LAB4

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Lab 4

In this lab we will look at daily tide data downloaded from NOAA's Tides and Currents API (Application Programming Interface) for six cities around the US. I used the API to obtain six csv files containing data for tide gauges in each city. These are in the "Data" folder. The tide gauges have numerical codes that correspond to the city as follows:

1. Boston: 8443970
2. New York: 8518750
3. Baltimore: 8574680
4. Charleston: 8665530
5. Miami: 8723214
6. Corpus Christi: 8775296

Part 1 - Monday Jan 27th

1. Create a data frame containing data on the city name and tide gauge ID given above. Your data frame should have 2 columns, one for the city name and one for the gauge ID. It will have 6 rows, one for each city.

```
#vector for citnames
city_names <- c("Boston", "New York", "Baltimore", "Charleston", "Miami", "Corpus Christi")

#vector for tide gauge IDs
gauge_ids <- c(8443970, 8518750, 8574680, 8665530, 8723214, 8775296)

#dataframe
tide_data <- data.frame(City = city_names, Gauge_ID = gauge_ids)
tide_data
```

```
##             City Gauge_ID
## 1         Boston  8443970
## 2       New York  8518750
## 3      Baltimore  8574680
## 4     Charleston  8665530
## 5          Miami  8723214
## 6 Corpus Christi  8775296
```

2 Create a data frame that combines the data from the 6 tide gauges into a single data frame.

To do this:

2.1 Create a vector with the file names of the 6 csv files in the "Data" folder. Use the function list.files(). HINT: if you set full.names=TRUE when you call list.files it will give you the full path name for each file

```
#listss all CSV files in the "Data" folder with full file paths
file_names <- list.files(path = "Data", pattern = "*.csv", full.names = TRUE)
print(file_names)
```

```
## [1] "Data/8443970.csv" "Data/8518750.csv" "Data/8574680.csv" "Data/8665530.csv"
## [5] "Data/8723214.csv" "Data/8775296.csv"
```

2.2 Read in the first of the tide data files (using read.csv() and the first element of the vector of file names you created in a). Store it as an object in your environment, for instance "tidedata"

```
#reasing in the first CSV file
tidedata <- read.csv(file_names[1])
head(tidedata)
```

```
##   Year Month Highest  MHHW    MHW    MSL    MTL    MLW   MLLW    DTL    GT
## 1 2011     1   0.844 0.161 -0.003 -1.450 -1.485 -2.967 -3.070 -1.454 3.231
## 2 2011     2   0.686 0.087 -0.054 -1.483 -1.517 -2.981 -3.049 -1.481 3.136
## 3 2011     3   0.695 0.035 -0.083 -1.501 -1.539 -2.996 -3.062 -1.513 3.096
## 4 2011     4   0.658 0.079 -0.034 -1.456 -1.496 -2.958 -3.042 -1.481 3.121
## 5 2011     5   0.719 0.162  0.030 -1.372 -1.409 -2.849 -2.962 -1.400 3.124
## 6 2011     6   0.659 0.191  0.045 -1.357 -1.395 -2.836 -2.936 -1.372 3.127
##      MN   DHQ   DLQ  HWI  LWI Lowest Inferred
## 1 2.964 0.164 0.103 3.63 9.85 -3.671        0
## 2 2.927 0.141 0.068 3.59 9.78 -3.703        0
## 3 2.913 0.117 0.066 3.63 9.85 -3.749        0
## 4 2.924 0.113 0.084 3.66 9.85 -3.761        0
## 5 2.879 0.132 0.113 3.68 9.89 -3.549        0
## 6 2.881 0.146 0.100 3.72 9.90 -3.322        0
```

2.3 If you look at the new data frame, notice it does not have the city name or the gauge ID. We have to add this. Create 2 new columns in your new data frame with the name and gauge ID of the relevant city. Reference the data frame you created in 1 to do this.

```
city_data <- data.frame(
  City = c("Boston", "New York", "Baltimore", "Charleston", "Miami", "Corpus Christi"),
  Gauge_ID = c(8443970, 8518750, 8574680, 8665530, 8723214, 8775296)
)

#adds columns for city name and gauge ID
tidedata$City <- city_data$City[1]   # Adding "Boston"
tidedata$Gauge_ID <- city_data$Gauge_ID[1]  # Adding Boston's gauge ID
head(tidedata)
```

```
##   Year Month Highest  MHHW    MHW    MSL    MTL    MLW   MLLW    DTL    GT
## 1 2011     1   0.844 0.161 -0.003 -1.450 -1.485 -2.967 -3.070 -1.454 3.231
## 2 2011     2   0.686 0.087 -0.054 -1.483 -1.517 -2.981 -3.049 -1.481 3.136
## 3 2011     3   0.695 0.035 -0.083 -1.501 -1.539 -2.996 -3.062 -1.513 3.096
```

```
## 4 2011     4   0.658 0.079 -0.034 -1.456 -1.496 -2.958 -3.042 -1.481 3.121
## 5 2011     5   0.719 0.162  0.030 -1.372 -1.409 -2.849 -2.962 -1.400 3.124
## 6 2011     6   0.659 0.191  0.045 -1.357 -1.395 -2.836 -2.936 -1.372 3.127
##      MN   DHQ   DLQ  HWI  LWI Lowest Inferred   City Gauge_ID
## 1 2.964 0.164 0.103 3.63 9.85 -3.671        0 Boston  8443970
## 2 2.927 0.141 0.068 3.59 9.78 -3.703        0 Boston  8443970
## 3 2.913 0.117 0.066 3.63 9.85 -3.749        0 Boston  8443970
## 4 2.924 0.113 0.084 3.66 9.85 -3.761        0 Boston  8443970
## 5 2.879 0.132 0.113 3.68 9.89 -3.549        0 Boston  8443970
## 6 2.881 0.146 0.100 3.72 9.90 -3.322        0 Boston  8443970
```

2.4 Now we will add the other 5 cities to our data frame. Write a for loop that loops through the 2nd, 3rd, 4th, 5th and 6th cities. For each city, read in that city's data file (using the vector from 2.1), add the 2 columns for city and gauge ID, then use rbind() to attach it to your tidedata data frame. For each run of the for loop, we want our tidedata data frame to "grow" with the data from a new city.

```
#initialize tidedata
tidedata <- read.csv(file_names[1])
tidedata$City <- city_data$City[1]
tidedata$Gauge_ID <- city_data$Gauge_ID[1]

#loop using rbind()
for (i in 2:6) {

  #reads the next csv file
  temp_data <- read.csv(file_names[i])
  #adds city name and gauge ID
  temp_data$City <- city_data$City[i]
  temp_data$Gauge_ID <- city_data$Gauge_ID[i]

  #use rbind() to append to tidedata
  tidedata <- rbind(tidedata, temp_data)
}
table(tidedata$City)
```

```
##
##      Baltimore         Boston     Charleston Corpus Christi          Miami
##            119            119            120             61            119
##       New York
##            120
```

```
tidedata
```

```
##     Year Month Highest   MHHW    MHW    MSL    MTL    MLW   MLLW    DTL    GT
## 1   2011     1   0.844  0.161 -0.003 -1.450 -1.485 -2.967 -3.070 -1.454 3.231
## 2   2011     2   0.686  0.087 -0.054 -1.483 -1.517 -2.981 -3.049 -1.481 3.136
## 3   2011     3   0.695  0.035 -0.083 -1.501 -1.539 -2.996 -3.062 -1.513 3.096
## 4   2011     4   0.658  0.079 -0.034 -1.456 -1.496 -2.958 -3.042 -1.481 3.121
## 5   2011     5   0.719  0.162  0.030 -1.372 -1.409 -2.849 -2.962 -1.400 3.124
## 6   2011     6   0.659  0.191  0.045 -1.357 -1.395 -2.836 -2.936 -1.372 3.127
## 7   2011     7   0.519  0.171  0.019 -1.390 -1.434 -2.887 -2.969 -1.399 3.140
## 8   2011     8   0.490  0.180  0.061 -1.371 -1.417 -2.895 -2.952 -1.386 3.132
## 9   2011     9   0.730  0.130  0.024 -1.423 -1.458 -2.941 -3.009 -1.439 3.139
```

```
## 10  2011    10   0.739  0.200  0.080 -1.356 -1.395 -2.871 -2.972 -1.386 3.172
## 11  2011    11   0.753  0.083 -0.049 -1.473 -1.508 -2.968 -3.081 -1.499 3.164
## 12  2011    12   0.683  0.014 -0.123 -1.510 -1.541 -2.960 -3.078 -1.532 3.092
## 13  2012     1   0.763  0.029 -0.142 -1.534 -1.566 -2.991 -3.107 -1.539 3.136
## 14  2012     2   0.395  0.019 -0.128 -1.532 -1.564 -3.001 -3.080 -1.530 3.099
## 15  2012     3   0.307 -0.013 -0.121 -1.512 -1.546 -2.972 -3.063 -1.538 3.050
## 16  2012     4   0.635  0.077 -0.016 -1.425 -1.464 -2.913 -3.006 -1.464 3.083
## 17  2012     5   0.630  0.087 -0.039 -1.468 -1.508 -2.978 -3.096 -1.504 3.183
## 18  2012     6   1.008  0.235  0.087 -1.347 -1.384 -2.855 -2.971 -1.368 3.206
## 19  2012     7   0.675  0.176  0.020 -1.418 -1.456 -2.932 -3.028 -1.426 3.204
## 20  2012     8   0.513  0.141  0.001 -1.430 -1.472 -2.946 -3.025 -1.442 3.166
## 21  2012     9   0.467  0.037 -0.064 -1.467 -1.506 -2.949 -3.016 -1.489 3.053
## 22  2012    10   0.801  0.107  0.000 -1.392 -1.426 -2.852 -2.957 -1.425 3.064
## 23  2012    11   0.736  0.134  0.000 -1.429 -1.466 -2.933 -3.061 -1.463 3.195
## 24  2012    12   0.820  0.145  0.006 -1.405 -1.438 -2.882 -3.006 -1.430 3.151
## 25  2013     1   0.693  0.005 -0.132 -1.557 -1.591 -3.051 -3.133 -1.564 3.138
## 26  2013     2   0.853  0.097 -0.047 -1.502 -1.537 -3.028 -3.129 -1.516 3.226
## 27  2013     3   0.784  0.265  0.153 -1.350 -1.397 -2.948 -3.019 -1.377 3.284
## 28  2013     4   0.664  0.106 -0.001 -1.491 -1.536 -3.071 -3.163 -1.528 3.269
## 29  2013     5   0.774  0.125  0.013 -1.473 -1.516 -3.046 -3.150 -1.512 3.275
## 30  2013     6   0.716  0.211  0.079 -1.401 -1.443 -2.965 -3.070 -1.429 3.281
## 31  2013     7   0.810  0.192  0.062 -1.389 -1.432 -2.926 -3.011 -1.409 3.203
## 32  2013     8   0.594  0.140  0.008 -1.416 -1.454 -2.916 -3.000 -1.430 3.140
## 33  2013     9   0.409  0.097 -0.010 -1.423 -1.461 -2.913 -2.986 -1.444 3.083
## 34  2013    10   0.488  0.079 -0.021 -1.424 -1.457 -2.894 -2.995 -1.458 3.074
## 35  2013    11   0.492  0.031 -0.110 -1.522 -1.559 -3.009 -3.134 -1.551 3.165
## 36  2013    12   0.703  0.104 -0.052 -1.518 -1.554 -3.057 -3.185 -1.540 3.289
## 37  2014     1   1.086  0.123 -0.044 -1.529 -1.574 -3.105 -3.225 -1.551 3.348
## 38  2014     2   0.494  0.034 -0.105 -1.567 -1.603 -3.102 -3.198 -1.582 3.232
## 39  2014     3   0.722  0.083 -0.028 -1.521 -1.567 -3.106 -3.173 -1.545 3.256
## 40  2014     4   0.630  0.135  0.028 -1.461 -1.507 -3.042 -3.126 -1.495 3.261
## 41  2014     5   0.481  0.182  0.055 -1.409 -1.455 -2.965 -3.080 -1.449 3.262
## 42  2014     6   0.686  0.175  0.037 -1.407 -1.454 -2.945 -3.050 -1.437 3.225
## 43  2014     7   0.653  0.138 -0.003 -1.445 -1.491 -2.979 -3.061 -1.461 3.199
## 44  2014     8   0.628  0.137  0.019 -1.418 -1.462 -2.944 -2.999 -1.431 3.136
## 45  2014     9   0.575  0.117  0.000 -1.443 -1.483 -2.967 -3.025 -1.454 3.142
## 46  2014    10   0.629  0.209  0.097 -1.351 -1.384 -2.865 -2.945 -1.368 3.154
## 47  2014    11   0.606  0.145  0.011 -1.451 -1.487 -2.986 -3.096 -1.475 3.241
## 48  2014    12   0.629  0.159  0.027 -1.449 -1.482 -2.991 -3.096 -1.468 3.255
## 49  2015     1   1.018  0.053 -0.097 -1.542 -1.580 -3.064 -3.179 -1.563 3.232
## 50  2015     2   0.787  0.066 -0.059 -1.539 -1.580 -3.101 -3.190 -1.562 3.256
## 51  2015     3   0.610 -0.077 -0.162 -1.614 -1.649 -3.137 -3.205 -1.641 3.128
## 52  2015     4   0.684  0.047 -0.043 -1.505 -1.548 -3.054 -3.131 -1.542 3.178
## 53  2015     5   0.492  0.005 -0.098 -1.535 -1.578 -3.059 -3.148 -1.571 3.153
## 54  2015     6   0.370  0.102 -0.025 -1.456 -1.498 -2.971 -3.067 -1.482 3.169
## 55  2015     7   0.461  0.192  0.058 -1.388 -1.431 -2.921 -3.002 -1.405 3.194
## 56  2015     8   0.544  0.163  0.054 -1.421 -1.469 -2.993 -3.049 -1.443 3.212
## 57  2015     9   0.659  0.109  0.024 -1.426 -1.468 -2.960 -3.019 -1.455 3.128
## 58  2015    10   0.729  0.150  0.056 -1.407 -1.443 -2.943 -3.023 -1.436 3.173
## 59  2015    11   0.428  0.039 -0.060 -1.495 -1.531 -3.002 -3.118 -1.539 3.157
## 60  2015    12   0.528  0.065 -0.059 -1.473 -1.506 -2.954 -3.077 -1.506 3.142
## 61  2016     1   0.633  0.097 -0.031 -1.446 -1.478 -2.926 -3.023 -1.463 3.120
## 62  2016     2   0.825  0.103 -0.025 -1.488 -1.528 -3.032 -3.119 -1.508 3.222
## 63  2016     3   0.577  0.040 -0.050 -1.477 -1.519 -2.989 -3.074 -1.517 3.114
```

```
## 64  2016     4   0.769  0.092  0.014 -1.442 -1.485 -2.984 -3.081 -1.494 3.173
## 65  2016     5   0.835  0.131  0.026 -1.446 -1.484 -2.995 -3.101 -1.485 3.232
## 66  2016     6   0.813  0.194  0.067 -1.417 -1.458 -2.984 -3.092 -1.449 3.286
## 67  2016     7   0.485  0.191  0.049 -1.428 -1.468 -2.985 -3.083 -1.446 3.274
## 68  2016     8   0.401  0.130 -0.001 -1.457 -1.496 -2.991 -3.077 -1.473 3.207
## 69  2016     9   0.462  0.121  0.015 -1.425 -1.463 -2.942 -3.024 -1.451 3.145
## 70  2016    10   0.774  0.119  0.018 -1.400 -1.433 -2.885 -2.978 -1.429 3.097
## 71  2016    11   0.777  0.091 -0.023 -1.434 -1.466 -2.910 -3.019 -1.464 3.110
## 72  2016    12   0.769  0.085 -0.058 -1.485 -1.516 -2.975 -3.106 -1.510 3.191
## 73  2017     1   0.520  0.111 -0.047 -1.477 -1.518 -2.990 -3.099 -1.494 3.210
## 74  2017     2   0.733  0.134  0.004 -1.454 -1.492 -2.988 -3.056 -1.461 3.190
## 75  2017     3   0.607  0.055 -0.059 -1.547 -1.594 -3.129 -3.219 -1.582 3.274
## 76  2017     4   0.692  0.184  0.089 -1.403 -1.448 -2.985 -3.066 -1.441 3.250
## 77  2017     5   0.954  0.248  0.138 -1.344 -1.390 -2.919 -3.015 -1.383 3.263
## 78  2017     6   0.773  0.191  0.069 -1.393 -1.433 -2.935 -3.051 -1.430 3.242
## 79  2017     8   0.523  0.102 -0.022 -1.428 -1.462 -2.903 -2.979 -1.438 3.081
## 80  2017     9   0.487  0.131  0.030 -1.388 -1.422 -2.874 -2.945 -1.407 3.076
## 81  2017    10   0.428  0.078 -0.017 -1.437 -1.468 -2.920 -3.020 -1.471 3.098
## 82  2017    11   0.617  0.103 -0.009 -1.440 -1.472 -2.935 -3.052 -1.474 3.155
## 83  2017    12   0.695  0.092 -0.067 -1.525 -1.554 -3.042 -3.167 -1.537 3.259
## 84  2018     1   1.491  0.105 -0.060 -1.566 -1.606 -3.153 -3.254 -1.574 3.359
## 85  2018     2   0.684  0.001 -0.127 -1.579 -1.612 -3.098 -3.182 -1.590 3.183
## 86  2018     3   1.328  0.339  0.212 -1.284 -1.330 -2.872 -2.972 -1.316 3.311
## 87  2018     4   0.553  0.126  0.039 -1.452 -1.498 -3.035 -3.140 -1.507 3.266
## 88  2018     5   0.584  0.144  0.015 -1.447 -1.491 -2.997 -3.116 -1.486 3.260
## 89  2018     6   0.802  0.209  0.067 -1.385 -1.424 -2.916 -3.040 -1.415 3.249
## 90  2018     7   0.662  0.137 -0.013 -1.451 -1.496 -2.980 -3.085 -1.474 3.222
## 91  2018     8   0.696  0.168  0.041 -1.393 -1.433 -2.908 -2.979 -1.405 3.147
## 92  2018     9   0.686  0.170  0.060 -1.386 -1.424 -2.907 -2.968 -1.399 3.138
## 93  2018    10   0.688  0.174  0.052 -1.387 -1.420 -2.893 -2.984 -1.405 3.158
## 94  2018    11   0.836  0.167  0.026 -1.427 -1.456 -2.938 -3.076 -1.454 3.243
## 95  2018    12   0.710  0.158  0.013 -1.438 -1.461 -2.936 -3.065 -1.453 3.223
## 96  2019     1   0.863  0.120 -0.024 -1.453 -1.484 -2.945 -3.051 -1.465 3.171
## 97  2019     2   0.653  0.024 -0.097 -1.539 -1.572 -3.048 -3.148 -1.562 3.172
## 98  2019     3   0.791  0.043 -0.064 -1.485 -1.518 -2.972 -3.056 -1.506 3.099
## 99  2019     4   0.553  0.057 -0.038 -1.461 -1.499 -2.961 -3.074 -1.508 3.131
## 100 2019     5   0.563  0.129  0.028 -1.372 -1.406 -2.841 -2.957 -1.414 3.086
## 101 2019     6   0.477  0.160  0.027 -1.372 -1.408 -2.844 -2.960 -1.400 3.120
## 102 2019     7   0.597  0.199  0.050 -1.370 -1.411 -2.873 -2.977 -1.389 3.176
## 103 2019     8   0.591  0.187  0.058 -1.389 -1.430 -2.919 -3.006 -1.409 3.193
## 104 2019     9   0.549  0.143  0.042 -1.405 -1.444 -2.931 -2.995 -1.426 3.138
## 105 2019    10   0.898  0.250  0.141 -1.318 -1.349 -2.840 -2.912 -1.331 3.162
## 106 2019    11   0.621  0.140  0.013 -1.396 -1.429 -2.871 -3.002 -1.431 3.142
## 107 2019    12   0.845  0.142 -0.015 -1.422 -1.457 -2.899 -3.047 -1.452 3.189
## 108 2020     1   0.456  0.084 -0.043 -1.430 -1.461 -2.880 -2.991 -1.453 3.075
## 109 2020     2   0.655  0.077 -0.059 -1.473 -1.509 -2.959 -3.053 -1.488 3.130
## 110 2020     3   0.636  0.097 -0.022 -1.431 -1.468 -2.913 -3.011 -1.457 3.108
## 111 2020     4   0.805  0.199  0.097 -1.330 -1.367 -2.831 -2.955 -1.378 3.154
## 112 2020     5   0.778  0.072 -0.039 -1.466 -1.502 -2.966 -3.101 -1.515 3.173
## 113 2020     6   0.627  0.160  0.029 -1.406 -1.443 -2.915 -3.047 -1.444 3.207
## 114 2020     7   0.636  0.209  0.055 -1.375 -1.411 -2.877 -2.995 -1.393 3.204
## 115 2020     8   0.471  0.170  0.018 -1.396 -1.433 -2.883 -2.996 -1.413 3.166
## 116 2020     9   0.754  0.111 -0.021 -1.426 -1.459 -2.897 -2.985 -1.437 3.096
## 117 2020    10   0.548  0.076 -0.034 -1.432 -1.466 -2.898 -3.001 -1.462 3.077
```

```
## 118 2020    11   0.716  0.056 -0.086 -1.473 -1.503 -2.920 -3.046 -1.495 3.102
## 119 2020    12   0.886  0.146 -0.023 -1.421 -1.456 -2.889 -3.047 -1.450 3.193
## 120 2011     1   0.403  0.050 -0.077 -0.759 -0.778 -1.478 -1.542 -0.746 1.592
## 121 2011     2   0.453  0.008 -0.112 -0.800 -0.817 -1.521 -1.614 -0.803 1.622
## 122 2011     3   0.543  0.060 -0.030 -0.702 -0.727 -1.423 -1.484 -0.712 1.544
## 123 2011     4   0.927  0.123  0.027 -0.657 -0.680 -1.387 -1.453 -0.665 1.576
## 124 2011     5   0.738  0.224  0.115 -0.545 -0.574 -1.263 -1.317 -0.547 1.541
## 125 2011     6   0.530  0.222  0.113 -0.557 -0.579 -1.271 -1.329 -0.554 1.551
## 126 2011     7   0.462  0.192  0.089 -0.596 -0.621 -1.331 -1.384 -0.596 1.576
## 127 2011     8   1.357  0.240  0.143 -0.557 -0.585 -1.312 -1.374 -0.567 1.614
## 128 2011     9   0.761  0.277  0.193 -0.498 -0.532 -1.256 -1.301 -0.512 1.578
## 129 2011    10   0.701  0.231  0.139 -0.563 -0.586 -1.310 -1.371 -0.570 1.602
## 130 2011    11   0.583  0.107 -0.001 -0.682 -0.709 -1.416 -1.466 -0.680 1.573
## 131 2011    12   0.499  0.074 -0.047 -0.735 -0.756 -1.465 -1.535 -0.731 1.609
## 132 2012     1   0.598 -0.002 -0.127 -0.797 -0.825 -1.522 -1.600 -0.801 1.598
## 133 2012     2   0.344  0.001 -0.100 -0.790 -0.809 -1.518 -1.582 -0.791 1.583
## 134 2012     3   0.212  0.023 -0.054 -0.725 -0.752 -1.449 -1.496 -0.737 1.519
## 135 2012     4   0.552  0.104  0.023 -0.672 -0.695 -1.413 -1.468 -0.682 1.572
## 136 2012     5   0.503  0.127  0.035 -0.662 -0.684 -1.403 -1.462 -0.668 1.589
## 137 2012     6   0.800  0.238  0.138 -0.559 -0.584 -1.305 -1.376 -0.569 1.614
## 138 2012     7   0.470  0.178  0.078 -0.625 -0.649 -1.375 -1.433 -0.627 1.611
## 139 2012     8   0.428  0.163  0.082 -0.621 -0.647 -1.375 -1.423 -0.630 1.586
## 140 2012     9   0.489  0.123  0.048 -0.647 -0.674 -1.395 -1.441 -0.659 1.564
## 141 2012    10   2.739  0.263  0.145 -0.555 -0.587 -1.318 -1.384 -0.561 1.647
## 142 2012    11   0.559  0.129  0.021 -0.654 -0.682 -1.384 -1.445 -0.658 1.574
## 143 2012    12   0.734  0.154  0.033 -0.651 -0.678 -1.389 -1.495 -0.671 1.649
## 144 2013     1   0.511 -0.024 -0.141 -0.835 -0.857 -1.572 -1.655 -0.840 1.631
## 145 2013     2   0.690 -0.002 -0.111 -0.798 -0.817 -1.522 -1.582 -0.792 1.580
## 146 2013     3   0.704  0.146  0.068 -0.627 -0.654 -1.376 -1.444 -0.649 1.590
## 147 2013     4   0.478  0.075 -0.017 -0.710 -0.739 -1.461 -1.526 -0.726 1.601
## 148 2013     5   0.280  0.063 -0.016 -0.721 -0.748 -1.480 -1.548 -0.743 1.611
## 149 2013     6   0.422  0.155  0.057 -0.626 -0.661 -1.378 -1.447 -0.646 1.602
## 150 2013     7   0.588  0.148  0.055 -0.613 -0.645 -1.344 -1.398 -0.625 1.546
## 151 2013     8   0.369  0.136  0.051 -0.626 -0.650 -1.350 -1.385 -0.625 1.521
## 152 2013     9   0.340  0.127  0.054 -0.627 -0.652 -1.357 -1.396 -0.635 1.523
## 153 2013    10   0.535  0.158  0.092 -0.592 -0.618 -1.328 -1.368 -0.605 1.526
## 154 2013    11   0.483 -0.006 -0.100 -0.797 -0.825 -1.550 -1.618 -0.812 1.612
## 155 2013    12   0.509  0.055 -0.075 -0.783 -0.808 -1.541 -1.601 -0.773 1.656
## 156 2014     1   0.736  0.018 -0.107 -0.822 -0.843 -1.578 -1.638 -0.810 1.656
## 157 2014     2   0.409 -0.063 -0.161 -0.837 -0.861 -1.560 -1.616 -0.840 1.553
## 158 2014     3   0.407  0.029 -0.049 -0.762 -0.783 -1.516 -1.561 -0.766 1.590
## 159 2014     4   0.766  0.137  0.039 -0.655 -0.682 -1.403 -1.471 -0.667 1.608
## 160 2014     5   0.518  0.164  0.067 -0.625 -0.652 -1.370 -1.435 -0.636 1.599
## 161 2014     6   0.496  0.174  0.073 -0.607 -0.635 -1.344 -1.402 -0.614 1.576
## 162 2014     7   0.410  0.124  0.031 -0.649 -0.679 -1.388 -1.453 -0.665 1.577
## 163 2014     8   0.596  0.191  0.102 -0.590 -0.616 -1.333 -1.376 -0.593 1.567
## 164 2014     9   0.573  0.201  0.109 -0.590 -0.615 -1.338 -1.377 -0.588 1.578
## 165 2014    10   0.437  0.196  0.126 -0.569 -0.604 -1.333 -1.388 -0.596 1.583
## 166 2014    11   0.499  0.067 -0.033 -0.727 -0.758 -1.483 -1.562 -0.748 1.629
## 167 2014    12   0.656  0.133  0.027 -0.680 -0.700 -1.426 -1.506 -0.686 1.639
## 168 2015     1   0.521 -0.055 -0.173 -0.859 -0.878 -1.583 -1.668 -0.862 1.613
## 169 2015     2   0.413 -0.037 -0.141 -0.830 -0.851 -1.560 -1.620 -0.829 1.583
## 170 2015     3   0.435 -0.110 -0.192 -0.872 -0.891 -1.590 -1.646 -0.878 1.536
## 171 2015     4   0.599  0.034 -0.038 -0.732 -0.756 -1.473 -1.530 -0.748 1.564
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## 172 2015     5   0.362  0.017 -0.082 -0.777 -0.804 -1.526 -1.573 -0.778 1.590
## 173 2015     6   0.364  0.155  0.052 -0.640 -0.665 -1.382 -1.435 -0.640 1.590
## 174 2015     7   0.400  0.199  0.102 -0.594 -0.626 -1.353 -1.404 -0.603 1.603
## 175 2015     8   0.370  0.171  0.101 -0.618 -0.647 -1.396 -1.448 -0.639 1.619
## 176 2015     9   0.545  0.196  0.132 -0.579 -0.607 -1.345 -1.388 -0.596 1.584
## 177 2015    10   0.715  0.208  0.129 -0.579 -0.610 -1.348 -1.411 -0.602 1.619
## 178 2015    11   0.523  0.081  0.004 -0.697 -0.723 -1.449 -1.511 -0.715 1.592
## 179 2015    12   0.489  0.094  0.001 -0.699 -0.723 -1.446 -1.525 -0.716 1.619
## 180 2016     1   0.860  0.059 -0.037 -0.725 -0.744 -1.450 -1.540 -0.741 1.599
## 181 2016     2   0.883  0.038 -0.066 -0.761 -0.791 -1.515 -1.581 -0.772 1.619
## 182 2016     3   0.457  0.042 -0.028 -0.711 -0.743 -1.457 -1.514 -0.736 1.556
## 183 2016     4   0.610  0.102  0.026 -0.675 -0.701 -1.428 -1.516 -0.707 1.618
## 184 2016     5   0.720  0.110  0.034 -0.678 -0.705 -1.443 -1.513 -0.702 1.623
## 185 2016     6   0.535  0.150  0.057 -0.663 -0.691 -1.439 -1.508 -0.679 1.658
## 186 2016     7   0.364  0.168  0.070 -0.649 -0.677 -1.424 -1.484 -0.658 1.652
## 187 2016     8   0.420  0.136  0.055 -0.660 -0.686 -1.427 -1.477 -0.671 1.613
## 188 2016     9   0.550  0.205  0.142 -0.558 -0.585 -1.311 -1.366 -0.581 1.571
## 189 2016    10   0.559  0.161  0.075 -0.625 -0.653 -1.381 -1.442 -0.641 1.603
## 190 2016    11   0.500  0.067 -0.040 -0.732 -0.758 -1.476 -1.545 -0.739 1.612
## 191 2016    12   0.461 -0.003 -0.106 -0.807 -0.836 -1.565 -1.655 -0.829 1.652
## 192 2017     1   0.742  0.083 -0.038 -0.747 -0.771 -1.505 -1.583 -0.750 1.666
## 193 2017     2   0.380  0.015 -0.076 -0.780 -0.806 -1.536 -1.610 -0.798 1.625
## 194 2017     3   0.777 -0.039 -0.135 -0.861 -0.888 -1.640 -1.733 -0.886 1.694
## 195 2017     4   0.660  0.181  0.085 -0.624 -0.656 -1.397 -1.457 -0.638 1.638
## 196 2017     5   0.724  0.213  0.133 -0.571 -0.602 -1.337 -1.402 -0.595 1.615
## 197 2017     6   0.512  0.171  0.080 -0.623 -0.654 -1.388 -1.453 -0.641 1.624
## 198 2017     7   0.602  0.201  0.104 -0.587 -0.620 -1.343 -1.391 -0.595 1.592
## 199 2017     8   0.356  0.159  0.080 -0.604 -0.631 -1.343 -1.385 -0.613 1.544
## 200 2017     9   0.579  0.188  0.115 -0.562 -0.595 -1.304 -1.341 -0.577 1.529
## 201 2017    10   0.626  0.168  0.071 -0.611 -0.644 -1.359 -1.420 -0.626 1.588
## 202 2017    11   0.645  0.158  0.059 -0.648 -0.670 -1.398 -1.466 -0.654 1.624
## 203 2017    12   0.670  0.037 -0.097 -0.808 -0.831 -1.565 -1.640 -0.802 1.677
## 204 2018     1   0.726 -0.017 -0.159 -0.876 -0.890 -1.621 -1.681 -0.849 1.664
## 205 2018     2   0.238 -0.034 -0.126 -0.806 -0.830 -1.534 -1.607 -0.821 1.573
## 206 2018     3   0.867  0.225  0.135 -0.568 -0.593 -1.321 -1.390 -0.583 1.615
## 207 2018     4   0.714  0.096  0.017 -0.676 -0.709 -1.435 -1.513 -0.709 1.609
## 208 2018     5   0.542  0.143  0.046 -0.643 -0.668 -1.381 -1.444 -0.650 1.587
## 209 2018     6   0.509  0.223  0.119 -0.565 -0.591 -1.300 -1.358 -0.568 1.581
## 210 2018     7   0.459  0.170  0.070 -0.609 -0.632 -1.334 -1.393 -0.612 1.563
## 211 2018     8   0.577  0.214  0.121 -0.564 -0.594 -1.309 -1.363 -0.574 1.577
## 212 2018     9   0.804  0.295  0.219 -0.481 -0.504 -1.227 -1.274 -0.490 1.569
## 213 2018    10   1.011  0.196  0.088 -0.606 -0.636 -1.359 -1.423 -0.614 1.619
## 214 2018    11   0.820  0.172  0.039 -0.661 -0.687 -1.413 -1.503 -0.666 1.675
## 215 2018    12   0.668  0.174  0.050 -0.652 -0.675 -1.400 -1.470 -0.648 1.644
## 216 2019     1   0.740  0.055 -0.062 -0.741 -0.767 -1.471 -1.561 -0.753 1.616
## 217 2019     2   0.553 -0.007 -0.118 -0.810 -0.832 -1.546 -1.626 -0.817 1.619
## 218 2019     3   0.656  0.036 -0.060 -0.729 -0.756 -1.451 -1.497 -0.731 1.533
## 219 2019     4   0.582  0.085 -0.004 -0.673 -0.705 -1.405 -1.475 -0.695 1.560
## 220 2019     5   0.509  0.221  0.126 -0.552 -0.579 -1.284 -1.346 -0.563 1.567
## 221 2019     6   0.505  0.211  0.110 -0.570 -0.594 -1.297 -1.359 -0.574 1.570
## 222 2019     7   0.488  0.222  0.117 -0.573 -0.599 -1.314 -1.373 -0.576 1.595
## 223 2019     8   0.471  0.239  0.156 -0.547 -0.578 -1.311 -1.363 -0.562 1.602
## 224 2019     9   0.532  0.233  0.161 -0.540 -0.569 -1.299 -1.348 -0.558 1.581
## 225 2019    10   0.739  0.312  0.216 -0.470 -0.501 -1.217 -1.277 -0.482 1.589
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## 226 2019    11   0.593  0.173  0.070 -0.614 -0.644 -1.358 -1.425 -0.626 1.598
## 227 2019    12   0.581  0.124 -0.003 -0.669 -0.692 -1.381 -1.490 -0.683 1.614
## 228 2020     1   0.450  0.069 -0.043 -0.709 -0.728 -1.413 -1.479 -0.705 1.548
## 229 2020     2   0.457  0.052 -0.058 -0.735 -0.762 -1.465 -1.552 -0.750 1.604
## 230 2020     3   0.536  0.133  0.045 -0.619 -0.644 -1.333 -1.394 -0.631 1.527
## 231 2020     4   0.685  0.195  0.111 -0.568 -0.601 -1.312 -1.373 -0.589 1.568
## 232 2020     5   0.635  0.111  0.020 -0.659 -0.690 -1.401 -1.485 -0.687 1.596
## 233 2020     6   0.489  0.199  0.100 -0.592 -0.619 -1.338 -1.401 -0.601 1.600
## 234 2020     7   0.515  0.245  0.136 -0.548 -0.576 -1.287 -1.355 -0.555 1.600
## 235 2020     8   0.470  0.214  0.121 -0.565 -0.595 -1.310 -1.359 -0.573 1.573
## 236 2020     9   0.588  0.214  0.129 -0.540 -0.570 -1.269 -1.324 -0.555 1.538
## 237 2020    10   0.687  0.182  0.096 -0.578 -0.608 -1.311 -1.361 -0.589 1.543
## 238 2020    11   0.583  0.074 -0.031 -0.706 -0.729 -1.426 -1.503 -0.714 1.577
## 239 2020    12   0.778  0.128 -0.002 -0.678 -0.696 -1.390 -1.477 -0.674 1.605
## 240 2011     1   0.238 -0.075 -0.154 -0.321 -0.324 -0.493 -0.554 -0.315 0.479
## 241 2011     2   0.347 -0.074 -0.161 -0.325 -0.329 -0.496 -0.583 -0.329 0.509
## 242 2011     3   0.752  0.061 -0.009 -0.171 -0.176 -0.343 -0.419 -0.179 0.480
## 243 2011     4   0.880  0.125  0.050 -0.129 -0.126 -0.301 -0.380 -0.128 0.505
## 244 2011     5   0.595  0.263  0.170 -0.005 -0.013 -0.195 -0.246  0.008 0.509
## 245 2011     6   0.578  0.203  0.107 -0.070 -0.075 -0.256 -0.305 -0.051 0.508
## 246 2011     7   0.472  0.201  0.105 -0.078 -0.080 -0.265 -0.321 -0.060 0.522
## 247 2011     8   0.477  0.182  0.112 -0.076 -0.074 -0.259 -0.320 -0.069 0.502
## 248 2011     9   0.670  0.320  0.241  0.045  0.048 -0.145 -0.204  0.058 0.524
## 249 2011    10   0.641  0.218  0.100 -0.074 -0.085 -0.270 -0.341 -0.062 0.559
## 250 2011    11   0.410  0.101 -0.007 -0.175 -0.187 -0.367 -0.439 -0.169 0.540
## 251 2011    12   0.560  0.028 -0.062 -0.235 -0.239 -0.415 -0.498 -0.235 0.526
## 252 2012     1   0.248 -0.044 -0.155 -0.320 -0.323 -0.490 -0.579 -0.312 0.535
## 253 2012     2   0.215 -0.062 -0.155 -0.325 -0.327 -0.499 -0.568 -0.315 0.506
## 254 2012     3   0.340  0.027 -0.049 -0.219 -0.225 -0.400 -0.452 -0.213 0.479
## 255 2012     4   0.401  0.057 -0.039 -0.218 -0.213 -0.387 -0.455 -0.199 0.512
## 256 2012     5   0.407  0.149  0.073 -0.099 -0.102 -0.277 -0.315 -0.083 0.464
## 257 2012     6   0.607  0.247  0.149 -0.028 -0.032 -0.213 -0.278 -0.016 0.525
## 258 2012     7   0.346  0.176  0.082 -0.097 -0.100 -0.282 -0.339 -0.082 0.515
## 259 2012     8   0.386  0.199  0.119 -0.057 -0.057 -0.232 -0.275 -0.038 0.474
## 260 2012     9   0.624  0.139  0.063 -0.121 -0.114 -0.291 -0.361 -0.111 0.500
## 261 2012    10   0.906  0.153  0.059 -0.101 -0.111 -0.281 -0.354 -0.100 0.507
## 262 2012    12   0.644  0.085 -0.011 -0.181 -0.181 -0.350 -0.429 -0.172 0.514
## 263 2013     1   0.321 -0.052 -0.127 -0.296 -0.293 -0.459 -0.542 -0.297 0.490
## 264 2013     2   0.404 -0.110 -0.185 -0.340 -0.342 -0.498 -0.547 -0.329 0.437
## 265 2013     3   0.468  0.035 -0.045 -0.221 -0.214 -0.383 -0.447 -0.206 0.482
## 266 2013     4   0.477  0.082  0.000 -0.177 -0.176 -0.352 -0.416 -0.167 0.498
## 267 2013     5   0.307  0.053 -0.026 -0.197 -0.198 -0.369 -0.419 -0.183 0.472
## 268 2013     6   0.352  0.151  0.056 -0.124 -0.125 -0.306 -0.355 -0.102 0.506
## 269 2013     7   0.380  0.162  0.079 -0.098 -0.099 -0.276 -0.325 -0.082 0.487
## 270 2013     8   0.429  0.175  0.102 -0.071 -0.070 -0.242 -0.300 -0.063 0.475
## 271 2013     9   0.375  0.161  0.079 -0.089 -0.090 -0.259 -0.318 -0.079 0.479
## 272 2013    10   0.443  0.192  0.117 -0.060 -0.056 -0.229 -0.271 -0.040 0.463
## 273 2013    11   0.313 -0.055 -0.166 -0.322 -0.329 -0.492 -0.573 -0.314 0.518
## 274 2013    12   0.259 -0.043 -0.119 -0.291 -0.289 -0.458 -0.523 -0.283 0.480
## 275 2014     1   0.351 -0.089 -0.187 -0.367 -0.367 -0.546 -0.649 -0.369 0.560
## 276 2014     2   0.107 -0.107 -0.199 -0.362 -0.363 -0.527 -0.615 -0.361 0.508
## 277 2014     3   0.292 -0.043 -0.118 -0.302 -0.291 -0.463 -0.546 -0.295 0.503
## 278 2014     4   0.676  0.118  0.026 -0.149 -0.151 -0.327 -0.398 -0.140 0.516
## 279 2014     5   0.649  0.153  0.071 -0.101 -0.107 -0.285 -0.348 -0.098 0.501
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## 280 2014     6   0.427  0.202  0.124 -0.051 -0.055 -0.234 -0.282 -0.040 0.484
## 281 2014     7   0.327  0.153  0.074 -0.110 -0.108 -0.290 -0.345 -0.096 0.498
## 282 2014     8   0.537  0.206  0.136 -0.041 -0.039 -0.214 -0.273 -0.034 0.479
## 283 2014     9   0.477  0.184  0.112 -0.061 -0.063 -0.238 -0.310 -0.063 0.494
## 284 2014    10   0.845  0.177  0.101 -0.063 -0.065 -0.230 -0.307 -0.065 0.484
## 285 2014    11   0.224 -0.025 -0.125 -0.288 -0.291 -0.457 -0.547 -0.286 0.522
## 286 2014    12   0.430 -0.019 -0.079 -0.250 -0.246 -0.412 -0.476 -0.248 0.457
## 287 2015     1   0.240 -0.139 -0.243 -0.412 -0.408 -0.572 -0.651 -0.395 0.512
## 288 2015     2   0.421 -0.111 -0.207 -0.398 -0.395 -0.583 -0.679 -0.395 0.568
## 289 2015     3   0.125 -0.144 -0.218 -0.385 -0.386 -0.553 -0.614 -0.379 0.470
## 290 2015     4   0.464  0.000 -0.075 -0.242 -0.244 -0.413 -0.484 -0.242 0.484
## 291 2015     5   0.280  0.034 -0.052 -0.223 -0.222 -0.392 -0.430 -0.198 0.464
## 292 2015     6   0.425  0.169  0.085 -0.101 -0.101 -0.286 -0.346 -0.089 0.515
## 293 2015     7   0.446  0.203  0.127 -0.053 -0.054 -0.234 -0.283 -0.040 0.486
## 294 2015     8   0.583  0.171  0.103 -0.077 -0.077 -0.257 -0.311 -0.070 0.482
## 295 2015     9   0.496  0.203  0.139 -0.035 -0.037 -0.212 -0.264 -0.031 0.467
## 296 2015    10   0.618  0.169  0.088 -0.083 -0.085 -0.258 -0.326 -0.078 0.494
## 297 2015    11   0.520  0.044 -0.045 -0.209 -0.212 -0.378 -0.444 -0.200 0.488
## 298 2015    12   0.361  0.067 -0.026 -0.192 -0.194 -0.362 -0.418 -0.176 0.485
## 299 2016     1   0.510 -0.063 -0.133 -0.313 -0.301 -0.468 -0.565 -0.314 0.502
## 300 2016     2   0.631 -0.025 -0.108 -0.274 -0.277 -0.445 -0.529 -0.277 0.504
## 301 2016     3   0.288  0.029 -0.051 -0.218 -0.221 -0.391 -0.452 -0.212 0.481
## 302 2016     4   0.462  0.096  0.000 -0.164 -0.169 -0.338 -0.424 -0.164 0.520
## 303 2016     5   0.510  0.108  0.030 -0.144 -0.147 -0.323 -0.359 -0.126 0.467
## 304 2016     6   0.372  0.146  0.048 -0.129 -0.132 -0.312 -0.352 -0.103 0.498
## 305 2016     7   0.324  0.148  0.069 -0.113 -0.116 -0.301 -0.358 -0.105 0.506
## 306 2016     8   0.403  0.161  0.079 -0.104 -0.105 -0.288 -0.347 -0.093 0.508
## 307 2016     9   0.478  0.274  0.199  0.020  0.025 -0.149 -0.211  0.031 0.485
## 308 2016    10   0.518  0.162  0.087 -0.102 -0.089 -0.265 -0.351 -0.095 0.513
## 309 2016    11   0.283  0.002 -0.080 -0.242 -0.243 -0.405 -0.470 -0.234 0.472
## 310 2016    12   0.250 -0.050 -0.159 -0.311 -0.316 -0.472 -0.546 -0.298 0.496
## 311 2017     1   0.321 -0.042 -0.131 -0.286 -0.293 -0.455 -0.516 -0.279 0.474
## 312 2017     2   0.198 -0.034 -0.121 -0.289 -0.290 -0.459 -0.516 -0.275 0.482
## 313 2017     3   0.276 -0.176 -0.242 -0.409 -0.409 -0.576 -0.627 -0.402 0.451
## 314 2017     4   0.503  0.153  0.080 -0.099 -0.101 -0.281 -0.338 -0.093 0.491
## 315 2017     5   0.536  0.226  0.140 -0.033 -0.037 -0.213 -0.269 -0.022 0.495
## 316 2017     6   0.439  0.181  0.111 -0.065 -0.066 -0.243 -0.291 -0.055 0.472
## 317 2017     7   0.437  0.201  0.115 -0.069 -0.068 -0.251 -0.308 -0.054 0.509
## 318 2017     8   0.498  0.225  0.146 -0.027 -0.030 -0.205 -0.255 -0.015 0.480
## 319 2017     9   0.472  0.210  0.148 -0.033 -0.027 -0.202 -0.257 -0.024 0.467
## 320 2017    10   0.649  0.195  0.098 -0.063 -0.075 -0.248 -0.300 -0.053 0.495
## 321 2017    11   0.521  0.118  0.016 -0.151 -0.152 -0.320 -0.384 -0.133 0.502
## 322 2017    12   0.350 -0.057 -0.149 -0.316 -0.318 -0.486 -0.571 -0.314 0.514
## 323 2018     1   0.132 -0.218 -0.295 -0.471 -0.468 -0.641 -0.733 -0.476 0.515
## 324 2018     2   0.283 -0.040 -0.125 -0.295 -0.295 -0.464 -0.546 -0.293 0.506
## 325 2018     3   0.646  0.048 -0.043 -0.245 -0.218 -0.393 -0.466 -0.209 0.514
## 326 2018     4   0.610  0.054 -0.029 -0.197 -0.200 -0.370 -0.432 -0.189 0.486
## 327 2018     5   0.409  0.151  0.070 -0.103 -0.109 -0.287 -0.331 -0.090 0.482
## 328 2018     6   0.495  0.265  0.171 -0.007 -0.010 -0.190 -0.237  0.014 0.502
## 329 2018     7   0.562  0.251  0.173 -0.012 -0.011 -0.194 -0.251  0.000 0.502
## 330 2018     8   0.469  0.200  0.133 -0.050 -0.054 -0.240 -0.290 -0.045 0.490
## 331 2018     9   0.662  0.381  0.287  0.109  0.101 -0.084 -0.144  0.118 0.525
## 332 2018    10   0.419  0.219  0.145 -0.073 -0.050 -0.245 -0.339 -0.060 0.558
## 333 2018    11   0.607  0.127  0.008 -0.171 -0.175 -0.358 -0.439 -0.156 0.566
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## 334 2018    12   0.560  0.147  0.059 -0.120 -0.126 -0.311 -0.373 -0.113 0.520
## 335 2019     1   0.373  0.062 -0.017 -0.223 -0.205 -0.392 -0.491 -0.215 0.553
## 336 2019     2   0.249  0.001 -0.081 -0.259 -0.264 -0.447 -0.507 -0.253 0.508
## 337 2019     3   0.304  0.037 -0.024 -0.196 -0.197 -0.369 -0.427 -0.195 0.464
## 338 2019     4   0.543  0.163  0.061 -0.126 -0.126 -0.312 -0.382 -0.110 0.545
## 339 2019     5   0.504  0.260  0.167 -0.013 -0.020 -0.206 -0.265 -0.003 0.525
## 340 2019     6   0.431  0.218  0.123 -0.054 -0.059 -0.240 -0.293 -0.038 0.511
## 341 2019     7   0.381  0.236  0.148 -0.035 -0.038 -0.223 -0.267 -0.016 0.503
## 342 2019     8   0.587  0.247  0.166 -0.016 -0.016 -0.198 -0.247  0.000 0.494
## 343 2019     9   0.560  0.309  0.211  0.037  0.036 -0.138 -0.210  0.049 0.519
## 344 2019    10   0.759  0.301  0.229  0.049  0.056 -0.116 -0.190  0.055 0.491
## 345 2019    11   0.688  0.140  0.042 -0.148 -0.136 -0.313 -0.413 -0.137 0.553
## 346 2019    12   0.382  0.038 -0.053 -0.230 -0.227 -0.401 -0.453 -0.208 0.491
## 347 2020     1   0.474  0.034 -0.078 -0.237 -0.242 -0.405 -0.472 -0.219 0.506
## 348 2020     2   0.419  0.021 -0.055 -0.222 -0.224 -0.392 -0.455 -0.217 0.476
## 349 2020     3   0.402  0.091  0.023 -0.141 -0.139 -0.300 -0.377 -0.143 0.468
## 350 2020     4   0.791  0.173  0.062 -0.089 -0.112 -0.286 -0.359 -0.093 0.532
## 351 2020     5   0.412  0.123  0.033 -0.123 -0.133 -0.299 -0.359 -0.118 0.482
## 352 2020     6   0.348  0.216  0.126 -0.045 -0.049 -0.224 -0.259 -0.021 0.475
## 353 2020     7   0.494  0.247  0.153 -0.028 -0.031 -0.215 -0.269 -0.011 0.516
## 354 2020     8   0.527  0.233  0.144 -0.033 -0.038 -0.219 -0.274 -0.021 0.507
## 355 2020     9   0.420  0.228  0.160 -0.008 -0.011 -0.181 -0.247 -0.010 0.475
## 356 2020    10   0.431  0.183  0.102 -0.073 -0.073 -0.247 -0.304 -0.061 0.487
## 357 2020    11   0.683  0.091 -0.003 -0.174 -0.173 -0.343 -0.401 -0.155 0.492
## 358 2020    12   0.652  0.056 -0.047 -0.205 -0.214 -0.381 -0.452 -0.198 0.508
## 359 2011     1   0.309 -0.089 -0.211 -0.989 -1.021 -1.831 -1.903 -0.996 1.814
## 360 2011     2   0.235 -0.087 -0.201 -0.966 -1.002 -1.804 -1.879 -0.983 1.792
## 361 2011     3   0.353 -0.021 -0.115 -0.872 -0.908 -1.702 -1.765 -0.893 1.744
## 362 2011     4   0.318 -0.080 -0.197 -0.957 -0.997 -1.797 -1.855 -0.967 1.775
## 363 2011     5   0.429  0.041 -0.092 -0.841 -0.884 -1.676 -1.728 -0.843 1.769
## 364 2011     6   0.466  0.042 -0.102 -0.856 -0.901 -1.700 -1.764 -0.861 1.806
## 365 2011     7   0.446  0.067 -0.058 -0.817 -0.864 -1.670 -1.747 -0.840 1.814
## 366 2011     8   0.577  0.157  0.065 -0.702 -0.754 -1.574 -1.635 -0.739 1.792
## 367 2011     9   0.343  0.128  0.057 -0.695 -0.747 -1.552 -1.601 -0.736 1.729
## 368 2011    10   0.424  0.147  0.041 -0.713 -0.760 -1.561 -1.600 -0.726 1.747
## 369 2011    11   0.391  0.089 -0.023 -0.782 -0.828 -1.634 -1.689 -0.800 1.778
## 370 2011    12   0.464  0.001 -0.116 -0.875 -0.911 -1.707 -1.770 -0.884 1.771
## 371 2012     1   0.300 -0.158 -0.258 -1.011 -1.047 -1.837 -1.913 -1.036 1.755
## 372 2012     2   0.282 -0.047 -0.137 -0.898 -0.932 -1.728 -1.791 -0.919 1.744
## 373 2012     3   0.367 -0.080 -0.171 -0.920 -0.961 -1.752 -1.797 -0.938 1.717
## 374 2012     4   0.585  0.061 -0.040 -0.794 -0.841 -1.643 -1.690 -0.814 1.751
## 375 2012     5   0.675  0.133  0.022 -0.743 -0.792 -1.606 -1.665 -0.766 1.798
## 376 2012     6   0.640  0.230  0.104 -0.654 -0.706 -1.517 -1.586 -0.678 1.816
## 377 2012     7   0.395  0.059 -0.071 -0.850 -0.898 -1.726 -1.788 -0.864 1.847
## 378 2012     8   0.364  0.099  0.002 -0.764 -0.818 -1.639 -1.693 -0.797 1.792
## 379 2012     9   0.332  0.098  0.016 -0.737 -0.785 -1.587 -1.639 -0.770 1.737
## 380 2012    10   0.474  0.124  0.039 -0.698 -0.743 -1.526 -1.566 -0.721 1.690
## 381 2012    11   0.649  0.216  0.109 -0.637 -0.686 -1.480 -1.524 -0.654 1.741
## 382 2012    12   0.642  0.055 -0.069 -0.829 -0.868 -1.667 -1.741 -0.843 1.796
## 383 2013     1   0.350 -0.017 -0.112 -0.877 -0.920 -1.727 -1.781 -0.899 1.764
## 384 2013     2   0.365 -0.081 -0.165 -0.925 -0.968 -1.771 -1.831 -0.956 1.750
## 385 2013     3   0.388 -0.004 -0.077 -0.855 -0.900 -1.724 -1.776 -0.890 1.772
## 386 2013     4   0.419  0.062 -0.037 -0.810 -0.856 -1.676 -1.735 -0.836 1.797
## 387 2013     5   0.472  0.105 -0.002 -0.772 -0.821 -1.641 -1.683 -0.789 1.788
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## 388 2013     6   0.500  0.020 -0.093 -0.868 -0.917 -1.741 -1.810 -0.895 1.830
## 389 2013     7   0.363  0.040 -0.068 -0.837 -0.885 -1.703 -1.751 -0.855 1.791
## 390 2013     8   0.483  0.110  0.022 -0.730 -0.776 -1.575 -1.641 -0.766 1.750
## 391 2013     9   0.424  0.148  0.074 -0.665 -0.712 -1.498 -1.540 -0.696 1.688
## 392 2013    10   0.517  0.185  0.117 -0.625 -0.670 -1.457 -1.492 -0.654 1.677
## 393 2013    11   0.484  0.122  0.021 -0.736 -0.779 -1.580 -1.628 -0.753 1.750
## 394 2013    12   0.456  0.047 -0.061 -0.845 -0.888 -1.715 -1.763 -0.858 1.811
## 395 2014     1   0.431  0.022 -0.084 -0.892 -0.930 -1.776 -1.853 -0.916 1.875
## 396 2014     2   0.459  0.055 -0.032 -0.802 -0.849 -1.666 -1.721 -0.833 1.776
## 397 2014     3   0.520  0.102  0.023 -0.781 -0.823 -1.669 -1.730 -0.814 1.831
## 398 2014     4   0.543  0.127  0.024 -0.744 -0.791 -1.607 -1.649 -0.761 1.776
## 399 2014     5   0.398  0.107 -0.010 -0.780 -0.831 -1.651 -1.700 -0.796 1.807
## 400 2014     6   0.409  0.136  0.007 -0.753 -0.802 -1.610 -1.660 -0.762 1.796
## 401 2014     7   0.456  0.117  0.004 -0.753 -0.798 -1.601 -1.656 -0.769 1.773
## 402 2014     8   0.553  0.194  0.105 -0.649 -0.700 -1.505 -1.554 -0.680 1.748
## 403 2014     9   0.481  0.276  0.193 -0.556 -0.608 -1.408 -1.448 -0.586 1.724
## 404 2014    10   0.462  0.163  0.080 -0.675 -0.729 -1.539 -1.573 -0.705 1.736
## 405 2014    11   0.313  0.122  0.030 -0.729 -0.780 -1.591 -1.647 -0.762 1.769
## 406 2014    12   0.531  0.151  0.045 -0.733 -0.774 -1.594 -1.653 -0.751 1.804
## 407 2015     1   0.485  0.090 -0.027 -0.796 -0.840 -1.653 -1.730 -0.820 1.820
## 408 2015     2   0.406  0.063 -0.027 -0.794 -0.844 -1.662 -1.750 -0.843 1.813
## 409 2015     3   0.494  0.018 -0.062 -0.829 -0.871 -1.681 -1.731 -0.856 1.749
## 410 2015     4   0.425  0.050 -0.040 -0.807 -0.854 -1.668 -1.722 -0.836 1.772
## 411 2015     5   0.403  0.116  0.001 -0.759 -0.804 -1.609 -1.668 -0.776 1.784
## 412 2015     6   0.304  0.051 -0.084 -0.856 -0.901 -1.718 -1.773 -0.861 1.824
## 413 2015     7   0.484  0.132  0.009 -0.769 -0.816 -1.641 -1.716 -0.792 1.848
## 414 2015     8   0.486  0.155  0.066 -0.715 -0.767 -1.600 -1.662 -0.753 1.817
## 415 2015     9   0.698  0.198  0.140 -0.628 -0.677 -1.493 -1.539 -0.670 1.737
## 416 2015    10   0.880  0.389  0.307 -0.457 -0.506 -1.320 -1.368 -0.489 1.757
## 417 2015    11   0.503  0.227  0.139 -0.618 -0.664 -1.468 -1.509 -0.641 1.736
## 418 2015    12   0.337  0.167  0.070 -0.688 -0.739 -1.547 -1.597 -0.715 1.765
## 419 2016     1   0.439  0.110  0.003 -0.752 -0.793 -1.590 -1.668 -0.779 1.778
## 420 2016     2   0.475  0.026 -0.054 -0.822 -0.869 -1.684 -1.741 -0.857 1.767
## 421 2016     3   0.322  0.028 -0.041 -0.802 -0.848 -1.655 -1.707 -0.839 1.735
## 422 2016     4   0.370  0.131  0.036 -0.729 -0.777 -1.591 -1.633 -0.751 1.764
## 423 2016     5   0.570  0.142  0.036 -0.738 -0.788 -1.612 -1.653 -0.755 1.795
## 424 2016     6   0.540  0.240  0.116 -0.664 -0.715 -1.547 -1.615 -0.687 1.855
## 425 2016     7   0.445  0.074 -0.049 -0.844 -0.894 -1.739 -1.817 -0.872 1.891
## 426 2016     8   0.366  0.112  0.017 -0.756 -0.807 -1.632 -1.686 -0.787 1.798
## 427 2016     9   0.472  0.152  0.068 -0.683 -0.728 -1.524 -1.577 -0.712 1.729
## 428 2016    10   1.070  0.343  0.240 -0.513 -0.566 -1.373 -1.432 -0.544 1.775
## 429 2016    11   0.655  0.228  0.129 -0.627 -0.675 -1.479 -1.522 -0.647 1.750
## 430 2016    12   0.544  0.132  0.018 -0.754 -0.798 -1.614 -1.673 -0.770 1.805
## 431 2017     1   0.385 -0.001 -0.112 -0.895 -0.939 -1.767 -1.834 -0.917 1.833
## 432 2017     2   0.183 -0.032 -0.112 -0.892 -0.936 -1.760 -1.808 -0.920 1.776
## 433 2017     3   0.508 -0.028 -0.105 -0.895 -0.937 -1.769 -1.817 -0.922 1.789
## 434 2017     4   0.530  0.144  0.032 -0.761 -0.809 -1.650 -1.695 -0.775 1.839
## 435 2017     5   0.425  0.099 -0.026 -0.818 -0.870 -1.714 -1.776 -0.839 1.875
## 436 2017     6   0.443  0.132  0.014 -0.755 -0.805 -1.624 -1.691 -0.779 1.823
## 437 2017     7   0.450  0.076 -0.042 -0.807 -0.855 -1.669 -1.734 -0.829 1.810
## 438 2017     8   0.409  0.167  0.065 -0.679 -0.727 -1.520 -1.576 -0.705 1.743
## 439 2017     9   1.246  0.334  0.243 -0.505 -0.552 -1.347 -1.400 -0.533 1.734
## 440 2017    10   0.464  0.200  0.122 -0.615 -0.658 -1.439 -1.474 -0.637 1.674
## 441 2017    11   0.558  0.168  0.078 -0.690 -0.724 -1.527 -1.571 -0.701 1.739
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## 442 2017    12   0.625  0.087 -0.030 -0.823 -0.862 -1.693 -1.754 -0.833 1.841
## 443 2018     1   0.603  0.006 -0.117 -0.918 -0.959 -1.802 -1.858 -0.926 1.864
## 444 2018     2   0.453 -0.010 -0.097 -0.872 -0.911 -1.725 -1.788 -0.899 1.778
## 445 2018     3   0.376  0.124  0.046 -0.731 -0.776 -1.598 -1.657 -0.766 1.781
## 446 2018     4   0.345  0.050 -0.051 -0.820 -0.863 -1.676 -1.728 -0.839 1.778
## 447 2018     5   0.349  0.063 -0.056 -0.826 -0.872 -1.688 -1.736 -0.836 1.799
## 448 2018     6   0.440  0.061 -0.070 -0.835 -0.883 -1.695 -1.751 -0.845 1.812
## 449 2018     7   0.560  0.145  0.016 -0.733 -0.781 -1.578 -1.641 -0.748 1.786
## 450 2018     8   0.449  0.087 -0.019 -0.787 -0.836 -1.653 -1.708 -0.810 1.795
## 451 2018     9   0.539  0.200  0.109 -0.641 -0.687 -1.484 -1.542 -0.671 1.742
## 452 2018    10   0.510  0.190  0.096 -0.645 -0.694 -1.484 -1.545 -0.678 1.735
## 453 2018    11   0.906  0.254  0.135 -0.624 -0.668 -1.471 -1.531 -0.638 1.785
## 454 2018    12   0.666  0.148  0.037 -0.729 -0.779 -1.596 -1.661 -0.756 1.809
## 455 2019     1   0.439  0.040 -0.056 -0.821 -0.868 -1.680 -1.740 -0.850 1.780
## 456 2019     2   0.685  0.133  0.032 -0.738 -0.781 -1.595 -1.655 -0.761 1.788
## 457 2019     3   0.506  0.138  0.053 -0.692 -0.739 -1.532 -1.594 -0.728 1.732
## 458 2019     4   0.422  0.106  0.012 -0.744 -0.790 -1.593 -1.646 -0.770 1.752
## 459 2019     5   0.438  0.158  0.039 -0.712 -0.762 -1.563 -1.614 -0.728 1.772
## 460 2019     6   0.487  0.202  0.052 -0.705 -0.751 -1.554 -1.610 -0.704 1.812
## 461 2019     7   0.571  0.224  0.084 -0.672 -0.722 -1.528 -1.600 -0.688 1.824
## 462 2019     8   0.701  0.222  0.112 -0.657 -0.706 -1.525 -1.579 -0.678 1.801
## 463 2019     9   0.655  0.315  0.212 -0.544 -0.587 -1.387 -1.463 -0.574 1.778
## 464 2019    10   0.619  0.337  0.244 -0.507 -0.554 -1.351 -1.390 -0.526 1.727
## 465 2019    11   0.628  0.314  0.195 -0.550 -0.595 -1.386 -1.441 -0.563 1.755
## 466 2019    12   0.687  0.137  0.016 -0.731 -0.774 -1.563 -1.613 -0.738 1.750
## 467 2020     1   0.432  0.062 -0.056 -0.808 -0.846 -1.637 -1.714 -0.826 1.776
## 468 2020     2   0.370  0.071 -0.028 -0.793 -0.832 -1.636 -1.688 -0.809 1.759
## 469 2020     3   0.313  0.050 -0.033 -0.781 -0.824 -1.615 -1.675 -0.812 1.725
## 470 2020     4   0.496  0.161  0.046 -0.707 -0.761 -1.569 -1.622 -0.730 1.783
## 471 2020     5   0.529  0.161  0.043 -0.723 -0.770 -1.584 -1.634 -0.737 1.795
## 472 2020     6   0.431  0.197  0.069 -0.690 -0.739 -1.547 -1.608 -0.705 1.805
## 473 2020     7   0.481  0.213  0.075 -0.687 -0.737 -1.550 -1.608 -0.697 1.821
## 474 2020     8   0.511  0.214  0.090 -0.667 -0.721 -1.532 -1.585 -0.685 1.799
## 475 2020     9   0.713  0.327  0.215 -0.515 -0.561 -1.336 -1.395 -0.534 1.722
## 476 2020    10   0.737  0.322  0.225 -0.505 -0.549 -1.323 -1.362 -0.520 1.684
## 477 2020    11   0.719  0.262  0.149 -0.584 -0.630 -1.409 -1.470 -0.604 1.732
## 478 2020    12   0.682  0.107 -0.041 -0.778 -0.824 -1.606 -1.674 -0.783 1.781
## 479 2011     1   0.096 -0.118 -0.139 -0.453 -0.442 -0.744 -0.790 -0.454 0.672
## 480 2011     2   0.025 -0.130 -0.150 -0.461 -0.453 -0.755 -0.795 -0.462 0.665
## 481 2011     3   0.027 -0.082 -0.098 -0.413 -0.401 -0.705 -0.740 -0.411 0.658
## 482 2011     4   0.110 -0.066 -0.082 -0.397 -0.387 -0.693 -0.733 -0.399 0.667
## 483 2011     5   0.241 -0.017 -0.038 -0.355 -0.345 -0.653 -0.696 -0.357 0.679
## 484 2011     6   0.168  0.020  0.004 -0.310 -0.304 -0.611 -0.653 -0.317 0.673
## 485 2011     7   0.143  0.017  0.000 -0.317 -0.310 -0.620 -0.663 -0.323 0.680
## 486 2011     8   0.359  0.112  0.102 -0.229 -0.219 -0.541 -0.572 -0.230 0.684
## 487 2011     9   0.275  0.132  0.120 -0.209 -0.200 -0.521 -0.550 -0.209 0.682
## 488 2011    10   0.317  0.185  0.167 -0.166 -0.155 -0.477 -0.516 -0.166 0.701
## 489 2011    11   0.332  0.183  0.161 -0.166 -0.156 -0.474 -0.513 -0.165 0.696
## 490 2011    12   0.234  0.051  0.030 -0.289 -0.281 -0.592 -0.626 -0.288 0.677
## 491 2012     1   0.057 -0.083 -0.102 -0.413 -0.403 -0.705 -0.744 -0.413 0.661
## 492 2012     2   0.248  0.039  0.025 -0.297 -0.287 -0.600 -0.634 -0.297 0.673
## 493 2012     3   0.198 -0.001 -0.021 -0.332 -0.323 -0.625 -0.661 -0.331 0.660
## 494 2012     4   0.227  0.044  0.025 -0.297 -0.288 -0.601 -0.634 -0.295 0.678
## 495 2012     5   0.236  0.095  0.071 -0.255 -0.245 -0.562 -0.601 -0.253 0.696
```

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## 496 2012     6   0.244  0.145  0.123 -0.206 -0.195 -0.513 -0.554 -0.204 0.699
## 497 2012     7   0.202  0.062  0.047 -0.279 -0.268 -0.584 -0.624 -0.281 0.686
## 498 2012     8   0.340  0.083  0.066 -0.256 -0.246 -0.559 -0.593 -0.255 0.676
## 499 2012     9   0.231  0.090  0.075 -0.248 -0.236 -0.548 -0.577 -0.243 0.667
## 500 2012    10   0.579  0.197  0.173 -0.148 -0.139 -0.450 -0.484 -0.143 0.681
## 501 2012    11   0.410  0.272  0.257 -0.077 -0.067 -0.390 -0.424 -0.076 0.696
## 502 2012    12   0.306  0.098  0.082 -0.245 -0.235 -0.552 -0.588 -0.245 0.686
## 503 2013     1   0.227  0.030  0.013 -0.310 -0.301 -0.615 -0.647 -0.308 0.677
## 504 2013     2   0.159  0.013 -0.005 -0.328 -0.317 -0.629 -0.661 -0.324 0.674
## 505 2013     3   0.342  0.086  0.066 -0.269 -0.258 -0.582 -0.612 -0.263 0.698
## 506 2013     4   0.227  0.018 -0.001 -0.326 -0.316 -0.631 -0.669 -0.326 0.686
## 507 2013     5   0.216  0.095  0.073 -0.257 -0.247 -0.567 -0.599 -0.252 0.694
## 508 2013     6   0.122 -0.003 -0.024 -0.344 -0.334 -0.644 -0.681 -0.342 0.678
## 509 2013     7   0.211  0.070  0.054 -0.263 -0.255 -0.563 -0.592 -0.261 0.662
## 510 2013     8   0.267  0.054  0.042 -0.274 -0.264 -0.570 -0.603 -0.274 0.657
## 511 2013     9   0.330  0.166  0.155 -0.170 -0.160 -0.475 -0.501 -0.167 0.667
## 512 2013    10   0.449  0.252  0.236 -0.093 -0.084 -0.403 -0.428 -0.088 0.680
## 513 2013    11   0.377  0.215  0.195 -0.135 -0.125 -0.445 -0.477 -0.131 0.692
## 514 2013    12   0.383  0.101  0.077 -0.255 -0.245 -0.568 -0.605 -0.252 0.706
## 515 2014     1   0.269  0.085  0.060 -0.277 -0.266 -0.592 -0.626 -0.270 0.711
## 516 2014     2   0.277  0.093  0.079 -0.253 -0.242 -0.563 -0.597 -0.252 0.690
## 517 2014     3   0.239  0.070  0.052 -0.286 -0.275 -0.601 -0.630 -0.280 0.700
## 518 2014     4   0.317  0.084  0.066 -0.265 -0.256 -0.578 -0.611 -0.264 0.695
## 519 2014     5   0.223  0.100  0.077 -0.250 -0.240 -0.556 -0.590 -0.245 0.690
## 520 2014     6   0.114  0.040  0.018 -0.302 -0.292 -0.602 -0.632 -0.296 0.672
## 521 2014     7   0.151  0.037  0.022 -0.295 -0.286 -0.594 -0.623 -0.293 0.661
## 522 2014     8   0.340  0.147  0.134 -0.194 -0.184 -0.502 -0.528 -0.190 0.675
## 523 2014     9   0.340  0.182  0.164 -0.166 -0.157 -0.479 -0.498 -0.158 0.680
## 524 2014    10   0.399  0.219  0.201 -0.135 -0.126 -0.452 -0.481 -0.131 0.700
## 525 2014    11   0.367  0.234  0.210 -0.130 -0.118 -0.447 -0.484 -0.125 0.718
## 526 2014    12   0.337  0.191  0.174 -0.167 -0.155 -0.484 -0.521 -0.165 0.712
## 527 2015     1   0.325  0.096  0.077 -0.256 -0.244 -0.565 -0.603 -0.254 0.699
## 528 2015     2   0.248  0.111  0.091 -0.242 -0.232 -0.555 -0.586 -0.237 0.697
## 529 2015     3   0.226  0.004 -0.019 -0.338 -0.331 -0.643 -0.671 -0.333 0.675
## 530 2015     4   0.254  0.038  0.020 -0.306 -0.296 -0.611 -0.642 -0.302 0.680
## 531 2015     5   0.174  0.072  0.045 -0.278 -0.267 -0.580 -0.614 -0.271 0.686
## 532 2015     6   0.130 -0.009 -0.031 -0.351 -0.342 -0.653 -0.690 -0.350 0.681
## 533 2015     7   0.104  0.027  0.008 -0.315 -0.307 -0.622 -0.661 -0.317 0.688
## 534 2015     8   0.346  0.128  0.117 -0.219 -0.211 -0.539 -0.568 -0.220 0.696
## 535 2015     9   0.554  0.199  0.186 -0.155 -0.146 -0.477 -0.503 -0.152 0.703
## 536 2015    10   0.509  0.383  0.368  0.017  0.027 -0.314 -0.345  0.019 0.728
## 537 2015    11   0.419  0.220  0.201 -0.134 -0.124 -0.449 -0.478 -0.129 0.699
## 538 2015    12   0.344  0.173  0.155 -0.172 -0.162 -0.479 -0.511 -0.169 0.684
## 539 2016     1   0.345  0.152  0.131 -0.199 -0.187 -0.505 -0.544 -0.196 0.696
## 540 2016     3   0.241  0.036  0.022 -0.303 -0.291 -0.604 -0.632 -0.298 0.668
## 541 2016     4   0.226  0.118  0.096 -0.236 -0.224 -0.545 -0.569 -0.226 0.687
## 542 2016     5   0.401  0.096  0.074 -0.260 -0.249 -0.573 -0.602 -0.253 0.698
## 543 2016     6   0.228  0.069  0.046 -0.286 -0.276 -0.598 -0.635 -0.283 0.704
## 544 2016     7   0.172  0.025  0.012 -0.312 -0.303 -0.618 -0.657 -0.316 0.682
## 545 2016     8   0.235  0.095  0.076 -0.249 -0.241 -0.558 -0.585 -0.245 0.680
## 546 2016     9   0.241  0.110  0.096 -0.227 -0.219 -0.533 -0.554 -0.222 0.664
## 547 2016    10   0.551  0.336  0.314 -0.022 -0.011 -0.337 -0.366 -0.015 0.702
## 548 2016    11   0.484  0.253  0.233 -0.104 -0.094 -0.422 -0.454 -0.100 0.707
## 549 2016    12   0.311  0.087  0.064 -0.264 -0.254 -0.573 -0.608 -0.260 0.695
```

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## 550 2017     1   0.258  0.058  0.034 -0.295 -0.284 -0.603 -0.636 -0.289 0.694
## 551 2017     2   0.119 -0.005 -0.021 -0.345 -0.333 -0.646 -0.680 -0.342 0.675
## 552 2017     3   0.214  0.014 -0.006 -0.334 -0.325 -0.643 -0.672 -0.329 0.686
## 553 2017     4   0.317  0.143  0.119 -0.217 -0.208 -0.534 -0.570 -0.214 0.713
## 554 2017     5   0.197  0.050  0.019 -0.312 -0.303 -0.625 -0.660 -0.305 0.710
## 555 2017     6   0.195  0.082  0.060 -0.263 -0.255 -0.570 -0.600 -0.259 0.682
## 556 2017     7   0.216  0.099  0.081 -0.238 -0.230 -0.541 -0.577 -0.239 0.676
## 557 2017     8   0.153  0.064  0.050 -0.263 -0.255 -0.560 -0.595 -0.265 0.659
## 558 2017     9   1.088  0.286  0.258 -0.068 -0.060 -0.378 -0.407 -0.060 0.693
## 559 2017    10   0.617  0.285  0.263 -0.065 -0.055 -0.374 -0.398 -0.056 0.683
## 560 2017    11   0.402  0.228  0.211 -0.128 -0.115 -0.441 -0.478 -0.125 0.706
## 561 2017    12   0.324  0.088  0.068 -0.269 -0.257 -0.583 -0.626 -0.269 0.714
## 562 2018     1   0.358  0.034  0.014 -0.324 -0.310 -0.634 -0.676 -0.321 0.710
## 563 2018     2   0.135 -0.046 -0.065 -0.382 -0.372 -0.679 -0.718 -0.382 0.672
## 564 2018     3   0.301  0.161  0.145 -0.196 -0.183 -0.512 -0.540 -0.189 0.701
## 565 2018     4   0.228  0.058  0.034 -0.296 -0.283 -0.601 -0.633 -0.288 0.691
## 566 2018     5   0.128 -0.016 -0.043 -0.349 -0.340 -0.637 -0.680 -0.348 0.664
## 567 2018     6   0.190  0.042  0.018 -0.299 -0.290 -0.598 -0.634 -0.296 0.676
## 568 2018     7   0.217  0.070  0.048 -0.270 -0.261 -0.571 -0.605 -0.267 0.675
## 569 2018     8   0.254  0.067  0.055 -0.264 -0.255 -0.565 -0.594 -0.264 0.661
## 570 2018     9   0.393  0.174  0.157 -0.170 -0.162 -0.481 -0.515 -0.170 0.689
## 571 2018    10   0.412  0.188  0.167 -0.160 -0.152 -0.471 -0.503 -0.157 0.691
## 572 2018    11   0.404  0.180  0.159 -0.175 -0.165 -0.489 -0.521 -0.171 0.701
## 573 2018    12   0.268  0.128  0.105 -0.227 -0.216 -0.538 -0.581 -0.227 0.709
## 574 2019     1   0.238  0.083  0.065 -0.265 -0.254 -0.573 -0.618 -0.267 0.701
## 575 2019     2   0.255  0.090  0.072 -0.258 -0.249 -0.570 -0.608 -0.259 0.698
## 576 2019     3   0.451  0.190  0.172 -0.156 -0.147 -0.466 -0.502 -0.156 0.692
## 577 2019     4   0.268  0.106  0.088 -0.233 -0.225 -0.539 -0.572 -0.233 0.678
## 578 2019     5   0.222  0.090  0.064 -0.255 -0.246 -0.557 -0.596 -0.253 0.686
## 579 2019     6   0.246  0.097  0.074 -0.248 -0.240 -0.553 -0.596 -0.249 0.693
## 580 2019     7   0.358  0.128  0.109 -0.214 -0.207 -0.523 -0.564 -0.218 0.692
## 581 2019     8   0.446  0.215  0.205 -0.131 -0.123 -0.452 -0.486 -0.135 0.701
## 582 2019     9   0.568  0.349  0.333 -0.008  0.000 -0.333 -0.366 -0.008 0.715
## 583 2019    10   0.599  0.387  0.370  0.026  0.033 -0.304 -0.338  0.025 0.725
## 584 2019    11   0.523  0.350  0.333 -0.004  0.006 -0.321 -0.358 -0.004 0.708
## 585 2019    12   0.321  0.168  0.148 -0.174 -0.166 -0.480 -0.518 -0.175 0.686
## 586 2020     1   0.393  0.082  0.057 -0.259 -0.249 -0.556 -0.597 -0.257 0.679
## 587 2020     2   0.295  0.045  0.020 -0.298 -0.288 -0.597 -0.632 -0.293 0.677
## 588 2020     3   0.288  0.039  0.020 -0.295 -0.287 -0.594 -0.634 -0.297 0.673
## 589 2020     4   0.311  0.091  0.071 -0.253 -0.244 -0.559 -0.596 -0.252 0.687
## 590 2020     5   0.227  0.128  0.107 -0.214 -0.207 -0.521 -0.552 -0.212 0.680
## 591 2020     6   0.259  0.153  0.134 -0.186 -0.178 -0.491 -0.530 -0.188 0.683
## 592 2020     7   0.233  0.101  0.082 -0.236 -0.228 -0.538 -0.578 -0.238 0.679
## 593 2020     8   0.365  0.157  0.143 -0.177 -0.168 -0.480 -0.516 -0.179 0.673
## 594 2020     9   0.592  0.311  0.296 -0.029 -0.022 -0.340 -0.369 -0.029 0.680
## 595 2020    10   0.590  0.346  0.327 -0.001  0.008 -0.312 -0.340  0.003 0.686
## 596 2020    11   0.573  0.305  0.281 -0.040 -0.030 -0.341 -0.382 -0.038 0.687
## 597 2020    12   0.248  0.090  0.063 -0.257 -0.244 -0.552 -0.597 -0.253 0.687
## 598 2015    10   0.615  0.296  0.275  0.223  0.200  0.125  0.127  0.212 0.169
## 599 2015    11   0.458  0.307  0.303  0.231  0.222  0.142  0.129  0.218 0.178
## 600 2015    12   0.376  0.165  0.165  0.082  0.073 -0.018 -0.018  0.073 0.183
## 601 2016     1   0.283  0.075  0.075 -0.004 -0.013 -0.101 -0.101 -0.013 0.176
## 602 2016     2   0.171 -0.012 -0.032 -0.117 -0.124 -0.216 -0.213 -0.113 0.201
## 603 2016     3   0.299  0.114  0.095  0.021  0.012 -0.071 -0.088  0.013 0.202
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## 604 2016     4   0.572  0.255  0.226  0.161  0.141  0.056  0.068  0.161 0.187
## 605 2016     5   0.425  0.291  0.295  0.208  0.201  0.108  0.096  0.193 0.195
## 606 2016     7   0.229  0.094  0.090  0.007 -0.006 -0.103 -0.104 -0.005 0.198
## 607 2016     8   0.446  0.144  0.143  0.068  0.058 -0.028 -0.029  0.057 0.173
## 608 2016     9   0.450  0.286  0.283  0.218  0.209  0.136  0.136  0.211 0.150
## 609 2016    10   0.415  0.306  0.300  0.239  0.229  0.158  0.153  0.229 0.153
## 610 2016    11   0.442  0.282  0.285  0.206  0.196  0.108  0.100  0.191 0.182
## 611 2016    12   0.415  0.183  0.183  0.094  0.087 -0.009 -0.009  0.087 0.192
## 612 2017     1   0.226  0.067  0.067 -0.019 -0.030 -0.127 -0.127 -0.030 0.194
## 613 2017     2   0.163  0.000 -0.006 -0.075 -0.089 -0.172 -0.171 -0.086 0.171
## 614 2017     3   0.311  0.121  0.114  0.039  0.036 -0.042 -0.063  0.029 0.184
## 615 2017     4   0.446  0.183  0.154  0.091  0.067 -0.021 -0.015  0.084 0.198
## 616 2017     5   0.310  0.140  0.140  0.049  0.036 -0.068 -0.068  0.036 0.208
## 617 2017     6   0.486  0.198  0.198  0.109  0.099  0.000  0.000  0.099 0.198
## 618 2017     7   0.091  0.016  0.016 -0.066 -0.076 -0.168 -0.168 -0.076 0.184
## 619 2017     8   0.300  0.062  0.060 -0.026 -0.036 -0.132 -0.146 -0.042 0.208
## 620 2017     9   0.358  0.202  0.192  0.124  0.109  0.027  0.023  0.112 0.179
## 621 2017    10   0.641  0.356  0.341  0.286  0.269  0.198  0.191  0.273 0.165
## 622 2017    11   0.272  0.143  0.135  0.064  0.057 -0.021 -0.029  0.057 0.172
## 623 2017    12   0.273  0.021  0.021 -0.064 -0.078 -0.176 -0.176 -0.078 0.197
## 624 2018     1   0.081 -0.088 -0.091 -0.181 -0.194 -0.296 -0.299 -0.194 0.211
## 625 2018     2   0.203  0.036  0.038 -0.042 -0.047 -0.132 -0.138 -0.051 0.174
## 626 2018     3   0.234  0.108  0.112  0.029  0.033 -0.046 -0.072  0.018 0.180
## 627 2018     4   0.334  0.121  0.115  0.037  0.028 -0.059 -0.074  0.023 0.195
## 628 2018     5   0.200  0.107  0.107  0.012  0.002 -0.102 -0.102  0.002 0.209
## 629 2018     6   0.268  0.066  0.066 -0.032 -0.044 -0.153 -0.153 -0.044 0.219
## 630 2018     7   0.108  0.006  0.006 -0.088 -0.099 -0.203 -0.203 -0.099 0.209
## 631 2018     8   0.250  0.117  0.113  0.040  0.034 -0.045 -0.056  0.030 0.173
## 632 2018     9   0.479  0.265  0.262  0.192  0.188  0.113  0.100  0.182 0.165
## 633 2018    10   0.667  0.383  0.388  0.307  0.306  0.224  0.209  0.296 0.174
## 634 2018    11   0.396  0.162  0.152  0.081  0.067 -0.017 -0.020  0.071 0.182
## 635 2018    12   0.298  0.061  0.063 -0.026 -0.033 -0.128 -0.134 -0.037 0.195
## 636 2019     1   0.154  0.034  0.034 -0.062 -0.069 -0.171 -0.171 -0.069 0.205
## 637 2019     3   0.344  0.165  0.153  0.080  0.067 -0.018 -0.019  0.073 0.184
## 638 2019     4   0.321  0.168  0.168  0.075  0.077 -0.013 -0.028  0.070 0.196
## 639 2019     5   0.529  0.379  0.378  0.296  0.289  0.200  0.196  0.287 0.183
## 640 2019     6   0.377  0.231  0.231  0.140  0.128  0.025  0.025  0.128 0.206
## 641 2019     7   0.302  0.165  0.160  0.072  0.057 -0.046 -0.047  0.059 0.212
## 642 2019     8   0.227  0.101  0.094  0.012  0.005 -0.084 -0.100  0.000 0.201
## 643 2019     9   0.481  0.315  0.320  0.233  0.237  0.155  0.137  0.226 0.178
## 644 2019    10   0.577  0.423  0.423  0.333  0.324  0.225  0.225  0.324 0.198
## 645 2019    11   0.396  0.241  0.234  0.155  0.144  0.054  0.046  0.143 0.195
## 646 2019    12   0.317  0.097  0.083  0.010 -0.010 -0.103 -0.104 -0.004 0.201
## 647 2020     1   0.311  0.120  0.116  0.031  0.018 -0.080 -0.082  0.019 0.202
## 648 2020     2   0.200  0.052  0.050 -0.048 -0.049 -0.148 -0.158 -0.053 0.210
## 649 2020     3   0.271  0.150  0.136  0.059  0.045 -0.045 -0.051  0.049 0.201
## 650 2020     4   0.463  0.307  0.299  0.223  0.209  0.119  0.113  0.210 0.194
## 651 2020     5   0.397  0.253  0.245  0.158  0.142  0.039  0.036  0.144 0.217
## 652 2020     6   0.432  0.283  0.278  0.188  0.183  0.087  0.076  0.179 0.207
## 653 2020     7   1.134  0.163  0.163  0.073  0.035 -0.092 -0.092  0.035 0.255
## 654 2020     8   0.605  0.147  0.143  0.062  0.042 -0.060 -0.067  0.040 0.214
## 655 2020     9   0.789  0.352  0.352  0.266  0.258  0.164  0.159  0.255 0.193
## 656 2020    10   0.672  0.310  0.306  0.222  0.215  0.124  0.122  0.216 0.188
## 657 2020    11   0.448  0.291  0.290  0.202  0.201  0.113  0.098  0.194 0.193
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## 658 2020    12   0.210 -0.014 -0.022 -0.117 -0.132 -0.242 -0.241 -0.127 0.227
##        MN    DHQ    DLQ   HWI  LWI Lowest Inferred           City Gauge_ID
## 1   2.964  0.164  0.103  3.63 9.85 -3.671        0         Boston  8443970
## 2   2.927  0.141  0.068  3.59 9.78 -3.703        0         Boston  8443970
## 3   2.913  0.117  0.066  3.63 9.85 -3.749        0         Boston  8443970
## 4   2.924  0.113  0.084  3.66 9.85 -3.761        0         Boston  8443970
## 5   2.879  0.132  0.113  3.68 9.89 -3.549        0         Boston  8443970
## 6   2.881  0.146  0.100  3.72 9.90 -3.322        0         Boston  8443970
## 7   2.906  0.152  0.082  3.69 9.83 -3.277        0         Boston  8443970
## 8   2.956  0.119  0.057  3.68 9.84 -3.533        0         Boston  8443970
## 9   2.965  0.106  0.068  3.65 9.83 -3.529        0         Boston  8443970
## 10  2.951  0.120  0.101  3.65 9.84 -3.666        0         Boston  8443970
## 11  2.919  0.132  0.113  3.58 9.78 -3.714        0         Boston  8443970
## 12  2.837  0.137  0.118  3.67 9.83 -3.581        0         Boston  8443970
## 13  2.849  0.171  0.116  3.62 9.84 -3.571        0         Boston  8443970
## 14  2.873  0.147  0.079  3.67 9.84 -3.400        0         Boston  8443970
## 15  2.851  0.108  0.091  3.70 9.82 -3.737        0         Boston  8443970
## 16  2.897  0.093  0.093  3.65 9.85 -3.526        0         Boston  8443970
## 17  2.939  0.126  0.118  3.67 9.87 -3.715        0         Boston  8443970
## 18  2.942  0.148  0.116  3.67 9.91 -3.426        0         Boston  8443970
## 19  2.952  0.156  0.096  3.70 9.91 -3.502        0         Boston  8443970
## 20  2.947  0.140  0.079  3.75 9.93 -3.360        0         Boston  8443970
## 21  2.885  0.101  0.067  3.73 9.91 -3.433        0         Boston  8443970
## 22  2.852  0.107  0.105  3.72 9.89 -3.509        0         Boston  8443970
## 23  2.933  0.134  0.128  3.68 9.88 -3.734        0         Boston  8443970
## 24  2.888  0.139  0.124  3.66 9.87 -3.741        0         Boston  8443970
## 25  2.919  0.137  0.082  3.60 9.85 -3.681        0         Boston  8443970
## 26  2.981  0.144  0.101  3.65 9.86 -3.553        0         Boston  8443970
## 27  3.101  0.112  0.071  3.63 9.84 -3.532        0         Boston  8443970
## 28  3.070  0.107  0.092  3.60 9.82 -3.697        0         Boston  8443970
## 29  3.059  0.112  0.104  3.62 9.86 -3.689        0         Boston  8443970
## 30  3.044  0.132  0.105  3.67 9.89 -3.709        0         Boston  8443970
## 31  2.988  0.130  0.085  3.72 9.92 -3.510        0         Boston  8443970
## 32  2.924  0.132  0.084  3.74 9.93 -3.563        0         Boston  8443970
## 33  2.903  0.107  0.073  3.72 9.93 -3.448        0         Boston  8443970
## 34  2.873  0.100  0.101  3.74 9.92 -3.337        0         Boston  8443970
## 35  2.899  0.141  0.125  3.68 9.90 -3.541        0         Boston  8443970
## 36  3.005  0.156  0.128  3.64 9.88 -3.856        0         Boston  8443970
## 37  3.061  0.167  0.120  3.61 9.84 -3.915        0         Boston  8443970
## 38  2.997  0.139  0.096  3.62 9.90 -3.911        0         Boston  8443970
## 39  3.078  0.111  0.067  3.65 9.87 -3.852        0         Boston  8443970
## 40  3.070  0.107  0.084  3.67 9.90 -3.496        0         Boston  8443970
## 41  3.020  0.127  0.115  3.67 9.88 -3.488        0         Boston  8443970
## 42  2.982  0.138  0.105  3.70 9.91 -3.508        0         Boston  8443970
## 43  2.976  0.141  0.082  3.73 9.90 -3.687        0         Boston  8443970
## 44  2.963  0.118  0.055  3.72 9.90 -3.640        0         Boston  8443970
## 45  2.967  0.117  0.058  3.70 9.90 -3.564        0         Boston  8443970
## 46  2.962  0.112  0.080  3.64 9.85 -3.530        0         Boston  8443970
## 47  2.997  0.134  0.110  3.65 9.84 -3.546        0         Boston  8443970
## 48  3.018  0.132  0.105  3.64 9.87 -3.659        0         Boston  8443970
## 49  2.967  0.150  0.115  3.61 9.83 -3.697        0         Boston  8443970
## 50  3.042  0.125  0.089  3.61 9.83 -4.095        0         Boston  8443970
## 51  2.975  0.085  0.068  3.73 9.90 -3.927        0         Boston  8443970
## 52  3.011  0.090  0.077  3.68 9.90 -3.735        0         Boston  8443970
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## 53  2.961  0.103  0.089  3.73 9.94 -3.614        0         Boston  8443970
## 54  2.946  0.127  0.096  3.71 9.91 -3.379        0         Boston  8443970
## 55  2.979  0.134  0.081  3.74 9.94 -3.442        0         Boston  8443970
## 56  3.047  0.109  0.056  3.71 9.88 -3.565        0         Boston  8443970
## 57  2.984  0.085  0.059  3.68 9.89 -3.716        0         Boston  8443970
## 58  2.999  0.094  0.080  3.66 9.86 -3.748        0         Boston  8443970
## 59  2.942  0.099  0.116  3.66 9.88 -3.867        0         Boston  8443970
## 60  2.895  0.124  0.123  3.68 9.90 -3.499        0         Boston  8443970
## 61  2.895  0.128  0.097  3.70 9.88 -3.500        0         Boston  8443970
## 62  3.007  0.128  0.087  3.62 9.93 -3.775        0         Boston  8443970
## 63  2.939  0.090  0.085  3.67 9.86 -3.715        0         Boston  8443970
## 64  2.998  0.078  0.097  3.64 9.83 -3.744        0         Boston  8443970
## 65  3.021  0.105  0.106  3.63 9.88 -3.661        0         Boston  8443970
## 66  3.051  0.127  0.108  3.68 9.89 -3.552        0         Boston  8443970
## 67  3.034  0.142  0.098  3.70 9.90 -3.568        0         Boston  8443970
## 68  2.990  0.131  0.086  3.73 9.91 -3.331        0         Boston  8443970
## 69  2.957  0.106  0.082  3.71 9.89 -3.484        0         Boston  8443970
## 70  2.903  0.101  0.093  3.70 9.92 -3.517        0         Boston  8443970
## 71  2.887  0.114  0.109  3.66 9.89 -3.630        0         Boston  8443970
## 72  2.917  0.143  0.131  3.68 9.91 -3.844        0         Boston  8443970
## 73  2.943  0.158  0.109  3.68 9.85 -3.777        0         Boston  8443970
## 74  2.992  0.130  0.068  3.66 9.86 -3.717        0         Boston  8443970
## 75  3.070  0.114  0.090  3.63 9.85 -3.644        0         Boston  8443970
## 76  3.074  0.095  0.081  3.60 9.82 -3.749        0         Boston  8443970
## 77  3.057  0.110  0.096  3.61 9.84 -3.574        0         Boston  8443970
## 78  3.004  0.122  0.116  3.68 9.89 -3.640        0         Boston  8443970
## 79  2.881  0.124  0.076  3.78 9.96 -3.439        0         Boston  8443970
## 80  2.904  0.101  0.071  3.72 9.90 -3.262        0         Boston  8443970
## 81  2.903  0.095  0.100  3.72 9.87 -3.392        0         Boston  8443970
## 82  2.926  0.112  0.117  3.60 9.83 -3.564        0         Boston  8443970
## 83  2.975  0.159  0.125  3.62 9.87 -3.668        0         Boston  8443970
## 84  3.093  0.165  0.101  3.60 9.85 -3.973        0         Boston  8443970
## 85  2.971  0.128  0.084  3.67 9.84 -3.947        0         Boston  8443970
## 86  3.084  0.127  0.100  3.68 9.93 -3.515        0         Boston  8443970
## 87  3.074  0.087  0.105  3.65 9.87 -3.567        0         Boston  8443970
## 88  3.012  0.129  0.119  3.67 9.87 -3.573        0         Boston  8443970
## 89  2.983  0.142  0.124  3.70 9.90 -3.624        0         Boston  8443970
## 90  2.967  0.150  0.105  3.73 9.91 -3.650        0         Boston  8443970
## 91  2.949  0.127  0.071  3.70 9.87 -3.618        0         Boston  8443970
## 92  2.967  0.110  0.061  3.69 9.89 -3.430        0         Boston  8443970
## 93  2.945  0.122  0.091  3.62 9.79 -3.475        0         Boston  8443970
## 94  2.964  0.141  0.138  3.65 9.82 -3.558        0         Boston  8443970
## 95  2.949  0.145  0.129  3.65 9.83 -3.619        0         Boston  8443970
## 96  2.921  0.144  0.106  3.68 9.86 -3.822        0         Boston  8443970
## 97  2.951  0.121  0.100  3.60 9.81 -3.889        0         Boston  8443970
## 98  2.908  0.107  0.084  3.66 9.88 -3.624        0         Boston  8443970
## 99  2.923  0.095  0.113  3.66 9.89 -3.507        0         Boston  8443970
## 100 2.869  0.101  0.116  3.73 9.93 -3.354        0         Boston  8443970
## 101 2.871  0.133  0.116  3.73 9.89 -3.265        0         Boston  8443970
## 102 2.923  0.149  0.104  3.73 9.89 -3.433        0         Boston  8443970
## 103 2.977  0.129  0.087  3.69 9.89 -3.565        0         Boston  8443970
## 104 2.973  0.101  0.064  3.71 9.88 -3.600        0         Boston  8443970
## 105 2.981  0.109  0.072  3.71 9.90 -3.477        0         Boston  8443970
## 106 2.884  0.127  0.131  3.67 9.85 -3.458        0         Boston  8443970
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## 107 2.884  0.157  0.148  3.70 9.87 -3.656        0         Boston  8443970
## 108 2.837  0.127  0.111  3.69 9.90 -3.498        0         Boston  8443970
## 109 2.900  0.136  0.094  3.68 9.93 -3.731        0         Boston  8443970
## 110 2.891  0.119  0.098  3.65 9.85 -3.675        0         Boston  8443970
## 111 2.928  0.102  0.124  3.63 9.83 -3.513        0         Boston  8443970
## 112 2.927  0.111  0.135  3.60 9.82 -3.855        0         Boston  8443970
## 113 2.944  0.131  0.132  3.66 9.87 -3.475        0         Boston  8443970
## 114 2.932  0.154  0.118  3.74 9.91 -3.281        0         Boston  8443970
## 115 2.901  0.152  0.113  3.74 9.94 -3.472        0         Boston  8443970
## 116 2.876  0.132  0.088  3.72 9.91 -3.466        0         Boston  8443970
## 117 2.864  0.110  0.103  3.71 9.90 -3.633        0         Boston  8443970
## 118 2.834  0.142  0.126  3.65 9.86 -3.660        0         Boston  8443970
## 119 2.866  0.169  0.158  3.70 9.92 -3.826        0         Boston  8443970
## 120 1.401  0.127  0.064  0.77 7.20 -1.929        0       New York  8518750
## 121 1.409  0.120  0.093  0.64 7.05 -2.228        0       New York  8518750
## 122 1.393  0.090  0.061  0.65 7.14 -2.030        0       New York  8518750
## 123 1.414  0.096  0.066  0.71 7.10 -1.870        0       New York  8518750
## 124 1.378  0.109  0.054  0.66 7.12 -1.540        0       New York  8518750
## 125 1.384  0.109  0.058  0.68 7.08 -1.591        0       New York  8518750
## 126 1.420  0.103  0.053  0.65 7.13 -1.577        0       New York  8518750
## 127 1.455  0.097  0.062  0.60 7.21 -1.866        0       New York  8518750
## 128 1.449  0.084  0.045  0.63 7.16 -1.599        0       New York  8518750
## 129 1.449  0.092  0.061  0.74 7.10 -1.811        0       New York  8518750
## 130 1.415  0.108  0.050  0.77 7.18 -1.804        0       New York  8518750
## 131 1.418  0.121  0.070  0.82 7.24 -1.939        0       New York  8518750
## 132 1.395  0.125  0.078  0.81 7.17 -2.101        0       New York  8518750
## 133 1.418  0.101  0.064  0.73 7.06 -2.192        0       New York  8518750
## 134 1.395  0.077  0.047  0.71 7.14 -2.078        0       New York  8518750
## 135 1.436  0.081  0.055  0.75 7.13 -1.785        0       New York  8518750
## 136 1.438  0.092  0.059  0.76 7.19 -1.733        0       New York  8518750
## 137 1.443  0.100  0.071  0.69 7.16 -1.615        0       New York  8518750
## 138 1.453  0.100  0.058  0.68 7.22 -1.653        0       New York  8518750
## 139 1.457  0.081  0.048  0.71 7.21 -1.643        0       New York  8518750
## 140 1.443  0.075  0.046  0.77 7.19 -1.747        0       New York  8518750
## 141 1.463  0.118  0.066  0.81 7.23 -1.842        0       New York  8518750
## 142 1.405  0.108  0.061  0.79 7.17 -1.811        0       New York  8518750
## 143 1.422  0.121  0.106  0.77 7.20 -2.070        0       New York  8518750
## 144 1.431  0.117  0.083  0.70 7.06 -2.067        0       New York  8518750
## 145 1.411  0.109  0.060  0.72 7.11 -1.991        0       New York  8518750
## 146 1.444  0.078  0.068  0.71 7.05 -1.867        0       New York  8518750
## 147 1.444  0.092  0.065  0.69 7.11 -1.816        0       New York  8518750
## 148 1.464  0.079  0.068  0.74 7.11 -2.021        0       New York  8518750
## 149 1.435  0.098  0.069  0.72 7.18 -1.816        0       New York  8518750
## 150 1.399  0.093  0.054  0.68 7.20 -1.625        0       New York  8518750
## 151 1.401  0.085  0.035  0.69 7.18 -1.736        0       New York  8518750
## 152 1.411  0.073  0.039  0.70 7.18 -1.691        0       New York  8518750
## 153 1.420  0.066  0.040  0.76 7.23 -1.660        0       New York  8518750
## 154 1.450  0.094  0.068  0.72 7.23 -1.884        0       New York  8518750
## 155 1.466  0.130  0.060  0.75 7.11 -1.865        0       New York  8518750
## 156 1.471  0.125  0.060  0.80 7.19 -2.149        0       New York  8518750
## 157 1.399  0.098  0.056  0.71 7.19 -2.176        0       New York  8518750
## 158 1.467  0.078  0.045  0.77 7.19 -1.938        0       New York  8518750
## 159 1.442  0.098  0.068  0.71 7.10 -1.815        0       New York  8518750
## 160 1.437  0.097  0.065  0.72 7.13 -1.676        0       New York  8518750
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## 161 1.417  0.101  0.058  0.69 7.12 -1.690        0       New York  8518750
## 162 1.419  0.093  0.065  0.64 7.16 -1.740        0       New York  8518750
## 163 1.435  0.089  0.043  0.67 7.13 -1.673        0       New York  8518750
## 164 1.447  0.092  0.039  0.71 7.17 -1.714        0       New York  8518750
## 165 1.458  0.070  0.055  0.67 7.17 -1.819        0       New York  8518750
## 166 1.450  0.100  0.079  0.78 7.20 -2.008        0       New York  8518750
## 167 1.453  0.106  0.079  0.75 7.17 -1.873        0       New York  8518750
## 168 1.410  0.118  0.085  0.69 7.14 -2.115        0       New York  8518750
## 169 1.419  0.104  0.060  0.74 7.11 -2.420        0       New York  8518750
## 170 1.398  0.082  0.056  0.72 7.18 -2.112        0       New York  8518750
## 171 1.435  0.072  0.057  0.79 7.14 -1.865        0       New York  8518750
## 172 1.444  0.099  0.047  0.74 7.19 -1.811        0       New York  8518750
## 173 1.434  0.103  0.053  0.76 7.23 -1.640        0       New York  8518750
## 174 1.455  0.097  0.051  0.65 7.18 -1.626        0       New York  8518750
## 175 1.497  0.070  0.052  0.69 7.21 -1.813        0       New York  8518750
## 176 1.477  0.064  0.043  0.71 7.23 -1.809        0       New York  8518750
## 177 1.477  0.079  0.063  0.78 7.19 -1.850        0       New York  8518750
## 178 1.453  0.077  0.062  0.79 7.19 -1.861        0       New York  8518750
## 179 1.447  0.093  0.079  0.81 7.20 -1.999        0       New York  8518750
## 180 1.413  0.096  0.090  0.84 7.14 -2.263        0       New York  8518750
## 181 1.449  0.104  0.066  0.73 7.18 -2.253        0       New York  8518750
## 182 1.429  0.070  0.057  0.76 7.15 -1.924        0       New York  8518750
## 183 1.454  0.076  0.088  0.68 7.10 -2.233        0       New York  8518750
## 184 1.477  0.076  0.070  0.73 7.15 -1.770        0       New York  8518750
## 185 1.496  0.093  0.069  0.67 7.22 -1.820        0       New York  8518750
## 186 1.494  0.098  0.060  0.74 7.21 -1.774        0       New York  8518750
## 187 1.482  0.081  0.050  0.71 7.22 -1.695        0       New York  8518750
## 188 1.453  0.063  0.055  0.78 7.22 -1.738        0       New York  8518750
## 189 1.456  0.086  0.061  0.83 7.24 -1.755        0       New York  8518750
## 190 1.436  0.107  0.069  0.81 7.21 -2.027        0       New York  8518750
## 191 1.459  0.103  0.090  0.79 7.14 -2.288        0       New York  8518750
## 192 1.467  0.121  0.078  0.78 7.18 -2.102        0       New York  8518750
## 193 1.460  0.091  0.074  0.82 7.15 -2.290        0       New York  8518750
## 194 1.505  0.096  0.093  0.78 7.17 -2.202        0       New York  8518750
## 195 1.482  0.096  0.060  0.76 7.12 -1.806        0       New York  8518750
## 196 1.470  0.080  0.065  0.74 7.09 -1.641        0       New York  8518750
## 197 1.468  0.091  0.065  0.68 7.17 -1.810        0       New York  8518750
## 198 1.447  0.097  0.048  0.79 7.20 -1.613        0       New York  8518750
## 199 1.423  0.079  0.042  0.72 7.20 -1.682        0       New York  8518750
## 200 1.419  0.073  0.037  0.78 7.18 -1.729        0       New York  8518750
## 201 1.430  0.097  0.061  0.76 7.16 -1.761        0       New York  8518750
## 202 1.457  0.099  0.068  0.80 7.13 -1.805        0       New York  8518750
## 203 1.468  0.134  0.075  0.78 7.21 -2.159        0       New York  8518750
## 204 1.462  0.142  0.060  0.74 7.12 -2.551        0       New York  8518750
## 205 1.408  0.092  0.073  0.75 7.08 -2.075        0       New York  8518750
## 206 1.456  0.090  0.069  0.82 7.15 -1.922        0       New York  8518750
## 207 1.452  0.079  0.078  0.71 7.15 -1.815        0       New York  8518750
## 208 1.427  0.097  0.063  0.75 7.12 -1.693        0       New York  8518750
## 209 1.419  0.104  0.058  0.70 7.16 -1.702        0       New York  8518750
## 210 1.404  0.100  0.059  0.70 7.17 -1.699        0       New York  8518750
## 211 1.430  0.093  0.054  0.70 7.12 -1.624        0       New York  8518750
## 212 1.446  0.076  0.047  0.71 7.19 -1.558        0       New York  8518750
## 213 1.447  0.108  0.064  0.68 7.13 -1.639        0       New York  8518750
## 214 1.452  0.133  0.090  0.81 7.20 -1.970        0       New York  8518750
```

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## 215 1.450  0.124  0.070  0.77 7.12 -1.973        0       New York  8518750
## 216 1.409  0.117  0.090  0.81 7.19 -2.446        0       New York  8518750
## 217 1.428  0.111  0.080  0.69 7.15 -2.033        0       New York  8518750
## 218 1.391  0.096  0.046  0.77 7.14 -2.227        0       New York  8518750
## 219 1.401  0.089  0.070  0.75 7.14 -1.893        0       New York  8518750
## 220 1.410  0.095  0.062  0.83 7.13 -1.574        0       New York  8518750
## 221 1.407  0.101  0.062  0.70 7.16 -1.601        0       New York  8518750
## 222 1.431  0.105  0.059  0.69 7.15 -1.567        0       New York  8518750
## 223 1.467  0.083  0.052  0.71 7.18 -1.762        0       New York  8518750
## 224 1.460  0.072  0.049  0.75 7.23 -1.690        0       New York  8518750
## 225 1.433  0.096  0.060  0.81 7.20 -1.972        0       New York  8518750
## 226 1.428  0.103  0.067  0.78 7.22 -2.017        0       New York  8518750
## 227 1.378  0.127  0.109  0.83 7.18 -2.135        0       New York  8518750
## 228 1.370  0.112  0.066  0.77 7.11 -1.935        0       New York  8518750
## 229 1.407  0.110  0.087  0.81 7.20 -2.126        0       New York  8518750
## 230 1.378  0.088  0.061  0.77 7.05 -1.882        0       New York  8518750
## 231 1.423  0.084  0.061  0.73 7.11 -2.051        0       New York  8518750
## 232 1.421  0.091  0.084  0.66 7.12 -2.042        0       New York  8518750
## 233 1.438  0.099  0.063  0.74 7.17 -1.589        0       New York  8518750
## 234 1.423  0.109  0.068  0.73 7.19 -1.568        0       New York  8518750
## 235 1.431  0.093  0.049  0.79 7.21 -1.645        0       New York  8518750
## 236 1.398  0.085  0.055  0.75 7.17 -1.655        0       New York  8518750
## 237 1.407  0.086  0.050  0.77 7.17 -1.705        0       New York  8518750
## 238 1.395  0.105  0.077  0.83 7.16 -1.883        0       New York  8518750
## 239 1.388  0.130  0.087  0.74 7.17 -1.801        0       New York  8518750
## 240 0.339  0.079  0.061    NA   NA -1.009        0      Baltimore  8574680
## 241 0.335  0.087  0.087    NA   NA -1.023        0      Baltimore  8574680
## 242 0.334  0.070  0.076 11.45 5.79 -0.662        0      Baltimore  8574680
## 243 0.351  0.075  0.079    NA   NA -0.794        0      Baltimore  8574680
## 244 0.365  0.093  0.051 11.42 5.73 -0.689        0      Baltimore  8574680
## 245 0.363  0.096  0.049 11.42 5.58 -0.648        0      Baltimore  8574680
## 246 0.370  0.096  0.056 11.42 5.57 -0.533        0      Baltimore  8574680
## 247 0.371  0.070  0.061    NA   NA -0.887        0      Baltimore  8574680
## 248 0.386  0.079  0.059    NA   NA -0.705        0      Baltimore  8574680
## 249 0.370  0.118  0.071    NA   NA -0.687        0      Baltimore  8574680
## 250 0.360  0.108  0.072    NA   NA -0.797        0      Baltimore  8574680
## 251 0.353  0.090  0.083 11.59 5.82 -0.783        0      Baltimore  8574680
## 252 0.335  0.111  0.089 11.51 5.62 -1.104        0      Baltimore  8574680
## 253 0.344  0.093  0.069 11.51 5.66 -1.170        0      Baltimore  8574680
## 254 0.351  0.076  0.052    NA   NA -0.841        0      Baltimore  8574680
## 255 0.348  0.096  0.068    NA   NA -0.869        0      Baltimore  8574680
## 256 0.350  0.076  0.038 11.50 5.70 -0.575        0      Baltimore  8574680
## 257 0.362  0.098  0.065    NA   NA -0.632        0      Baltimore  8574680
## 258 0.364  0.094  0.057 11.43 5.60 -0.513        0      Baltimore  8574680
## 259 0.351  0.080  0.043 11.43 5.60 -0.504        0      Baltimore  8574680
## 260 0.354  0.076  0.070    NA   NA -0.642        0      Baltimore  8574680
## 261 0.340  0.094  0.073    NA   NA -0.689        0      Baltimore  8574680
## 262 0.339  0.096  0.079    NA   NA -0.772        0      Baltimore  8574680
## 263 0.332  0.075  0.083    NA   NA -0.877        0      Baltimore  8574680
## 264 0.313  0.075  0.049 11.48 5.70 -1.011        0      Baltimore  8574680
## 265 0.338  0.080  0.064    NA   NA -0.798        0      Baltimore  8574680
## 266 0.352  0.082  0.064    NA   NA -0.735        0      Baltimore  8574680
## 267 0.343  0.079  0.050 11.47 5.60 -1.065        0      Baltimore  8574680
## 268 0.362  0.095  0.049 11.51 5.57 -0.617        0      Baltimore  8574680
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## 269 0.355  0.083  0.049 11.43 5.72 -0.540        0      Baltimore  8574680
## 270 0.344  0.073  0.058 11.47 5.64 -0.593        0      Baltimore  8574680
## 271 0.338  0.082  0.059 11.40 5.62 -0.594        0      Baltimore  8574680
## 272 0.346  0.075  0.042    NA   NA -0.633        0      Baltimore  8574680
## 273 0.326  0.111  0.081    NA   NA -1.095        0      Baltimore  8574680
## 274 0.339  0.076  0.065    NA   NA -0.858        0      Baltimore  8574680
## 275 0.359  0.098  0.103    NA   NA -1.140        0      Baltimore  8574680
## 276 0.328  0.092  0.088 11.55 5.56 -0.979        0      Baltimore  8574680
## 277 0.345  0.075  0.083    NA   NA -1.027        0      Baltimore  8574680
## 278 0.353  0.092  0.071 11.35 5.67 -1.096        0      Baltimore  8574680
## 279 0.356  0.082  0.063 11.32 5.73 -0.488        0      Baltimore  8574680
## 280 0.358  0.078  0.048 11.45 5.60 -0.540        0      Baltimore  8574680
## 281 0.364  0.079  0.055    NA   NA -0.818        0      Baltimore  8574680
## 282 0.350  0.070  0.059 11.41 5.67 -0.440        0      Baltimore  8574680
## 283 0.350  0.071  0.072 11.38 5.63 -0.539        0      Baltimore  8574680
## 284 0.331  0.076  0.077 11.45 5.48 -0.779        0      Baltimore  8574680
## 285 0.332  0.100  0.090 11.54 5.50 -0.975        0      Baltimore  8574680
## 286 0.333  0.060  0.064    NA   NA -1.000        0      Baltimore  8574680
## 287 0.329  0.104  0.079    NA   NA -1.225        0      Baltimore  8574680
## 288 0.376  0.096  0.096    NA   NA -1.509        0      Baltimore  8574680
## 289 0.335  0.074  0.061 11.56 5.57 -0.875        0      Baltimore  8574680
## 290 0.338  0.075  0.071 11.49 5.74 -0.967        0      Baltimore  8574680
## 291 0.340  0.086  0.038 11.50 5.67 -0.824        0      Baltimore  8574680
## 292 0.371  0.084  0.060    NA   NA -0.547        0      Baltimore  8574680
## 293 0.361  0.076  0.049 11.42 5.75 -0.446        0      Baltimore  8574680
## 294 0.360  0.068  0.054 11.39 5.62 -0.550        0      Baltimore  8574680
## 295 0.351  0.064  0.052 11.43 5.60 -0.482        0      Baltimore  8574680
## 296 0.345  0.081  0.068 11.41 5.57 -0.682        0      Baltimore  8574680
## 297 0.333  0.089  0.066 11.52 5.58 -0.812        0      Baltimore  8574680
## 298 0.336  0.093  0.056 11.54 5.59 -0.761        0      Baltimore  8574680
## 299 0.335  0.070  0.097    NA   NA -1.152        0      Baltimore  8574680
## 300 0.337  0.083  0.084    NA   NA -1.014        0      Baltimore  8574680
## 301 0.340  0.080  0.061 11.48 5.67 -0.792        0      Baltimore  8574680
## 302 0.338  0.096  0.086 11.34 5.48 -1.176        0      Baltimore  8574680
## 303 0.353  0.078  0.036 11.49 5.67 -0.702        0      Baltimore  8574680
## 304 0.360  0.098  0.040 11.52 5.60 -0.576        0      Baltimore  8574680
## 305 0.370  0.079  0.057 11.62 5.71 -0.517        0      Baltimore  8574680
## 306 0.367  0.082  0.059 11.53 5.70 -0.564        0      Baltimore  8574680
## 307 0.348  0.075  0.062    NA   NA -0.454        0      Baltimore  8574680
## 308 0.352  0.075  0.086    NA   NA -0.977        0      Baltimore  8574680
## 309 0.325  0.082  0.065    NA   NA -0.940        0      Baltimore  8574680
## 310 0.313  0.109  0.074 11.53 5.60 -0.925        0      Baltimore  8574680
## 311 0.324  0.089  0.061    NA   NA -0.938        0      Baltimore  8574680
## 312 0.338  0.087  0.057 11.51 5.65 -1.014        0      Baltimore  8574680
## 313 0.334  0.066  0.051 11.43 5.59 -1.022        0      Baltimore  8574680
## 314 0.361  0.073  0.057 11.33 5.71 -0.551        0      Baltimore  8574680
## 315 0.353  0.086  0.056 11.42 5.62 -0.537        0      Baltimore  8574680
## 316 0.354  0.070  0.048 11.49 5.68 -0.530        0      Baltimore  8574680
## 317 0.366  0.086  0.057 11.52 5.83 -0.475        0      Baltimore  8574680
## 318 0.351  0.079  0.050 11.43 5.69 -0.488        0      Baltimore  8574680
## 319 0.350  0.062  0.055    NA   NA -0.556        0      Baltimore  8574680
## 320 0.346  0.097  0.052    NA   NA -0.664        0      Baltimore  8574680
## 321 0.336  0.102  0.064    NA   NA -0.772        0      Baltimore  8574680
## 322 0.337  0.092  0.085    NA   NA -0.985        0      Baltimore  8574680
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## 323 0.346  0.077  0.092    NA   NA -1.609        0      Baltimore  8574680
## 324 0.339  0.085  0.082 11.46 5.67 -1.056        0      Baltimore  8574680
## 325 0.350  0.091  0.073    NA   NA -1.792        0      Baltimore  8574680
## 326 0.341  0.083  0.062 11.46 5.62 -0.794        0      Baltimore  8574680
## 327 0.357  0.081  0.044 11.46 5.65 -0.516        0      Baltimore  8574680
## 328 0.361  0.094  0.047 11.39 5.68 -0.545        0      Baltimore  8574680
## 329 0.367  0.078  0.057    NA   NA -0.656        0      Baltimore  8574680
## 330 0.373  0.067  0.050 11.45 5.77 -0.473        0      Baltimore  8574680
## 331 0.371  0.094  0.060    NA   NA -0.456        0      Baltimore  8574680
## 332 0.390  0.074  0.094    NA   NA -1.019        0      Baltimore  8574680
## 333 0.366  0.119  0.081    NA   NA -0.795        0      Baltimore  8574680
## 334 0.370  0.088  0.062 11.40 5.82 -0.696        0      Baltimore  8574680
## 335 0.375  0.079  0.099    NA   NA -1.305        0      Baltimore  8574680
## 336 0.366  0.082  0.060 11.50 5.81 -0.838        0      Baltimore  8574680
## 337 0.345  0.061  0.058    NA   NA -0.787        0      Baltimore  8574680
## 338 0.373  0.102  0.070    NA   NA -0.937        0      Baltimore  8574680
## 339 0.373  0.093  0.059 11.44 5.70 -0.576        0      Baltimore  8574680
## 340 0.363  0.095  0.053 11.54 5.79 -0.524        0      Baltimore  8574680
## 341 0.371  0.088  0.044 11.48 5.66 -0.405        0      Baltimore  8574680
## 342 0.364  0.081  0.049 11.39 5.64 -0.475        0      Baltimore  8574680
## 343 0.349  0.098  0.072 11.41 5.59 -0.521        0      Baltimore  8574680
## 344 0.345  0.072  0.074    NA   NA -0.776        0      Baltimore  8574680
## 345 0.355  0.098  0.100    NA   NA -1.009        0      Baltimore  8574680
## 346 0.348  0.091  0.052    NA   NA -0.940        0      Baltimore  8574680
## 347 0.327  0.112  0.067    NA   NA -0.981        0      Baltimore  8574680
## 348 0.337  0.076  0.063    NA   NA -0.902        0      Baltimore  8574680
## 349 0.323  0.068  0.077 11.51 5.60 -0.825        0      Baltimore  8574680
## 350 0.348  0.111  0.073    NA   NA -0.780        0      Baltimore  8574680
## 351 0.332  0.090  0.060 11.41 5.67 -0.802        0      Baltimore  8574680
## 352 0.350  0.090  0.035 11.43 5.63 -0.483        0      Baltimore  8574680
## 353 0.368  0.094  0.054 11.46 5.68 -0.411        0      Baltimore  8574680
## 354 0.363  0.089  0.055 11.45 5.60 -0.435        0      Baltimore  8574680
## 355 0.341  0.068  0.066 11.47 5.63 -0.537        0      Baltimore  8574680
## 356 0.349  0.081  0.057    NA   NA -0.691        0      Baltimore  8574680
## 357 0.340  0.094  0.058    NA   NA -0.911        0      Baltimore  8574680
## 358 0.334  0.103  0.071    NA   NA -0.852        0      Baltimore  8574680
## 359 1.620  0.122  0.072  0.34 6.62 -2.301        0     Charleston  8665530
## 360 1.603  0.114  0.075  0.27 6.47 -2.315        0     Charleston  8665530
## 361 1.587  0.094  0.063  0.38 6.59 -2.219        0     Charleston  8665530
## 362 1.600  0.117  0.058  0.31 6.50 -2.152        0     Charleston  8665530
## 363 1.584  0.133  0.052  0.35 6.59 -2.014        0     Charleston  8665530
## 364 1.598  0.144  0.064  0.34 6.57 -1.966        0     Charleston  8665530
## 365 1.612  0.125  0.077  0.30 6.52 -2.022        0     Charleston  8665530
## 366 1.639  0.092  0.061  0.34 6.59 -1.959        0     Charleston  8665530
## 367 1.609  0.071  0.049  0.43 6.61 -1.934        0     Charleston  8665530
## 368 1.602  0.106  0.039  0.49 6.63 -2.044        0     Charleston  8665530
## 369 1.611  0.112  0.055  0.40 6.66 -2.331        0     Charleston  8665530
## 370 1.591  0.117  0.063  0.41 6.59 -2.190        0     Charleston  8665530
## 371 1.579  0.100  0.077  0.32 6.54 -2.307        0     Charleston  8665530
## 372 1.591  0.090  0.063  0.37 6.56 -2.063        0     Charleston  8665530
## 373 1.581  0.091  0.045  0.29 6.55 -2.162        0     Charleston  8665530
## 374 1.603  0.101  0.047  0.36 6.55 -2.087        0     Charleston  8665530
## 375 1.628  0.111  0.059  0.44 6.59 -2.097        0     Charleston  8665530
## 376 1.621  0.126  0.069  0.44 6.67 -2.017        0     Charleston  8665530
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## 377 1.655  0.130  0.062  0.37 6.59 -2.014        0     Charleston  8665530
## 378 1.641  0.097  0.054  0.43 6.62 -1.855        0     Charleston  8665530
## 379 1.603  0.082  0.052  0.46 6.67 -1.903        0     Charleston  8665530
## 380 1.565  0.085  0.040  0.52 6.71 -1.964        0     Charleston  8665530
## 381 1.589  0.108  0.044  0.43 6.66 -2.004        0     Charleston  8665530
## 382 1.598  0.125  0.074  0.34 6.57 -2.033        0     Charleston  8665530
## 383 1.615  0.095  0.053  0.28 6.52 -2.099        0     Charleston  8665530
## 384 1.606  0.084  0.060  0.34 6.55 -2.140        0     Charleston  8665530
## 385 1.647  0.073  0.052  0.29 6.46 -2.217        0     Charleston  8665530
## 386 1.639  0.099  0.059  0.33 6.56 -1.979        0     Charleston  8665530
## 387 1.639  0.107  0.042  0.37 6.61 -2.057        0     Charleston  8665530
## 388 1.648  0.113  0.069  0.32 6.57 -2.078        0     Charleston  8665530
## 389 1.635  0.108  0.048  0.32 6.53 -2.197        0     Charleston  8665530
## 390 1.597  0.087  0.066  0.37 6.60 -1.903        0     Charleston  8665530
## 391 1.572  0.074  0.042  0.41 6.60 -1.798        0     Charleston  8665530
## 392 1.574  0.067  0.035  0.43 6.68 -1.706        0     Charleston  8665530
## 393 1.601  0.101  0.048  0.44 6.66 -1.938        0     Charleston  8665530
## 394 1.655  0.108  0.048  0.34 6.62 -2.083        0     Charleston  8665530
## 395 1.692  0.106  0.077  0.34 6.60 -2.460        0     Charleston  8665530
## 396 1.634  0.086  0.056  0.30 6.55 -2.117        0     Charleston  8665530
## 397 1.692  0.079  0.061  0.36 6.62 -2.229        0     Charleston  8665530
## 398 1.631  0.103  0.042  0.30 6.56 -1.931        0     Charleston  8665530
## 399 1.641  0.118  0.049  0.32 6.56 -2.038        0     Charleston  8665530
## 400 1.617  0.129  0.050  0.35 6.58 -1.957        0     Charleston  8665530
## 401 1.606  0.113  0.054  0.35 6.56 -1.997        0     Charleston  8665530
## 402 1.611  0.088  0.049  0.39 6.60 -1.996        0     Charleston  8665530
## 403 1.601  0.083  0.040  0.43 6.69 -1.896        0     Charleston  8665530
## 404 1.619  0.083  0.034  0.40 6.62 -1.984        0     Charleston  8665530
## 405 1.621  0.092  0.056  0.44 6.65 -2.100        0     Charleston  8665530
## 406 1.639  0.106  0.059  0.44 6.68 -1.963        0     Charleston  8665530
## 407 1.626  0.117  0.077  0.38 6.61 -2.124        0     Charleston  8665530
## 408 1.635  0.090  0.088  0.32 6.54 -2.295        0     Charleston  8665530
## 409 1.619  0.080  0.050  0.34 6.56 -1.990        0     Charleston  8665530
## 410 1.628  0.090  0.054  0.32 6.57 -2.052        0     Charleston  8665530
## 411 1.610  0.115  0.059  0.39 6.62 -2.055        0     Charleston  8665530
## 412 1.634  0.135  0.055  0.42 6.61 -2.134        0     Charleston  8665530
## 413 1.650  0.123  0.075  0.41 6.61 -2.096        0     Charleston  8665530
## 414 1.666  0.089  0.062  0.38 6.57 -1.931        0     Charleston  8665530
## 415 1.633  0.058  0.045  0.41 6.61 -1.964        0     Charleston  8665530
## 416 1.627  0.082  0.048  0.55 6.72 -1.804        0     Charleston  8665530
## 417 1.607  0.088  0.041  0.49 6.68 -1.866        0     Charleston  8665530
## 418 1.617  0.098  0.050  0.51 6.72 -1.956        0     Charleston  8665530
## 419 1.593  0.107  0.078  0.43 6.67 -2.040        0     Charleston  8665530
## 420 1.630  0.080  0.057  0.43 6.61 -2.229        0     Charleston  8665530
## 421 1.614  0.069  0.052  0.35 6.53 -2.166        0     Charleston  8665530
## 422 1.627  0.095  0.042  0.36 6.58 -2.178        0     Charleston  8665530
## 423 1.648  0.106  0.041  0.38 6.59 -1.956        0     Charleston  8665530
## 424 1.663  0.124  0.068  0.45 6.66 -1.908        0     Charleston  8665530
## 425 1.690  0.123  0.078  0.41 6.64 -2.032        0     Charleston  8665530
## 426 1.649  0.095  0.054  0.41 6.63 -2.004        0     Charleston  8665530
## 427 1.592  0.084  0.053  0.44 6.69 -1.968        0     Charleston  8665530
## 428 1.613  0.103  0.059  0.61 6.78 -1.725        0     Charleston  8665530
## 429 1.608  0.099  0.043  0.50 6.68 -1.870        0     Charleston  8665530
## 430 1.632  0.114  0.059  0.41 6.67 -2.101        0     Charleston  8665530
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## 431 1.655  0.111  0.067  0.36 6.57 -2.170        0     Charleston  8665530
## 432 1.648  0.080  0.048  0.34 6.56 -2.275        0     Charleston  8665530
## 433 1.664  0.077  0.048  0.37 6.53 -2.156        0     Charleston  8665530
## 434 1.682  0.112  0.045  0.30 6.56 -2.064        0     Charleston  8665530
## 435 1.688  0.125  0.062  0.31 6.56 -2.257        0     Charleston  8665530
## 436 1.638  0.118  0.067  0.39 6.56 -2.161        0     Charleston  8665530
## 437 1.627  0.118  0.065  0.42 6.59 -2.040        0     Charleston  8665530
## 438 1.585  0.102  0.056  0.42 6.67 -1.964        0     Charleston  8665530
## 439 1.590  0.091  0.053  0.57 6.74 -1.741        0     Charleston  8665530
## 440 1.561  0.078  0.035  0.47 6.71 -1.740        0     Charleston  8665530
## 441 1.605  0.090  0.044  0.43 6.62 -1.894        0     Charleston  8665530
## 442 1.663  0.117  0.061  0.43 6.66 -2.145        0     Charleston  8665530
## 443 1.685  0.123  0.056  0.33 6.58 -2.108        0     Charleston  8665530
## 444 1.628  0.087  0.063  0.34 6.58 -2.093        0     Charleston  8665530
## 445 1.644  0.078  0.059  0.44 6.60 -2.187        0     Charleston  8665530
## 446 1.625  0.101  0.052  0.39 6.58 -2.288        0     Charleston  8665530
## 447 1.632  0.119  0.048  0.40 6.61 -1.931        0     Charleston  8665530
## 448 1.625  0.131  0.056  0.36 6.55 -2.055        0     Charleston  8665530
## 449 1.594  0.129  0.063  0.34 6.60 -2.007        0     Charleston  8665530
## 450 1.634  0.106  0.055  0.37 6.56 -2.116        0     Charleston  8665530
## 451 1.593  0.091  0.058  0.41 6.63 -1.898        0     Charleston  8665530
## 452 1.580  0.094  0.061  0.42 6.63 -1.963        0     Charleston  8665530
## 453 1.606  0.119  0.060  0.44 6.70 -1.875        0     Charleston  8665530
## 454 1.633  0.111  0.065  0.39 6.63 -2.330        0     Charleston  8665530
## 455 1.624  0.096  0.060  0.40 6.58 -2.228        0     Charleston  8665530
## 456 1.627  0.101  0.060  0.33 6.56 -2.028        0     Charleston  8665530
## 457 1.585  0.085  0.062  0.36 6.61 -2.001        0     Charleston  8665530
## 458 1.605  0.094  0.053  0.32 6.51 -2.052        0     Charleston  8665530
## 459 1.602  0.119  0.051  0.39 6.58 -1.918        0     Charleston  8665530
## 460 1.606  0.150  0.056  0.39 6.59 -1.783        0     Charleston  8665530
## 461 1.612  0.140  0.072  0.38 6.60 -1.869        0     Charleston  8665530
## 462 1.637  0.110  0.054  0.37 6.62 -1.705        0     Charleston  8665530
## 463 1.599  0.103  0.076  0.53 6.70 -1.992        0     Charleston  8665530
## 464 1.595  0.093  0.039  0.58 6.72 -1.861        0     Charleston  8665530
## 465 1.581  0.119  0.055  0.52 6.70 -2.047        0     Charleston  8665530
## 466 1.579  0.121  0.050  0.47 6.65 -1.886        0     Charleston  8665530
## 467 1.581  0.118  0.077  0.40 6.66 -2.087        0     Charleston  8665530
## 468 1.608  0.099  0.052  0.40 6.59 -2.278        0     Charleston  8665530
## 469 1.582  0.083  0.060  0.30 6.54 -2.152        0     Charleston  8665530
## 470 1.615  0.115  0.053  0.35 6.62 -1.886        0     Charleston  8665530
## 471 1.627  0.118  0.050  0.33 6.58 -2.134        0     Charleston  8665530
## 472 1.616  0.128  0.061  0.37 6.62 -1.997        0     Charleston  8665530
## 473 1.625  0.138  0.058  0.40 6.60 -1.814        0     Charleston  8665530
## 474 1.622  0.124  0.053  0.38 6.63 -1.849        0     Charleston  8665530
## 475 1.551  0.112  0.059  0.47 6.72 -1.721        0     Charleston  8665530
## 476 1.548  0.097  0.039  0.53 6.70 -1.721        0     Charleston  8665530
## 477 1.558  0.113  0.061  0.50 6.70 -1.821        0     Charleston  8665530
## 478 1.565  0.148  0.068  0.38 6.60 -2.006        0     Charleston  8665530
## 479 0.605  0.021  0.046  1.60 7.77 -0.924        0          Miami  8723214
## 480 0.605  0.020  0.040  1.43 7.64 -0.908        0          Miami  8723214
## 481 0.607  0.016  0.035  1.45 7.67 -0.910        0          Miami  8723214
## 482 0.611  0.016  0.040  1.49 7.67 -0.886        0          Miami  8723214
## 483 0.615  0.021  0.043  1.55 7.70 -0.816        0          Miami  8723214
## 484 0.615  0.016  0.042  1.49 7.63 -0.842        0          Miami  8723214
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## 485 0.620  0.017  0.043  1.46 7.63 -0.801        0          Miami  8723214
## 486 0.643  0.010  0.031  1.44 7.60 -0.704        0          Miami  8723214
## 487 0.641  0.012  0.029  1.44 7.56 -0.694        0          Miami  8723214
## 488 0.644  0.018  0.039  1.39 7.53 -0.683        0          Miami  8723214
## 489 0.635  0.022  0.039  1.46 7.60 -0.733        0          Miami  8723214
## 490 0.622  0.021  0.034  1.50 7.67 -0.885        0          Miami  8723214
## 491 0.603  0.019  0.039  1.54 7.67 -0.856        0          Miami  8723214
## 492 0.625  0.014  0.034  1.47 7.61 -0.751        0          Miami  8723214
## 493 0.604  0.020  0.036  1.42 7.65 -0.742        0          Miami  8723214
## 494 0.626  0.019  0.033  1.45 7.60 -0.762        0          Miami  8723214
## 495 0.633  0.024  0.039  1.53 7.70 -0.761        0          Miami  8723214
## 496 0.636  0.022  0.041  1.52 7.70 -0.777        0          Miami  8723214
## 497 0.631  0.015  0.040  1.54 7.69 -0.698        0          Miami  8723214
## 498 0.625  0.017  0.034  1.53 7.66 -0.730        0          Miami  8723214
## 499 0.623  0.015  0.029  1.54 7.65 -0.735        0          Miami  8723214
## 500 0.623  0.024  0.034  1.57 7.64 -0.713        0          Miami  8723214
## 501 0.647  0.015  0.034  1.52 7.61 -0.633        0          Miami  8723214
## 502 0.634  0.016  0.036  1.48 7.61 -0.773        0          Miami  8723214
## 503 0.628  0.017  0.032  1.49 7.66 -0.763        0          Miami  8723214
## 504 0.624  0.018  0.032  1.52 7.66 -0.750        0          Miami  8723214
## 505 0.648  0.020  0.030  1.46 7.60 -0.762        0          Miami  8723214
## 506 0.630  0.019  0.038  1.40 7.61 -0.783        0          Miami  8723214
## 507 0.640  0.023  0.032  1.43 7.60 -0.736        0          Miami  8723214
## 508 0.620  0.021  0.037  1.50 7.71 -0.804        0          Miami  8723214
## 509 0.617  0.016  0.029  1.52 7.72 -0.728        0          Miami  8723214
## 510 0.612  0.012  0.033  1.55 7.70 -0.709        0          Miami  8723214
## 511 0.630  0.011  0.026  1.48 7.58 -0.623        0          Miami  8723214
## 512 0.639  0.016  0.024  1.50 7.59 -0.548        0          Miami  8723214
## 513 0.640  0.020  0.032  1.51 7.58 -0.668        0          Miami  8723214
## 514 0.645  0.024  0.037  1.51 7.66 -0.718        0          Miami  8723214
## 515 0.652  0.025  0.034  1.53 7.65 -0.758        0          Miami  8723214
## 516 0.642  0.014  0.034  1.51 7.67 -0.725        0          Miami  8723214
## 517 0.652  0.018  0.029  1.47 7.68 -0.745        0          Miami  8723214
## 518 0.644  0.018  0.033  1.45 7.62 -0.757        0          Miami  8723214
## 519 0.633  0.023  0.034  1.46 7.59 -0.731        0          Miami  8723214
## 520 0.620  0.022  0.030  1.50 7.70 -0.803        0          Miami  8723214
## 521 0.616  0.016  0.029  1.52 7.68 -0.744        0          Miami  8723214
## 522 0.636  0.013  0.026  1.49 7.62 -0.699        0          Miami  8723214
## 523 0.643  0.018  0.019  1.50 7.68 -0.688        0          Miami  8723214
## 524 0.653  0.018  0.029  1.53 7.62 -0.585        0          Miami  8723214
## 525 0.657  0.024  0.037  1.48 7.58 -0.625        0          Miami  8723214
## 526 0.658  0.018  0.037  1.50 7.62 -0.661        0          Miami  8723214
## 527 0.641  0.019  0.039  1.49 7.63 -0.718        0          Miami  8723214
## 528 0.646  0.020  0.031  1.48 7.56 -0.737        0          Miami  8723214
## 529 0.624  0.023  0.028  1.53 7.66 -0.763        0          Miami  8723214
## 530 0.631  0.018  0.031  1.50 7.66 -0.746        0          Miami  8723214
## 531 0.625  0.027  0.034  1.50 7.69 -0.739        0          Miami  8723214
## 532 0.622  0.021  0.037  1.49 7.71 -0.816        0          Miami  8723214
## 533 0.630  0.019  0.039  1.50 7.67 -0.767        0          Miami  8723214
## 534 0.656  0.011  0.029  1.47 7.63 -0.684        0          Miami  8723214
## 535 0.663  0.013  0.026  1.46 7.58 -0.657        0          Miami  8723214
## 536 0.682  0.015  0.031  1.40 7.52 -0.575        0          Miami  8723214
## 537 0.651  0.019  0.029  1.51 7.66 -0.615        0          Miami  8723214
## 538 0.635  0.018  0.032  1.53 7.68 -0.717        0          Miami  8723214
```

```
## 539 0.636  0.021  0.039  1.55 7.68 -0.740        0          Miami  8723214
## 540 0.626  0.014  0.028  1.51 7.69 -0.778        0          Miami  8723214
## 541 0.641  0.022  0.024  1.47 7.63 -0.737        0          Miami  8723214
## 542 0.647  0.022  0.029  1.55 7.72 -0.691        0          Miami  8723214
## 543 0.644  0.023  0.037  1.60 7.78 -0.752        0          Miami  8723214
## 544 0.630  0.013  0.039  1.53 7.78 -0.793        0          Miami  8723214
## 545 0.634  0.019  0.027  1.55 7.77 -0.710        0          Miami  8723214
## 546 0.629  0.014  0.021  1.54 7.73 -0.689        0          Miami  8723214
## 547 0.651  0.022  0.029  1.55 7.61 -0.549        0          Miami  8723214
## 548 0.655  0.020  0.032  1.52 7.65 -0.591        0          Miami  8723214
## 549 0.637  0.023  0.035  1.55 7.74 -0.727        0          Miami  8723214
## 550 0.637  0.024  0.033  1.54 7.73 -0.782        0          Miami  8723214
## 551 0.625  0.016  0.034  1.54 7.72 -0.835        0          Miami  8723214
## 552 0.637  0.020  0.029  1.49 7.66 -0.807        0          Miami  8723214
## 553 0.653  0.024  0.036  1.46 7.64 -0.721        0          Miami  8723214
## 554 0.644  0.031  0.035  1.47 7.73 -0.780        0          Miami  8723214
## 555 0.630  0.022  0.030  1.55 7.76 -0.713        0          Miami  8723214
## 556 0.622  0.018  0.036  1.56 7.78 -0.787        0          Miami  8723214
## 557 0.610  0.014  0.035  1.59 7.76 -0.761        0          Miami  8723214
## 558 0.636  0.028  0.029  1.49 7.67 -0.562        0          Miami  8723214
## 559 0.637  0.022  0.024  1.47 7.58 -0.566        0          Miami  8723214
## 560 0.652  0.017  0.037  1.54 7.62 -0.669        0          Miami  8723214
## 561 0.651  0.020  0.043  1.58 7.71 -0.748        0          Miami  8723214
## 562 0.648  0.020  0.042  1.52 7.68 -0.850        0          Miami  8723214
## 563 0.614  0.019  0.039  1.51 7.71 -0.830        0          Miami  8723214
## 564 0.657  0.016  0.028  1.51 7.66 -0.685        0          Miami  8723214
## 565 0.635  0.024  0.032  1.47 7.68 -0.783        0          Miami  8723214
## 566 0.594  0.027  0.043  1.55 7.78 -0.780        0          Miami  8723214
## 567 0.616  0.024  0.036  1.54 7.76 -0.764        0          Miami  8723214
## 568 0.619  0.022  0.034  1.53 7.72 -0.748        0          Miami  8723214
## 569 0.620  0.012  0.029  1.52 7.71 -0.809        0          Miami  8723214
## 570 0.638  0.017  0.034  1.46 7.66 -0.636        0          Miami  8723214
## 571 0.638  0.021  0.032  1.45 7.59 -0.630        0          Miami  8723214
## 572 0.648  0.021  0.032  1.48 7.60 -0.663        0          Miami  8723214
## 573 0.643  0.023  0.043  1.50 7.67 -0.835        0          Miami  8723214
## 574 0.638  0.018  0.045  1.52 7.71 -0.823        0          Miami  8723214
## 575 0.642  0.018  0.038  1.42 7.66 -0.745        0          Miami  8723214
## 576 0.638  0.018  0.036  1.46 7.63 -0.641        0          Miami  8723214
## 577 0.627  0.018  0.033  1.44 7.66 -0.768        0          Miami  8723214
## 578 0.621  0.026  0.039  1.49 7.69 -0.783        0          Miami  8723214
## 579 0.627  0.023  0.043  1.52 7.70 -0.708        0          Miami  8723214
## 580 0.632  0.019  0.041  1.48 7.67 -0.681        0          Miami  8723214
## 581 0.657  0.010  0.034  1.48 7.65 -0.554        0          Miami  8723214
## 582 0.666  0.016  0.033  1.47 7.60 -0.495        0          Miami  8723214
## 583 0.674  0.017  0.034  1.44 7.59 -0.583        0          Miami  8723214
## 584 0.654  0.017  0.037  1.47 7.58 -0.652        0          Miami  8723214
## 585 0.628  0.020  0.038  1.52 7.64 -0.635        0          Miami  8723214
## 586 0.613  0.025  0.041  1.52 7.69 -0.797        0          Miami  8723214
## 587 0.617  0.025  0.035  1.48 7.69 -0.872        0          Miami  8723214
## 588 0.614  0.019  0.040  1.48 7.68 -0.728        0          Miami  8723214
## 589 0.630  0.020  0.037  1.42 7.63 -0.726        0          Miami  8723214
## 590 0.628  0.021  0.031  1.46 7.63 -0.743        0          Miami  8723214
## 591 0.625  0.019  0.039  1.53 7.73 -0.665        0          Miami  8723214
## 592 0.620  0.019  0.040  1.55 7.75 -0.648        0          Miami  8723214
```

```
## 593 0.623  0.014  0.036  1.51 7.73 -0.617        0          Miami  8723214
## 594 0.636  0.015  0.029  1.46 7.59 -0.542        0          Miami  8723214
## 595 0.639  0.019  0.028  1.47 7.62 -0.501        0          Miami  8723214
## 596 0.622  0.024  0.041  1.47 7.61 -0.606        0          Miami  8723214
## 597 0.615  0.027  0.045  1.55 7.62 -0.757        0          Miami  8723214
## 598 0.150  0.021 -0.002    NA   NA -0.110        0 Corpus Christi  8775296
## 599 0.161  0.004  0.013    NA   NA  0.009        0 Corpus Christi  8775296
## 600 0.183  0.000  0.000    NA   NA -0.395        0 Corpus Christi  8775296
## 601 0.176  0.000  0.000    NA   NA -0.495        0 Corpus Christi  8775296
## 602 0.184  0.020 -0.003    NA   NA -0.464        0 Corpus Christi  8775296
## 603 0.166  0.019  0.017    NA   NA -0.427        0 Corpus Christi  8775296
## 604 0.170  0.029 -0.012    NA   NA -0.209        0 Corpus Christi  8775296
## 605 0.187 -0.004  0.012    NA   NA -0.046        0 Corpus Christi  8775296
## 606 0.193  0.004  0.001    NA   NA -0.249        0 Corpus Christi  8775296
## 607 0.171  0.001  0.001    NA   NA -0.231        0 Corpus Christi  8775296
## 608 0.147  0.003  0.000    NA   NA -0.016        0 Corpus Christi  8775296
## 609 0.142  0.006  0.005    NA   NA  0.061        0 Corpus Christi  8775296
## 610 0.177 -0.003  0.008    NA   NA -0.069        0 Corpus Christi  8775296
## 611 0.192  0.000  0.000    NA   NA -0.148        0 Corpus Christi  8775296
## 612 0.194  0.000  0.000    NA   NA -0.471        0 Corpus Christi  8775296
## 613 0.166  0.006 -0.001    NA   NA -0.337        0 Corpus Christi  8775296
## 614 0.156  0.007  0.021    NA   NA -0.237        0 Corpus Christi  8775296
## 615 0.175  0.029 -0.006    NA   NA -0.215        0 Corpus Christi  8775296
## 616 0.208  0.000  0.000    NA   NA -0.227        0 Corpus Christi  8775296
## 617 0.198  0.000  0.000    NA   NA -0.113        0 Corpus Christi  8775296
## 618 0.184  0.000  0.000    NA   NA -0.274        0 Corpus Christi  8775296
## 619 0.192  0.002  0.014    NA   NA -0.300        0 Corpus Christi  8775296
## 620 0.165  0.010  0.004    NA   NA -0.332        0 Corpus Christi  8775296
## 621 0.143  0.015  0.007    NA   NA -0.152        0 Corpus Christi  8775296
## 622 0.156  0.008  0.008    NA   NA -0.150        0 Corpus Christi  8775296
## 623 0.197  0.000  0.000    NA   NA -0.385        0 Corpus Christi  8775296
## 624 0.205  0.003  0.003    NA   NA -0.525        0 Corpus Christi  8775296
## 625 0.170 -0.002  0.006    NA   NA -0.280        0 Corpus Christi  8775296
## 626 0.158 -0.004  0.026    NA   NA -0.171        0 Corpus Christi  8775296
## 627 0.174  0.006  0.015    NA   NA -0.245        0 Corpus Christi  8775296
## 628 0.209  0.000  0.000    NA   NA -0.246        0 Corpus Christi  8775296
## 629 0.219  0.000  0.000    NA   NA -0.315        0 Corpus Christi  8775296
## 630 0.209  0.000  0.000    NA   NA -0.349        0 Corpus Christi  8775296
## 631 0.158  0.004  0.011    NA   NA -0.224        0 Corpus Christi  8775296
## 632 0.149  0.003  0.013    NA   NA -0.062        0 Corpus Christi  8775296
## 633 0.164 -0.005  0.015    NA   NA -0.075        0 Corpus Christi  8775296
## 634 0.169  0.010  0.003    NA   NA -0.246        0 Corpus Christi  8775296
## 635 0.191 -0.002  0.006    NA   NA -0.488        0 Corpus Christi  8775296
## 636 0.205  0.000  0.000    NA   NA -0.492        0 Corpus Christi  8775296
## 637 0.171  0.012  0.001    NA   NA -0.186        0 Corpus Christi  8775296
## 638 0.181  0.000  0.015    NA   NA -0.232        0 Corpus Christi  8775296
## 639 0.178  0.001  0.004    NA   NA  0.038        0 Corpus Christi  8775296
## 640 0.206  0.000  0.000    NA   NA -0.097        0 Corpus Christi  8775296
## 641 0.206  0.005  0.001    NA   NA -0.302        0 Corpus Christi  8775296
## 642 0.178  0.007  0.016    NA   NA -0.226        0 Corpus Christi  8775296
## 643 0.165 -0.005  0.018    NA   NA -0.109        0 Corpus Christi  8775296
## 644 0.198  0.000  0.000    NA   NA -0.071        0 Corpus Christi  8775296
## 645 0.180  0.007  0.008    NA   NA -0.080        0 Corpus Christi  8775296
## 646 0.186  0.014  0.001    NA   NA -0.267        0 Corpus Christi  8775296
```

```
## 647 0.196  0.004  0.002    NA   NA -0.356        0 Corpus Christi  8775296
## 648 0.198  0.002  0.010    NA   NA -0.429        0 Corpus Christi  8775296
## 649 0.181  0.014  0.006    NA   NA -0.238        0 Corpus Christi  8775296
## 650 0.180  0.008  0.006    NA   NA -0.019        0 Corpus Christi  8775296
## 651 0.206  0.008  0.003    NA   NA -0.079        0 Corpus Christi  8775296
## 652 0.191  0.005  0.011    NA   NA -0.052        0 Corpus Christi  8775296
## 653 0.255  0.000  0.000    NA   NA -0.244        0 Corpus Christi  8775296
## 654 0.203  0.004  0.007    NA   NA -0.259        0 Corpus Christi  8775296
## 655 0.188  0.000  0.005    NA   NA -0.064        0 Corpus Christi  8775296
## 656 0.182  0.004  0.002    NA   NA -0.160        0 Corpus Christi  8775296
## 657 0.177  0.001  0.015    NA   NA -0.156        0 Corpus Christi  8775296
## 658 0.220  0.008 -0.001    NA   NA -0.530        0 Corpus Christi  8775296
```

2b. Take a look at your data frame - is this in a tidy format? **Answer:** No the dataset is not fully in tidy format because the date information displayed is split into separate, "Year" amd "Month" columns instead of being stored as a single "Date" column.

3. Your data frame right now has one column with a year and one with the month. We are going to combine these into a single column, and use the lubridate pacakage to tell R to interpret that column as a date. Make sure the lubridate package is installed (install.packages()) and loaded (library("lubridate"))

3.1 Create a new column named "Date" that has the first day of the month for that row in the format YYYY-MM-01 where YYYY is the data in the Year column and MM is the data in the Month column. Hint: Use paste0() to combine data and characters (i.e. the required separators "-")

3.2 Use the ymd() (i.e. year-month-day) function from the lubridate package to convert your new date column to a date object in R

```
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union
```

```
#3.1
#new column "Date" with "YYYY-MM-01" format
tidedata$Date <- paste0(tidedata$Year, "-", sprintf("%02d", tidedata$Month), "-01")
head(tidedata$Date)
```

```
## [1] "2011-01-01" "2011-02-01" "2011-03-01" "2011-04-01" "2011-05-01"
## [6] "2011-06-01"
```

```
#3.2
#converts the "Date" colsumn to a Date object using lubridate's ymd()
tidedata$Date <- ymd(tidedata$Date)
str(tidedata$Date)
```

```
##  Date[1:658], format: "2011-01-01" "2011-02-01" "2011-03-01" "2011-04-01" "2011-05-01" ...
```

Now lets use ggplot to make some cool graphs of this data using ggplot.

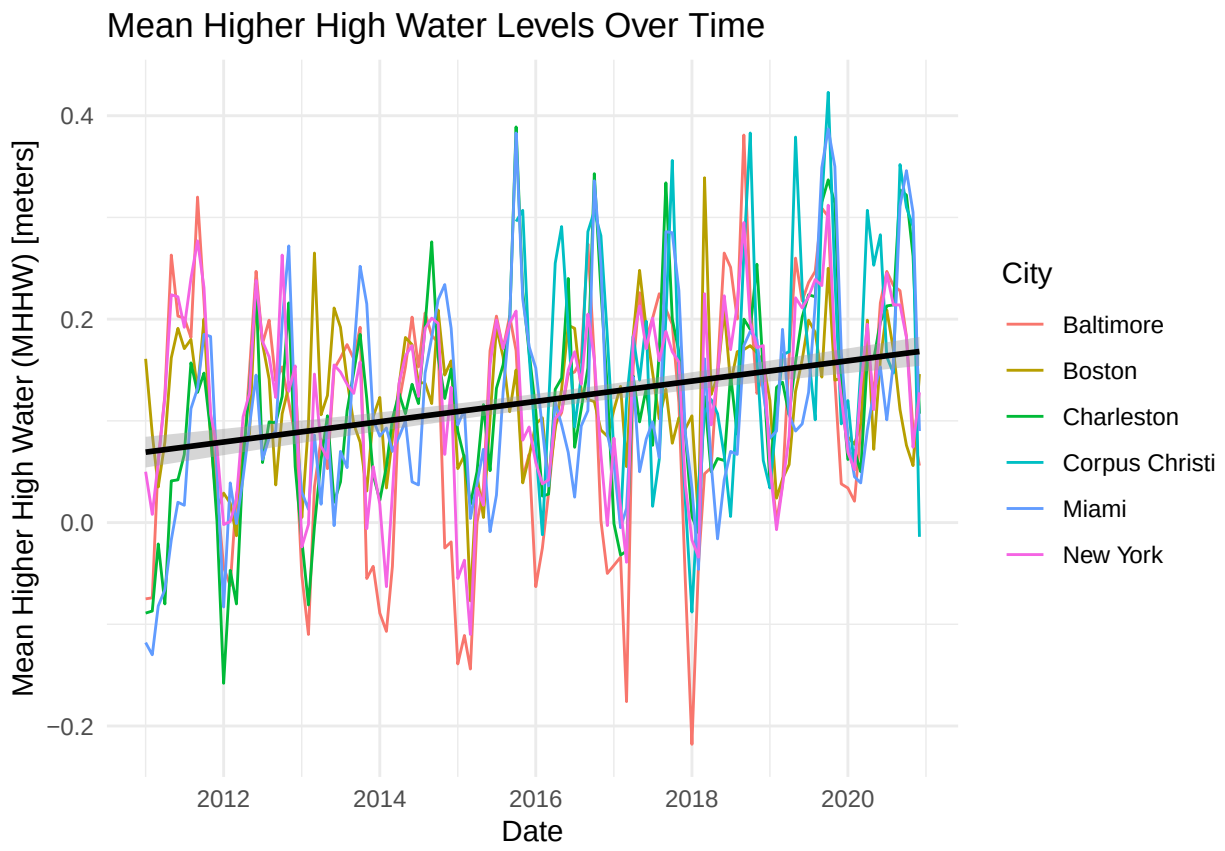
4. Make a plot showing data from all 6 gauges on the same plot. Use different colors to distinguish lines for the different cities. See the example plot uploaded to Canvas (Plot 1)

- Plot the date on the x axis and MHHW (mean higher high water - i.e. the average daily high water level) on the y axis Make sure to add proper axis labels and units (using +labs(x=“ “,y=” “))
- Add a single best-fit line through the full data set using geom_smooth(method=“lm”) - note that by default ggplot will fit one best fit line for each city. To override this specify the aestetic mapping (aes()) again within the geom_smooth function and add the argument inherit.aes=FALSE

```
library(ggplot2)
#creates a ggplot with daee on x-axis and MHHW on y-axis
ggplot(tidedata, aes(x = Date, y = MHHW, color = City)) +

#this adds a line for each city
  geom_line() +
#best-fit line across all data
  geom_smooth(aes(x = Date, y = MHHW), method = "lm", inherit.aes = FALSE, color = "black") +
#labels with units
  labs(
    title = "Mean Higher High Water Levels Over Time",
    x = "Date",
    y = "Mean Higher High Water (MHHW) [meters]",
    color = "City"
  ) +
    theme_minimal()
```

```
## `geom_smooth()` using formula = 'y ~ x'
```



5. Now make a slightly different plot with the same x and y variables, but use facet_wrap() to make a subplot separately for each city. Add a best-fit line for each subplot. See the example plot uploaded to Canvas (Plot 2)

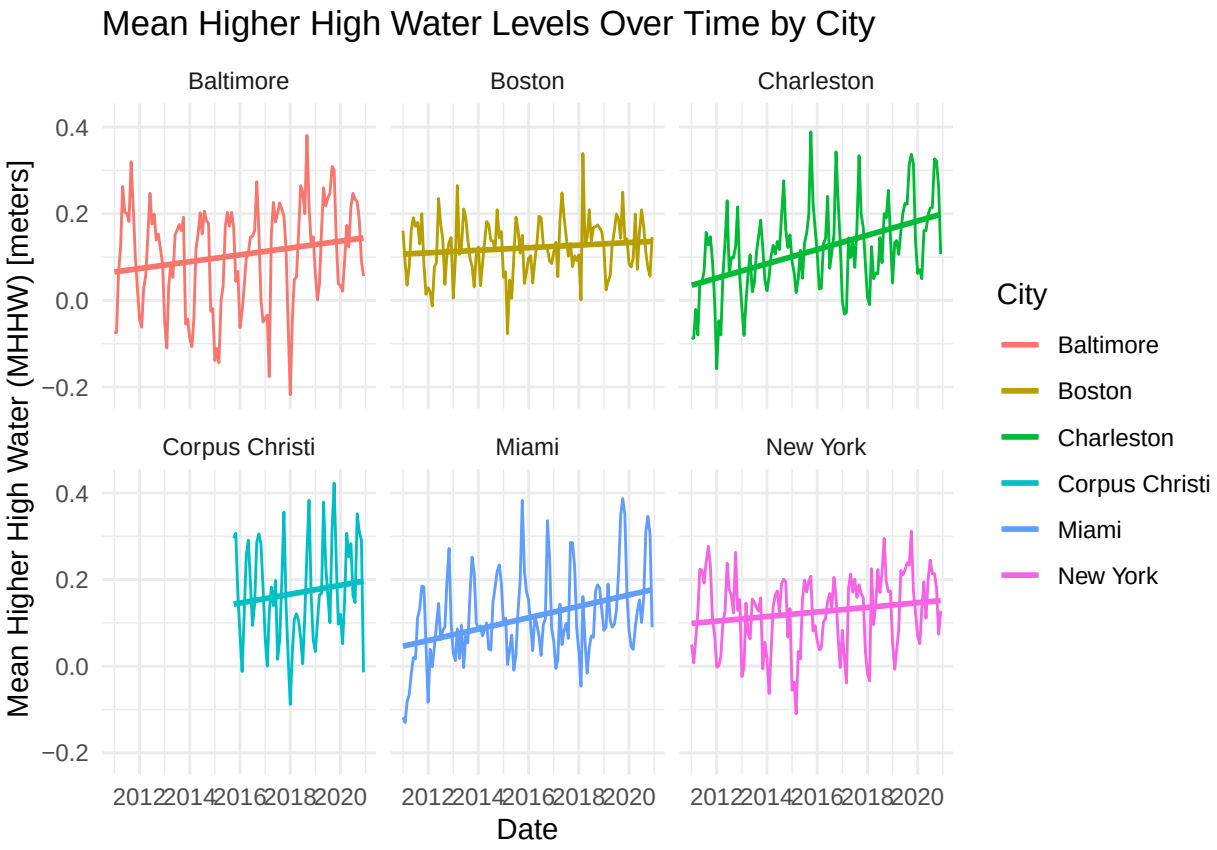
```
#Hint: you should only need minor modification of the code from question 4 to make this plot
library(ggplot2)
#facet plot
ggplot(tidedata, aes(x = Date, y = MHHW, color = City)) +

  # lines for each city's trend
  geom_line() +



 #best-fit line for each city
  geom_smooth(method = "lm", se = FALSE) +
#facets into separate subplots for each city
  facet_wrap(~ City) +
#labels and title
  labs(
    title = "Mean Higher High Water Levels Over Time by City",
    x = "Date",
    y = "Mean Higher High Water (MHHW) [meters]"
  ) +
    theme_minimal()
```

```
## `geom_smooth()` using formula = 'y ~ x'
```



Part 2 - Wednesday Jan 29th

In this part of the lab we will identify some outliers, and practice running regressions

6. Make a box plot showing the distribution of the highest tides each month ("Highest" column in the NOAA data) . (Ideally practice using ggplot by using geom_boxplot() - put the city on the x axis and Highest on the y. But this can also be done in base R). See the example plot on Canvas (Plot 3)

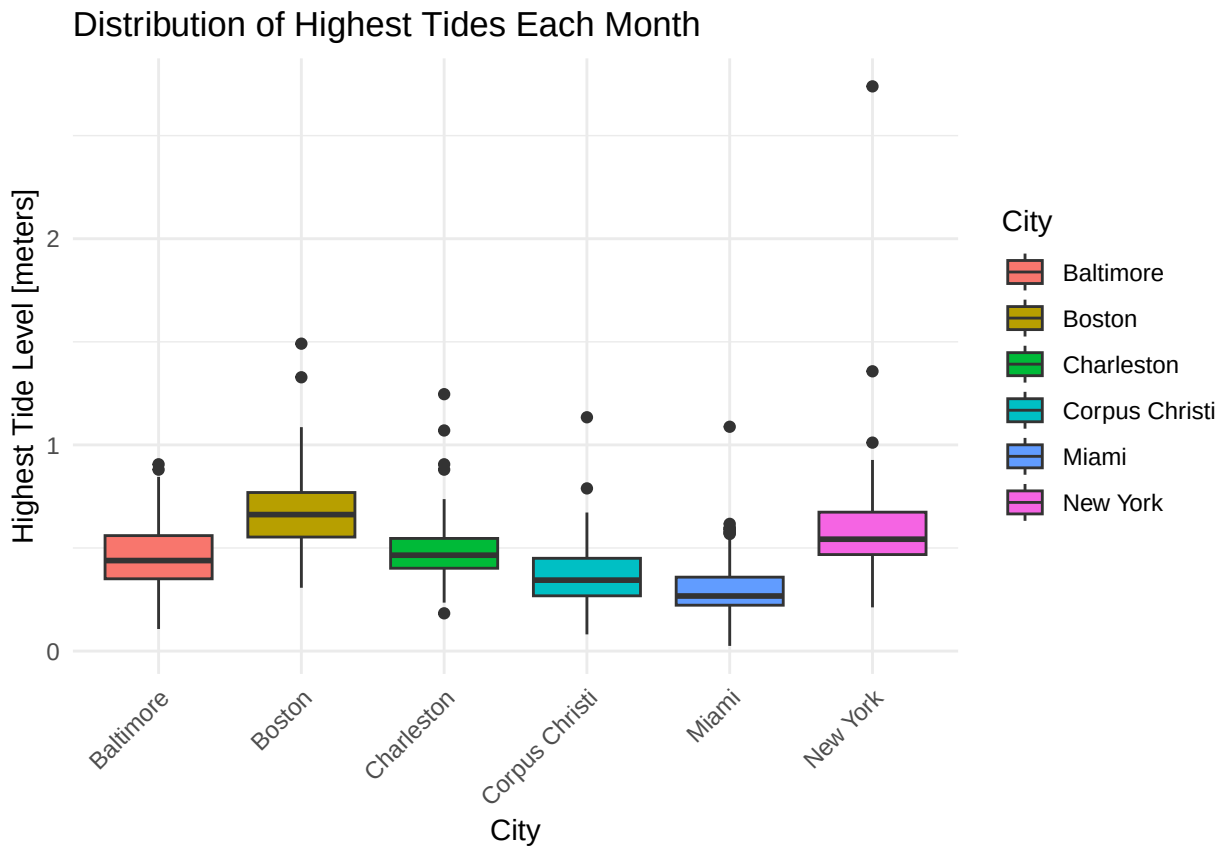
```
library(ggplot2)

# this creaes box plot with City on the x-axis and Highest tide on the y-axis
ggplot(tidedata, aes(x = City, y = Highest, fill = City)) +



#box plot
  geom_boxplot() +
  labs(
    title = "Distribution of Highest Tides Each Month",
    x = "City",
    y = "Highest Tide Level [meters]"
  ) +
```

```
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```



Notice the very extreme value in New York City - a major outlier both within New York and compared to all the other cities

7a. Find the row in the data corresponding to this outlier observation

```
#Hint: The which.max() function might be useful here
#finds the row index of the maximum "Highest" tide in New York
outlier_index <- which.max(tidedata$Highest[tidedata$City == "New York"])
outlier_row <- tidedata[tidedata$City == "New York", ][outlier_index, ]
outlier_row
```

```
##     Year Month Highest  MHHW   MHW    MSL    MTL    MLW   MLLW    DTL    GT
## 141 2012    10   2.739 0.263 0.145 -0.555 -0.587 -1.318 -1.384 -0.561 1.647
##        MN   DHQ   DLQ  HWI  LWI Lowest Inferred     City Gauge_ID       Date
## 141 1.463 0.118 0.066 0.81 7.23 -1.842        0 New York  8518750 2012-10-01
```

7b. What month and year did this outlier event occur in? What meteorological event happened in New York in that month that probably caused this outlier event? (Feel free to use Google - I don't expect you to know this off hand)

Answer: October 2012. This was mostly likely caused by Hurricane Sandy which happened October 29th 2012.

8a. Fit a linear regression with the mean higher high water (MHHW) as the dependent variable and date (i.e. time) as the independent variable.

```
#Hint: the forumla in your lm() function is of the form y~x where y here is MHHW and x is your date col
sea_level_model <- lm(MHHW ~ Date, data = tidedata)
summary(sea_level_model)
```

```
##
## Call:
## lm(formula = MHHW ~ Date, data = tidedata)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.35710 -0.06419  0.00207  0.06161  0.27239
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -3.399e-01  6.002e-02  -5.663 2.23e-08 ***
## Date         2.732e-05  3.552e-06   7.692 5.31e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.09572 on 656 degrees of freedom
## Multiple R-squared:  0.08274,    Adjusted R-squared:  0.08134
## F-statistic: 59.17 on 1 and 656 DF,  p-value: 5.314e-14
```

8b. Give the estimated coefficient of the date column. Is it statistically significant (i.e. has a p-value less than 0.05)?

This coefficient gives us the average increase in high tide levels each day, across all six cities, for this ten year time frame (i.e. the units of the coefficient are in m per day).

```
#summary of the regression model
summary(sea_level_model)
```

```
##
## Call:
## lm(formula = MHHW ~ Date, data = tidedata)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.35710 -0.06419  0.00207  0.06161  0.27239
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -3.399e-01  6.002e-02  -5.663 2.23e-08 ***
## Date         2.732e-05  3.552e-06   7.692 5.31e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.09572 on 656 degrees of freedom
## Multiple R-squared:  0.08274,    Adjusted R-squared:  0.08134
## F-statistic: 59.17 on 1 and 656 DF,  p-value: 5.314e-14
```

```r
#extracts the estimated coefficient for Date
coef_date <- summary(sea_level_model)$coefficients["Date", "Estimate"]
#extracts the p-value for Date
p_value_date <- summary(sea_level_model)$coefficients["Date", "Pr(>|t|)"]
cat("Estimated coefficient for Date:", coef_date, "meters per day\n")
```

```
## Estimated coefficient for Date: 2.732001e-05 meters per day
```

```r
cat("P-value:", p_value_date, "\n")
```

```
## P-value: 5.313671e-14
```

8c. Using your estimated coefficient, estimate the mean increase in sea-level over the 10 year time frame from 2011-2020.

```r
#calculatec  estimated increase in sea level over 10 years from 2011-2020
sea_level_increase_10yrs <- coef_date * 3650
cat("Estimated sea-level increase over 10 years:", sea_level_increase_10yrs, "meters\n")
```

```
## Estimated sea-level increase over 10 years: 0.09971803 meters
```

Upload your .Rmd file and you knitted file with the answers and plots to Canvas. Add and commit to your Github repository.