.06555   50 female
## 639   23076.0937 15      black 66.18482   54 female
```

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## 640   30537.6398 15    white 66.44449  24   male
## 641   16982.2432 13    white 65.50939  38 female
## 642   19805.3814 12    white 64.06472  71 female
## 643   26485.5643 14    black 72.11810  24   male
## 644   13936.4144 12    white 64.13901  38 female
## 645   24420.6955 16    white 64.75170  34 female
## 646   21878.3301 11    white 72.20326  31   male
## 647   27979.6762 14    white 71.00609  20   male
## 648   24477.7154 17 hispanic 64.19495  41 female
## 649   25363.0775 17    white 63.65898  25 female
## 650   12526.4430 12    white 66.86213  27 female
## 651   41681.6067 18    white 75.18170  30   male
## 652   22141.9392 17 hispanic 65.86811  26 female
## 653   15614.3959 12    white 67.14265  44 female
## 654   35213.6535 16    white 70.58245  30   male
## 655   13541.7737 12    white 68.35426  31 female
## 656   15524.9714  6    white 70.44056  75   male
## 657   33674.8662 16    white 66.50504  26   male
## 658   11625.2021  8    white 70.50765  22   male
## 659   15599.9557 12    white 62.66823  49 female
## 660   11055.6492 12    black 61.04436  39 female
## 661    9867.9012 12    black 64.86502  28 female
## 662   26317.4657 12    white 67.24574  46   male
## 663   29425.7248 14    white 64.93867  35   male
## 664   43682.3600 18    white 65.68957  52   male
## 665   25099.1609 12    white 66.51239  40   male
## 666   26837.5026 12    white 74.21724  41   male
## 667   38005.3195 16    white 73.80273  42   male
## 668   14286.0193 13    white 66.28297  22 female
## 669   23662.1292 16    white 68.93080  25 female
## 670   32012.8469 18    white 66.09704  44 female
## 671   40615.1864 16    white 74.36389  56   male
## 672   23969.1583 12    white 72.37949  27   male
## 673   28840.3432 12    white 65.61603  62   male
## 674   39378.5663 17    other 66.52629  54   male
## 675   10490.7084 12    white 64.73345  18 female
## 676   30954.4084 12    white 66.37034  73   male
## 677   12766.0103 12    white 64.52285  31 female
## 678   18163.9569 13    white 67.82326  42 female
## 679   22337.8004 16    white 64.15133  23 female
## 680   29510.7878 16    white 64.35311  63 female
## 681   10564.6834 12    white 63.33757  20 female
## 682   13132.8052 12    white 68.97627  28 female
## 683   13534.9792 12    white 67.44008  32 female
## 684   26994.3161 15    white 62.95530  66 female
## 685   29982.9319 12    white 66.85605  67   male
## 686   14048.3511 13    white 59.82544  28 female
## 687   14272.3951 11    white 61.85860  58 female
## 688   37551.3699 16    white 72.44135  41   male
## 689   36012.9855 16    white 66.60469  39   male
## 690   24188.8151 15    black 66.39671  60 female
## 691   13207.7092 12    black 66.38942  45 female
## 692    6574.1450  8    white 59.57195  64 female
## 693   34151.3113 16    white 65.33567  30   male
```

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## 694  22681.8966 12      white 68.58468  82 female
## 695  24002.0163 12      white 71.66115  28   male
## 696   6388.2051  8      white 63.93733  58 female
## 697   7451.3825  8 hispanic 64.48913  27   male
## 698  13957.4701 12      white 64.24300  38 female
## 699  21428.6765 12      white 66.79827  77 female
## 700  26336.2777 13      white 65.99471  32   male
## 701  23574.8500 12      white 73.07390  24   male
## 702  14343.1828  7      white 73.82733  49   male
## 703  16761.2824 14      white 64.83539  22 female
## 704  21024.2213 12      white 63.11851  21   male
## 705  14149.8751 12      white 63.43203  40 female
## 706  25422.1372 12      white 66.34629  42   male
## 707  28106.9340 12      white 69.91938  53   male
## 708   9548.3577 12 hispanic 65.86858  33 female
## 709  10764.3226 12      white 63.44294  21 female
## 710  35522.0146 12      white 73.07807  91   male
## 711  22643.0461 16      white 63.01705  26 female
## 712  11423.7632 11      white 68.92440  34 female
## 713  24659.8123 12      white 73.14869  30   male
## 714  16102.8752 12      white 67.79395  46 female
## 715  15259.0206 12      white 63.62625  46 female
## 716  30943.6203 18      white 62.57749  42 female
## 717  34646.0032 16      black 70.10582  41   male
## 718  22633.9553 15      white 64.31609  40 female
## 719  14621.0989 12      white 65.75935  40 female
## 720  19156.0062 12      white 60.85753  71 female
## 721  23547.3112 12      white 72.05727  25   male
## 722  23920.4236 13      white 64.55149  78 female
## 723  17355.4391 14      white 64.24739  26 female
## 724  30041.0319 12      white 68.02362  66   male
## 725  35780.6018 13      white 73.89188  76   male
## 726  26644.0094 13      white 66.63394  33   male
## 727  25318.2994  9      white 69.86527  84   male
## 728  12366.1550 10      white 66.11651  58 female
## 729  28217.5464 12      white 71.34630  52   male
## 730  26519.0245 12      white 70.88307  43   male
## 731  12860.2055  7      black 71.47186  57   male
## 732  22139.1614  9      white 74.41812  61   male
## 733  35868.0967 16      white 74.69529  29   male
## 734  24768.8163 12      white 71.92581  32   male
## 735  20084.2164 16 hispanic 65.85539  30 female
## 736  10334.9207 12      black 64.52972  31 female
## 737  15473.4491 10      white 66.49255  75 female
## 738  25615.9467 12      white 71.70659  37   male
## 739   7487.6981 12 hispanic 60.09432  28 female
## 740  22029.5514 15      white 63.97287  37 female
## 741  20943.5762 13      white 64.81971  61 female
## 742  12982.6709 12      white 64.71230  32 female
## 743  10709.0642 12      black 61.97447  36 female
## 744  31323.2034 13      black 68.29414  71   male
## 745  30685.3790 14      black 73.48687  46   male
## 746  20849.4467 12      white 63.93752  77 female
## 747  26284.5863 17      white 68.21020  25 female
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## 748   16830.0439 12    white 66.10164  52 female
## 749   28856.5080 17    white 71.22581  36 female
## 750   29392.8451 14    white 72.70185  26   male
## 751   22490.5085 14    white 61.42908  58 female
## 752    6698.8758  9    white 63.24714  45 female
## 753    3359.7764  9    white 64.36810  25 female
## 754    2193.1969  6    white 67.04141  62 female
## 755   11418.7307 12    white 63.15251  25 female
## 756   27779.9235 12    white 72.70741  48   male
## 757   28789.7827 16    white 66.07587  57 female
## 758   12220.7658 12    white 69.75553  22 female
## 759   11452.0119  8    white 67.89105  24   male
## 760   13596.2172 12    white 66.86191  33 female
## 761   35035.3742 16    white 74.10505  25   male
## 762   22939.8764 16    white 63.60244  27 female
## 763   15101.6471 12    white 60.20715  49 female
## 764    6110.1616  9    white 59.45893  46 female
## 765   34678.6152 16    other 74.59877  34   male
## 766    8222.7431  8    white 65.95294  66 female
## 767   23733.2783 12    white 64.16955  35   male
## 768   23386.7131 12    white 71.26410  25   male
## 769   12304.8142 12    white 63.12568  30 female
## 770   12409.7245 12    white 67.16629  26 female
## 771   23462.8363 11    white 68.58090  44   male
## 772   25067.9084 11    white 70.34383  51   male
## 773   12787.2398 12    white 66.38894  29 female
## 774   30998.5292 14    white 73.58718  34   male
## 775   18356.5813 14    white 64.78882  31 female
## 776   25244.2632 16    white 63.53549  40 female
## 777   33988.5965 15    white 67.63722  42   male
## 778   25900.1813 13    white 65.60212  30   male
## 779   23493.7191 12    black 68.83580  42   male
## 780   17992.5790 13    white 59.93190  50 female
## 781   19856.8833 12    white 60.79660  75 female
## 782   27894.4214 12    white 75.03414  46   male
## 783   13275.6963 13    white 63.93496  19 female
## 784   19361.5648 15 hispanic 62.74962  45 female
## 785   31161.6332 16    white 67.22273  69 female
## 786   34772.2452 17    black 64.10166  33   male
## 787   17254.5059 14    black 63.43396  40 female
## 788   16679.1216 14    white 67.07147  19 female
## 789   34974.3231 16    white 65.87795  34   male
## 790   17196.2264 14    white 65.22229  24 female
## 791   13727.2214 13    white 62.64251  23 female
## 792   22969.4197 14    white 66.43623  55 female
## 793   32143.0015 18    white 64.09800  47 female
## 794   33988.5826 14    white 70.74232  54   male
## 795   42133.5187 18    white 71.24931  37   male
## 796   26151.4676 12    white 71.70961  40   male
## 797   25164.4014 14    white 59.66460  75 female
## 798   23800.7803 12    white 69.78665  29   male
## 799   40456.4566 17    white 73.99725  40   male
## 800   45665.6349 18    white 67.55916  61   male
## 801   26327.2444 12    white 74.33899  38   male
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## 802   23609.6902 12    white 75.00721  22   male
## 803   28820.8435 12    white 68.16158  59   male
## 804   31658.6667 18    white 62.58655  46 female
## 805   24613.3809 12    white 72.03875  31   male
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## 809   14261.0664 13    white 60.87601  28 female
## 810   27507.2384 12    white 73.12189  46   male
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## 812   18332.5466 12    white 62.07427  65 female
## 813   21489.5139 12    white 64.53591  22   male
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## 815   23819.3977 12    white 68.11736  31   male
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## 817   26768.4195 16    white 68.42126  43 female
## 818   31342.5326 18    white 62.78644  44 female
## 819   14013.8094 12    white 62.76001  40 female
## 820   28574.8042 12    white 67.82704  58   male
## 821   16258.1418 12    white 64.15770  51 female
## 822   24791.5060 16    white 70.10556  30 female
## 823   18718.8705 10    white 70.27167  31   male
## 824   24108.8895 12    white 72.18899  28   male
## 825   24597.5413 11    white 68.90136  50   male
## 826   19078.9085 14    white 63.07259  37 female
## 827    1689.6672  5    white 57.97290  85 female
## 828   17305.4515 14    white 63.11989  27 female
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## 830   33561.8074 15    white 72.57431  34   male
## 831   18044.8665 14    white 69.41363  24 female
## 832   27731.2253 12    white 69.82504  51   male
## 833   17928.0789 13    white 64.89705  44 female
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## 842   17830.0863 12    white 64.87640  59 female
## 843   31959.4718 18    other 62.80542  59 female
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## 849   19392.0784 12    white 66.42656  66 female
## 850   20028.0733 13    white 62.94001  58 female
## 851   19246.8025 15    white 65.19972  20 female
## 852   36576.0121 16    white 73.78851  34   male
## 853   20353.3958 13    white 67.18860  55 female
## 854   30072.6751 17    white 67.54551  47 female
## 855   16480.5731 12    white 65.25626  51 female
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## 856   24208.1945 16    white 63.70218  34 female
## 857   23618.4802 16    white 67.83460  26 female
## 858   20969.1181 12    white 65.48821  18   male
## 859   41252.4807 17    white 71.76438  47   male
## 860   26424.4671 12    black 65.69804  62   male
## 861   13483.0300 12    white 63.66103  36 female
## 862   30951.5842 16    other 59.63484  88 female
## 863   22823.7357 12    black 71.69116  35   male
## 864   14701.6104 12    white 63.51513  43 female
## 865   25862.9519 14    black 67.28185  26   male
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## 869   24392.5871 16    white 64.61287  34 female
## 870   33911.7176 14    white 70.36270  54   male
## 871   26189.4203 12    white 70.13582  42   male
## 872   27142.9136 12    white 66.03882  52   male
## 873   28672.4983 12    white 65.66768  61   male
## 874   40664.7574 18    white 73.68208  26   male
## 875   15333.7916 12    white 62.23430  48 female
## 876   28248.3777 17    white 65.58047  39 female
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## 878   32866.9382 18    black 64.71665  64 female
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## 880   35106.4978 16    white 70.93384  29   male
## 881   26056.2648 16    white 65.78463  42 female
## 882     797.1448  6    other 61.52156  72 female
## 883   16934.1209 10    white 63.13920  87 female
## 884   41720.9735 18    white 66.56994  40   male
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## 887   23438.4192 12    white 72.40009  24   male
## 888   18027.1821 14    white 69.32629  24 female
## 889   23406.9552 16    white 64.14805  29 female
## 890    9567.8687 12    black 62.50258  29 female
## 891   14629.4337 12    white 59.63618  47 female
## 892   30398.6287 15    black 69.84609  33   male
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## 895   14677.2414 12    white 64.27539  42 female
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## 897   23832.8362 16    white 67.13204  28 female
## 898   18933.1767 11    white 69.10554  18   male
## 899   14294.8581  9    white 70.90079  21   male
## 900     270.9036  8    black 65.99266  35 female
## 901   14535.7266 14    black 63.21551  25 female
## 902   27331.4142 12    white 71.37289  47   male
## 903   28375.1677 14    white 72.07876  21   male
## 904   27349.4039 12    white 67.93927  51   male
## 905   42537.6022 17    white 71.94711  54   male
## 906   15136.3841 12    white 65.66242  43 female
## 907   34728.4305 14    white 66.47077  63   male
## 908   24022.6473 16    white 65.42764  31 female
## 909   26866.8924 14    black 71.35958  27   male
```

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## 910   22800.6392 10     white 73.69928  50    male
## 911   18790.7852  9     white 70.20955  47    male
## 912   20761.1236 14     white 64.33590  45 female
## 913   32613.7228 14     white 69.23577  48    male
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## 917   17735.0206 12     white 62.64564  61 female
## 918   44966.6562 18     white 71.15194  53    male
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## 923   19155.5063 14     white 69.61523  30 female
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## 928   37003.4885 16     white 69.73543  41    male
## 929   16728.4071 14     white 63.79241  23 female
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## 935    9013.1761 12     black 61.52425  27 female
## 936   22540.7794 12     black 68.53243  37    male
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## 940   23367.6855 11     black 60.75108  66    male
## 941   31794.3964 14     black 63.99366  63    male
## 942   15977.9586 10     white 64.58116  80 female
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## 944   19864.3277 11     white 69.30129  23    male
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## 951   36486.6619 14     white 69.87076  69    male
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## 953   11195.1150 12     white 68.21243  18 female
## 954   10121.9232 12     white 62.91207  18 female
## 955   25237.9352 12     white 70.72026  36    male
## 956   12607.8691 12     white 63.74181  31 female
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## 958   -3245.0904  4     white 65.76632  64 female
## 959   22696.3764 14     white 58.92336  62 female
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## 961   21113.5945 12     white 66.20177  18    male
## 962   16077.8607 13     white 65.44585  33 female
## 963   18454.6826 14     white 64.39271  32 female
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## 964   11592.9463 12    white 65.77418  23 female
## 965   32393.1131 17 hispanic 65.50058  26   male
## 966   31844.1935 15    white 72.89740  24   male
## 967   34878.0395 16    white 72.44737  26   male
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## 969   22261.6774 16    white 64.65599  22 female
## 970   22541.4805 12    white 70.61207  21   male
## 971   18749.9744 13    white 68.07568  45 female
## 972   36799.7983 16    white 70.49066  39   male
## 973   28770.0419 16    white 64.21713  59 female
## 974    9358.5761 11    white 58.72468  34 female
## 975   42525.7702 18    white 67.90288  43   male
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## 977   18544.9585 13    white 68.82437  43 female
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## 986   11328.8024 12 hispanic 63.21394  46 female
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## 1002  25717.3078 16 hispanic 65.49676  62 female
## 1003  29497.4823 13 hispanic 72.42630  64   male
## 1004   8456.4766  9 hispanic 65.38834  74 female
## 1005  23152.2687 14    white 63.81682  59 female
## 1006  27225.5973 12    white 68.20842  50   male
## 1007  15668.8304 12    white 68.29211  43 female
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## 1017  19746.2970 14    white 63.72689  40 female
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## 1018   16503.4425 12     white 68.01107  48 female
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## 1070   38513.4774 15     white 69.73083  65   male
## 1071   13007.7474 12     black 63.64059  47 female
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## 1072  33406.6897 16    white 68.70302  22   male
## 1073  10014.0941 13 hispanic 64.18301  22 female
## 1074  23655.1984 16    white 67.13533  27 female
## 1075  34889.8971 14    white 71.67133  58   male
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## 1079  26272.0901 16    white 64.20871  45 female
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## 1082  26486.6547 15 hispanic 66.31635  23   male
## 1083  37801.1791 17    white 69.68933  30   male
## 1084  18368.3362 12    white 62.25103  65 female
## 1085  31219.0452 12    white 65.91611  75   male
## 1086   7534.5608 12 hispanic 66.49011  21 female
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## 1092  18060.8363 13    white 66.43334  43 female
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## 1095  33267.3286 16    black 67.69980  36   male
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## 1097  21782.0221 13    black 64.32170  22   male
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## 1101  21021.3531 10    other 66.28669  60   male
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## 1103  27114.8368 14    other 61.94551  37   male
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## 1106  47433.2766 18    white 69.24438  69   male
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## 1117  25921.2056 17    white 63.77365  28 female
## 1118  20122.6088 14    white 64.70483  41 female
## 1119  23294.6047 13    other 69.95972  22   male
## 1120  18777.1153 14    white 71.26888  26 female
## 1121  12679.9719 13    white 61.87336  18 female
## 1122  37859.2899 17    white 70.85695  29   male
## 1123  22754.5746 12    white 74.30637  18   male
## 1124  14756.7604 13    white 64.20481  27 female
## 1125  21415.7003 15    white 69.74732  27 female
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## 1126   16498.6466 13    white 64.00159  37 female
## 1127   28132.7685 14 hispanic 69.62591  44   male
## 1128   25299.3074 12    white 73.66522  33   male
## 1129   14616.9468 12 hispanic 62.72194  65 female
## 1130   29208.0060 14    white 73.55019  24   male
## 1131   16480.1504 14    white 66.08877  19 female
## 1132   27665.6816 15    white 65.39048  67 female
## 1133   22247.0002 12    white 70.91890  19   male
## 1134   34252.6915 14    white 68.52425  58   male
## 1135   33929.1756 15    white 60.29879  50   male
## 1136   14801.9864 12    white 64.01087  43 female
## 1137   17174.3177 13    white 63.81617  41 female
## 1138   39046.4516 16    white 71.89981  50   male
## 1139   23735.2001 14    white 61.41213  65 female
## 1140   22152.5998 12    white 68.69143  21   male
## 1141   18639.0026 12    white 67.11030  61 female
## 1142    5446.9590 11 hispanic 64.56858  27 female
## 1143   30540.4243 16 hispanic 68.26174  28   male
## 1144   41077.8797 17    white 74.42452  43   male
## 1145   15041.4045 12    white 65.19333  43 female
## 1146   24155.7209 13 hispanic 70.70130  36   male
## 1147   18820.8240 14    white 64.43980  34 female
## 1148   28556.1229 17    white 68.86163  37 female
## 1149   23268.4327 17 hispanic 64.38678  34 female
## 1150   21545.9715 13 hispanic 71.90196  20   male
## 1151   20315.6146 15    white 62.55289  29 female
## 1152   12482.9456 12    white 64.88607  29 female
## 1153   24714.2293 12    white 71.65621  32   male
## 1154   21461.2148 14    white 65.15171  48 female
## 1155   13073.5363 12    white 64.28045  33 female
## 1156   27767.2153 12    white 70.88341  50   male
## 1157   12029.6379 12    white 61.76662  30 female
## 1158   24549.8172 16    white 66.27003  33 female
## 1159    8564.3131 10    white 64.07142  39 female
## 1160   26397.4121 10    white 66.80599  78   male
## 1161   21221.0799 11    white 68.07656  32   male
## 1162   11766.7366 12    white 65.75189  24 female
## 1163   20744.4800 14    white 66.01494  43 female
## 1164   29083.5410 16    white 65.76547  59 female
## 1165   31744.0301 12    white 66.74771  77   male
## 1166   24489.0307 12    white 66.14089  37   male
## 1167    7779.4733  9    white 63.30037  51 female
## 1168   18300.9593 13    white 67.61928  43 female
## 1169   23574.4094 12    white 70.42987  27   male
## 1170   22563.6220 16    white 62.62478  26 female
## 1171   25519.3751 14    black 69.98806  21   male
## 1172   27065.1986 12    white 71.81932  45   male
## 1173   40613.3081 17    white 74.77192  40   male
## 1174   19211.3766 14    white 61.96560  39 female
## 1175   28780.8774 17    white 68.21042  39 female
## 1176   18660.1502 14    white 68.04935  29 female
## 1177   42599.3329 17    white 70.49075  56   male
## 1178   23438.4463 13    black 73.38321  21   male
## 1179   25946.4583 17    white 62.13713  30 female
```

```
## 1180   17396.1190 12    black 59.77629  76 female
## 1181   22774.2754 16    other 64.15965  37 female
## 1182   -2147.8235  6 hispanic 60.19710  67 female
## 1183   27358.7166 15 hispanic 73.26521  20   male
## 1184   30708.1363 18    other 66.31204  48 female
## 1185   47739.5697 18    white 68.99589  71   male
## 1186   44802.9412 18    white 70.34337  53   male
## 1187   25851.3464 16    white 70.05628  36 female
## 1188   24282.4848 12    white 72.16573  29   male
## 1189   37783.8453 18    white 61.13580  82 female
## 1190   12948.7538 12    white 63.66416  33 female
## 1191   27978.2810 12    white 71.92584  50   male
## 1192   23157.0308 12    white 68.36849  27   male
```

```r
## Compute deviation (i.e. residuals)
mean_earn <- mean(heights_df$earn)
## Corrected Sum of Squares Total

sst <- sum((mean_earn - heights_df$earn)^2)
## Corrected Sum of Squares for Model


ssm <- sum((mean_earn - predicted_df$earn)^2)

## Residuals

residuals <- heights_df$earn - predicted_df$earn
## Sum of Squares for Error

sse <- sum(residuals^2)

## R Squared
r_squared <- ssm/sst

## Number of observations
n <- 1192
## Number of regression paramaters
dim(model.matrix(earn_lm))
```

```
## [1] 1192    8
```

```r
p <- 8
## Corrected Degrees of Freedom for Model
dfm <- p - 1
## Degrees of Freedom for Error
dfe <- n - p
## Corrected Degrees of Freedom Total:   DFT = n - 1
dft <- n -1

## Mean of Squares for Model:   MSM = SSM / DFM
msm <- ssm/dfm
## Mean of Squares for Error:   MSE = SSE / DFE
mse <- sse/dfe
```

```r
## Mean of Squares Total:    MST = SST / DFT
mst <- sst/dft
## F Statistic
f_score <- msm/mse

## Adjusted R Squared R2 = 1 - (1 - R2)(n - 1) / (n - p)

summary(earn_lm)$adj.r.squared  # since I had issues applying this function(2 = 1 - (1 - R2)(n - 1) / (
```

```
## [1] 0.2152832
```

```r
summary(earn_lm)$adj.r.squared
```

```
## [1] 0.2152832
```