# MSDS 7333 Fall 2020: Final Case Study

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#### **Business Understanding**

The goal of this case is to provide business clients an understanding of how to approach a data science problem and to minimize dollar cost based on those data science decisions. For this case the following information has been provided:

- A data set with unknown data
- A request to build a model that balances minimizing cost to the business but is accurate enough to apply to the business problem

In addition to the data, information on the cost of decisions has also been provided. The decision cost breaks down as follows:

- True Positives \$0
- True Negatives \$0
- False Positive \$10
- False Negative \$500

This information allows for understanding that correctly classifying the data does not cost the company anything. Classifying the data as true when it is false (False Positive) costs the company \$10. Classifying the data as false when it is true (False Negative) costs the company \$500. As the classification models are built one of the key goals will be to minimize the cost associated with these values.

For the purposes of this analysis two metrics will be leveraged to compare the classification models: accuracy and classification cost. The accuracy metric will identify how well the model performed in classifying the data values. High accuracy means either the model is performing well of the model is over-fitting on the data. Data over-fitting is detrimental for analysis purposes in that new data may not get classified correctly. This is where the classification cost metric comes into the picture. Using the information provided above, a classification cost for each model will be calculated. This will allow for an understanding of the impact poor classification has from a financial perspective. The combination of these two metrics should provide good initial guidance for model selection.

## Initial Data Understanding

The first step to approaching a data science problem is to understand the data that is available for use. In this particular case a data set of unknown origin / contents has been provided. For this data set, there is no metadata nor column headers available to make data inferences from. After loading the data, the data types will be evaluated. This will provide an understanding of how the data columns are structured and begin to paint a picture for analysis.

In evaluating the data, the following summary information can be obtained. There are:

```
##
                  variable
                                 ٧2
## 1:
                             160000
                      rows
## 2:
                   columns
                                 51
## 3:
         discrete_columns
                                 5
       continuous_columns
                                 46
## 4:
## 5: all_missing_columns
                                  0
## 6: total_missing_values
                               1466
## 7:
             complete_rows
                            158534
       total_observations 8160000
## 8:
             memory_usage 72504864
## 9:
```

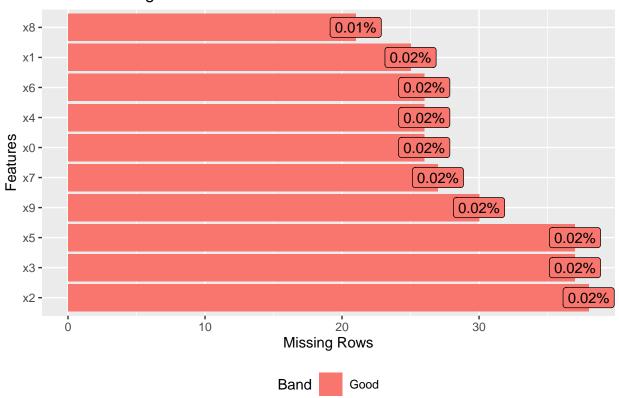
The output below shows these columns are the discrete columns (noted as character) and which are continuous (noted as numeric).

##		variable	sapply.dfclass.
##	1:	x0	numeric
##	2:	x1	numeric
##	3:	x2	numeric
##	4:	x3	numeric
##	5:	x4	numeric
##	6:	x5	numeric
##	7:	x6	numeric
##	8:	x7	numeric
##	9:	8x	numeric
##	10:	x9	numeric
##	11:	x10	numeric
##	12:	x11	numeric
##	13:	x12	numeric
##	14:	x13	numeric
##	15:	x14	numeric
##	16:	x15	numeric
##	17:	x16	numeric
##	18:	x17	numeric
##	19:	x18	numeric
##	20:	x19	numeric
##	21:	x20	numeric
##	22:	x21	numeric
##	23:	x22	numeric
##	24:	x23	numeric
##	25:	x24	character
##	26:	x25	numeric
##	27:	x26	numeric
##	28:	x27	numeric
##	29:	x28	numeric
##	30:	x29	character
##	31:	x30	character
##	32:	x31	numeric
##	33:	x32	character
##	34:	x33	numeric
##	35:	x34	numeric
##	36:	x35	numeric
##	37:	x36	numeric
##	38:	x37	character
##	39:	x38	numeric

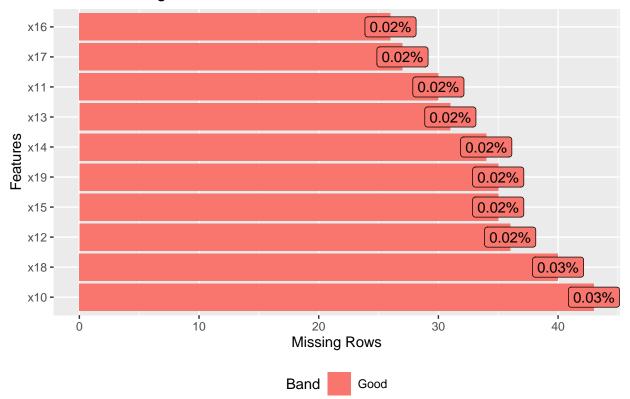
```
## 40:
             x39
                            numeric
## 41:
             x40
                            numeric
## 42:
             x41
                            numeric
## 43:
             x42
                            numeric
## 44:
             x43
                            numeric
##
   45:
                            numeric
             x44
## 46:
             x45
                            numeric
## 47:
             x46
                            numeric
## 48:
             x47
                            numeric
##
   49:
             x48
                            numeric
## 50:
             x49
                            numeric
   51:
##
                            integer
               У
##
       variable sapply.df..class.
```

In evaluating the missing data, the following 5 plots will assist in understanding the percentages of missing data by individual column. The plots indicate there is at most 0.03% of the data missing in any column. This would indicate that there are not large swaths of data missing in columns.

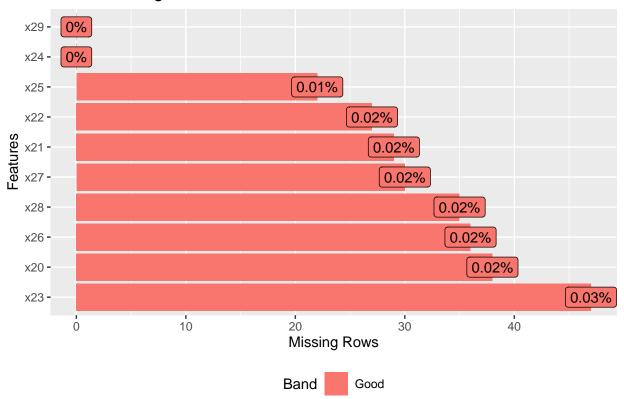
### Plot of Missing Values: 1 – 10



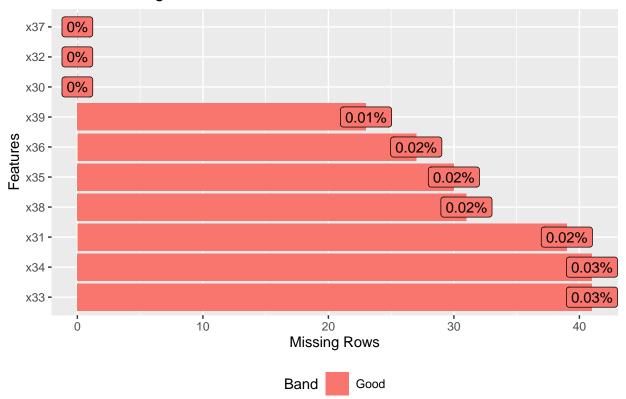
# Plot of Missing Values: 11 – 20



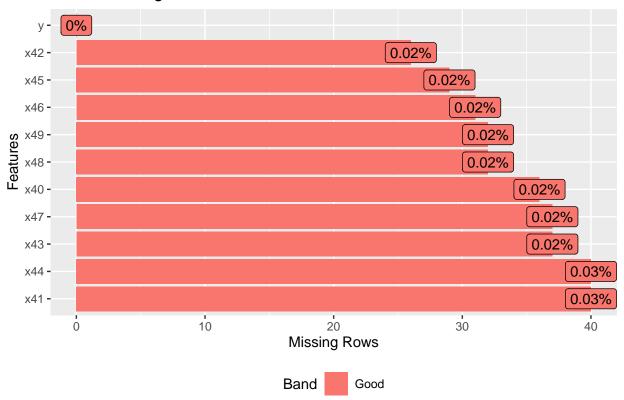
# Plot of Missing Values: 21 - 30



# Plot of Missing Values: 31 - 40

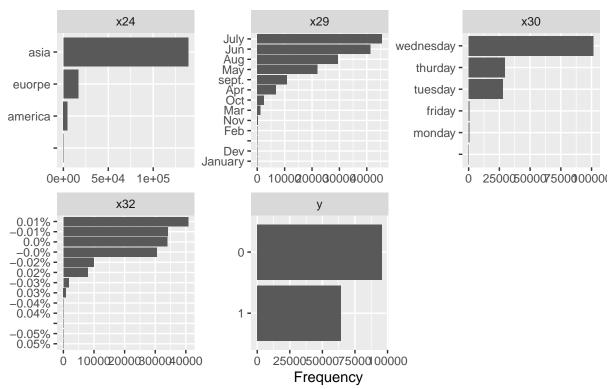


#### Plot of Missing Values: 41 - 51



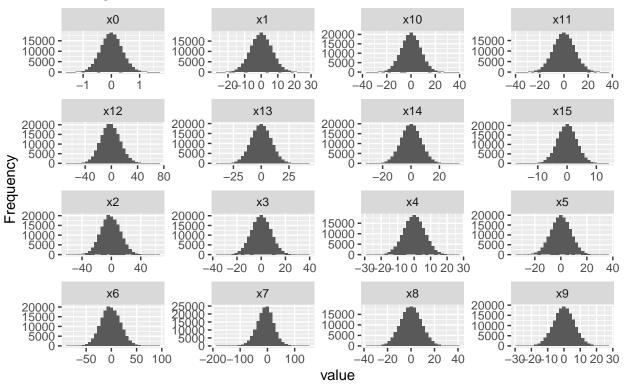
Now that the amount of missing data in the data set is understood, the evaluation of the discrete and continuous variables must be undertaken. The discrete variables will be addressed first. From the bar charts below the buckets that each data value is associated with is shown. This allows for additional data understanding. For example, in evaluating variable x29, events seem to occur more in the summer months (June, July, August). Similarly for variable x30, events seem to occur more on Wednesdays than other days of the week. This analysis also points out a possible issue with data cleaning that needs to occur. Variable x32 looks to actually be a numeric value, but is being treated as categorical due to the percentage size inside the data. That value will be stripped out to make it more appropriate for analysis. Additionally, this analysis provides a quick look into the categorization variable (y). From the bar chart, it can be seen that there is not a large class imbalance in the variable. If such an imbalance existed additional steps would need to be undertaken to address this prior to analysis.

### Bar Plots of Discrete Variables



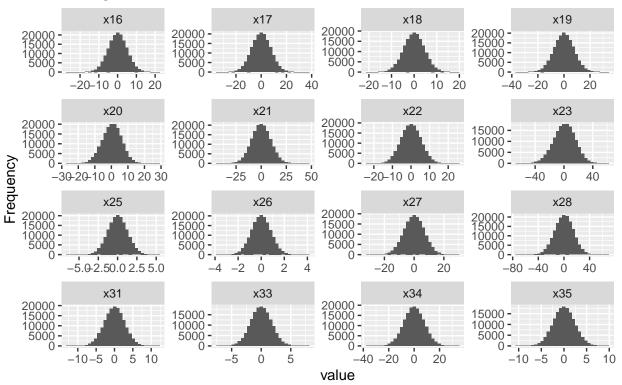
Moving on to the continuous variables, histogram plots will be leveraged for analysis. Histogram plots will provide an understanding of the data distribution. From the histogram plots below, the data look to be normally distributed for all of the continuous variables. This indicates there are no data outliers that need to be addressed and no data wrangling that needs to occur for correction.

## Histogram Plots of Continuous Variables



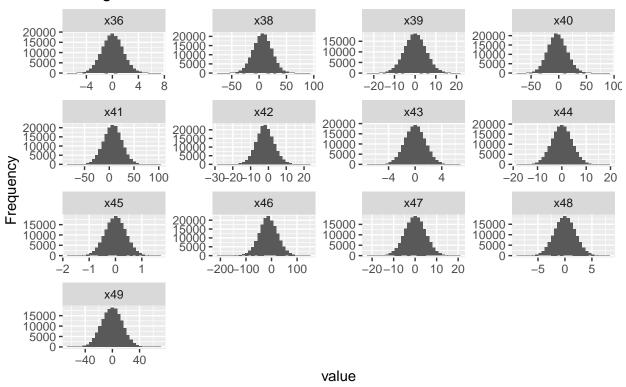
Page 1

## Histogram Plots of Continuous Variables



Page 2

#### Histogram Plots of Continuous Variables



Page 3

Evaluating all of the plots for both the discrete and continuous variables also shows that one value, x37, is missing from any of the plots. Upon investigation that field seems to be a currency field. This field contains the dollar sign (\$) symbol which is not getting picked up correctly.

To summarize the data discovery portion of this case: \* There are a few elements of missing data that will need to be cleaned up \* There are characters in the data that need to be cleaned up.

#### Addressing Data Issues

As discussed previously there are characters in values that should be treated as numeric. Specifically in variable x32 there is a percentage sign and in variable x37 there is a dollar sign. If these characters are not removed from the analysis then there will be issues with model building.

##		x0	x1	x2	х3	x4
##	1	-0.1665626917	-3.961588267	4.621113289	2.481907979	-1.800134785
##	2	-0.1498940245	-0.585675516	27.839855623	4.152332836	6.426801797
##	3	-0.3217069446	-1.429818791	12.251561473	6.586873690	-5.304647182
##	4	-0.2455944247	5.076677387	-24.149632159	3.637306617	6.505811289
##	5	-0.2733664430	0.306326096	-11.352592866	1.676757856	2.928440755
##	6	-0.2267056536	11.350364151	10.831366657	5.182091767	-2.236453611
##	7	-0.4312461403	-0.974762351	-7.412660528	-0.930500107	-1.265166492
##	8	-0.1350711421	8.524647734	-6.731169291	-13.374529887	-0.079429331
##	9	0.0266938766	-5.770476401	0.774835896	4.718854574	4.816483565
##	10	-0.3490734121	3.334116136	-3.355872462	-0.796301836	-0.900424872
##	11	-0.3332242084	1.138614252	11.346696861	0.104432071	0.819079997
##	12	0.3361037723	3.737029384	-6.419189956	2.604201449	-0.996172617

```
## 13
        -0.4592342709
                         1.570554812 12.485591390
                                                                    -0.404275430
                                                      3.798924920
                                                     -5.688357879
##
  14
                                                                    -7.428024453
         0.2011134545
                       -8.868768760
                                       0.827724664
##
   15
        -0.0257958550
                        -6.100713404
                                        3.878302891 -22.074012675
                                                                     0.753331614
##
  16
        -0.4792646670
                        -1.085310876
                                        6.500735228
                                                      5.535042260
                                                                    -5.157180638
##
  17
         0.1409715470 -13.770814842
                                     -11.794552278
                                                      1.282170634 -10.314442518
## 18
                                                                    -0.325790470
        -0.0338699607
                        -0.880807619
                                        1.755285673
                                                      2.582832615
## 19
         0.4667515593
                        10.563190096
                                        9.123766971
                                                      2.027940599
                                                                     2.226413967
## 20
        -1.0427434370
                        12.617560166
                                        5.378505841
                                                     -0.209906396
                                                                    -4.400668316
##
  21
         0.3392382140
                        -8.215266749
                                      -3.090575967
                                                      3.994229817
                                                                    10.610467040
##
  22
        -0.4307369552
                         0.328170652
                                      17.954293288 -14.565121512
                                                                    -2.486026383
##
  23
        -0.4817698251
                        -2.168826799
                                      -6.910079610
                                                      6.385888518
                                                                     0.921009872
##
   24
        -0.0984580298
                         4.373457153
                                      -6.739371178
                                                      1.041695563
                                                                     3.201977043
##
  25
         0.0100548664
                                       9.472252622
                       16.636074418
                                                     -4.087241396
                                                                     5.092983308
         0.8406766904
                         3.453940205 -10.696952444
##
  26
                                                     -0.574694574 -12.300653996
## 27
         0.3978632428
                        15.691714843
                                      -7.081571991
                                                     -7.931013130
                                                                    -6.876648493
##
  28
                        -8.797995979
                                      -8.147813155
                                                     13.497621271
                                                                     4.747904146
        -0.0786071633
##
  29
        -0.2799004296
                        -2.715869801 -11.381726105
                                                     -3.227753454 -12.764563186
   30
##
        -0.3213932126
                        -5.910639728
                                        6.243551558 -12.936754657
                                                                     4.847572574
                        -0.975465624 -16.710253514
##
  31
                                                     12.998582975 -12.397671965
         0.4735738775
##
   32
        -0.0195461662
                        -8.022478672
                                      -0.371785931
                                                     -0.806204619
                                                                     4.549538586
##
  33
         0.3627721499
                       -6.503168102
                                       3.715882043 -11.156008210
                                                                     0.545817895
  34
##
         0.0527123207 -11.329599248
                                        8.376243747
                                                     -5.090649944
                                                                     8.704249394
## 35
                                      -5.779958714
         0.2712825549
                        -2.219412031
                                                      2.644812263
                                                                     8.717416532
##
  36
        -0.6257706222
                        -5.268381740
                                       7.168771520
                                                     -7.270383461
                                                                    12.138739239
##
  37
         1.1757557349
                         4.073244547 -36.985104146
                                                      2.056062162
                                                                     9.569774772
##
   38
        -0.4040550020
                         7.480153833
                                      18.222300316
                                                     -1.502661764 -18.243496892
         0.3440583972 -10.889625298
##
  39
                                        5.843789691
                                                      0.744330826
                                                                    -0.287727963
##
   40
        -0.5988953561
                         5.640068413
                                        1.761614979
                                                     -5.129643069
                                                                    -3.988226443
##
  41
        -0.0081482184
                        -2.534533505
                                      14.414888200
                                                      0.333338515
                                                                     5.263494257
## 42
                                      -3.072909471
         0.1418322908
                         2.557094168
                                                      5.819899536 -11.340314910
## 43
         0.5644848597
                        -3.334305989
                                      17.276095491
                                                     -3.865065924
                                                                     7.147975873
##
   44
         0.2363300636
                         0.200914947 -10.262689715
                                                      1.393440214
                                                                     8.552917422
##
   45
         0.4311257408
                        -0.519485274
                                      -1.645443002
                                                     23.779609825
                                                                     9.662183652
                        -1.927675875
                                      15.677723524
##
  46
         0.0102509873
                                                     -4.622862278
                                                                    -0.691079564
                         3.973927743
##
  47
         0.2600411292
                                      15.745898401
                                                      1.334108185
                                                                     2.605113848
## 48
        -0.2038677309
                        -6.163149806
                                      15.909395201
                                                     18.663701629
                                                                    -8.768311839
## 49
        -0.9271547713
                        -7.290313011
                                        6.049319300
                                                     -3.980340325
                                                                   -12.851657533
## 50
         0.1404429950
                        -4.643231023
                                      10.674679377
                                                      4.062732655
                                                                    -9.624931192
## 51
        -0.2073223107
                         7.934199888
                                      11.003081463 -14.037770071
                                                                    -0.268209654
## 52
                                                     -0.408635563
                                                                    -1.284213849
         0.1628177329
                         2.296764049
                                        6.802463666
##
  53
        -0.3044676849
                         1.414355113
                                        6.792488173
                                                      4.567646726
                                                                    -2.383951295
##
  54
         0.3519473542
                        -1.660321417
                                        9.897001330
                                                      2.446241118
                                                                     2.747477383
##
  55
         0.4924336885
                        -0.588843672 -21.437191743
                                                      4.192252606
                                                                     6.736804441
##
  56
         0.4679549732
                         5.307757173 -22.124917036
                                                    -13.565343034
                                                                     5.031746145
                                                      2.850158426
## 57
         0.2900619777
                        15.603193946
                                      -9.630084434
                                                                    -1.559257797
## 58
        -0.0605605928
                        -5.645629810 -10.223961276
                                                     13.385464559
                                                                  -12.792250196
                                      10.409122780
                                                      2.202742629
                                                                    -0.704323639
## 59
         0.4548310846
                        -0.366991167
##
  60
         0.0469230974
                        -5.295441457
                                      17.702197546
                                                      3.138763604
                                                                     4.607988143
##
  61
         0.3966280318
                        -5.217705505
                                      24.188691019
                                                      6.882527618
                                                                     6.107273404
##
   62
                         6.011142207
                                      18.022767225
        -0.7110922268
                                                      2.780639281
                                                                    -0.647246261
##
  63
                        -5.257243066 -23.517317480
        -0.1430298504
                                                      6.669763259
                                                                     0.862099800
                         6.635723467
## 64
        -0.0417770062
                                      -0.132594421 -10.760671161
                                                                    -1.704727464
## 65
                                                                     0.733633978
        -0.1344778076
                        -3.273940188
                                       5.866674591
                                                      8.391347169
## 66
        -0.0696891685
                       -2.804739757
                                       7.624230569 16.265944660
                                                                     4.420572334
```

```
## 67
         0.4734893295
                         0.878033423
                                       -9.299702838
                                                       1.208710199
                                                                     -5.041806428
                                                                      6.003392117
## 68
                                        9.907419943
                                                      13.294013810
         0.1235491922
                        -5.504059614
##
   69
         0.6668007965
                        -4.682425645
                                       21.753474742
                                                      -7.471300631
                                                                      5.701090055
##
  70
        -0.7938920530
                         6.243681046
                                       29.384152109
                                                       2.396063454
                                                                     -8.471853569
##
   71
        -0.2101184676
                         0.864219209
                                        8.075399107
                                                       9.063460234
                                                                      1.285749737
  72
                                                                     -5.795143295
##
         0.0393418658
                         9.703957053 -12.614641339
                                                       4.097207855
## 73
         0.1357668497
                         4.899632033
                                        5.370264595
                                                      -0.982473373
                                                                      8.681341330
## 74
        -0.1051141863
                         3.740267725 -15.509283168
                                                       3.712759218
                                                                     -1.257666683
##
        -0.0100275041
                         2.480454751
                                       12.380046876
                                                      -3.473704154
                                                                      2.253117888
  75
##
  76
        -0.6644715534
                         1.225262046
                                       -9.109499975
                                                      10.798597460
                                                                      0.127611167
##
  77
         0.6198459414
                        -6.494275370 -19.072755326
                                                    -16.237465115
                                                                     -1.912788190
##
   78
         0.1125201116
                         1.638139738
                                       -4.016128033
                                                      12.627078636
                                                                     -1.970707595
##
   79
        -0.0936323077
                         6.155348556 -14.741782964
                                                       7.841556130
                                                                      5.674618273
        -0.1505569767
                                       -3.907873939
                                                                     -0.375193249
##
  80
                        -1.118423084
                                                       2.420317199
## 81
        -0.7507699715
                        -6.117821583
                                       -4.637497409
                                                      -8.931898652
                                                                      3.250648876
##
  82
                                      -20.201045212
                                                      14.420419857
                                                                     -5.444340044
         0.3369162204
                         1.675800539
##
  83
                                       -7.567101656
        -0.0488346121
                        11.371039874
                                                      -1.714822678
                                                                      1.583673695
   84
##
         0.3344195581
                         6.945274363
                                       -9.632117467
                                                     -15.059392758
                                                                      3.025473673
##
  85
                                        8.535949601
        -0.4283344783
                         0.067097197
                                                       5.641595836
                                                                      0.951300537
##
   86
         0.5142716524
                        -1.231156756 -10.228056989
                                                     -10.959919954
                                                                      1.046820802
##
  87
         0.5991630884
                        -5.711355822
                                       -3.728649758
                                                       9.585663163
                                                                      4.872736360
##
  88
        -0.1699528544 -11.809846632
                                        3.436959758
                                                      -8.483380668 -10.611325489
## 89
        -0.3454689078
                        -5.519488226
                                        6.236185364
                                                       0.860459148
                                                                      2.607758577
##
  90
         0.4643924297
                         4.953012326
                                        0.999876674
                                                      -1.673990131
                                                                      8.102019255
##
  91
        -0.1399831842
                        -2.810755014
                                       -3.639468779
                                                      -4.154565747
                                                                      2.232407957
##
  92
        -0.3631990673
                        17.633805899
                                       -1.116241305
                                                      -2.296301223
                                                                      5.458881716
##
  93
         0.4813203779
                        -0.137992496
                                        8.490474736
                                                       2.490461332
                                                                     -4.927792487
##
   94
         0.1796774091
                         2.645806279
                                        4.897157308
                                                       7.394880303
                                                                      7.565403237
##
  95
         0.0323814315
                         1.414276484 -29.815202447
                                                      -5.906669928
                                                                      2.482397260
## 96
                                       21.236065279
        -0.3543896827
                        -2.935532883
                                                       0.492084885
                                                                      0.290752600
##
  97
        -0.0582251652
                         2.896050335
                                      -14.500372469
                                                      -2.621658483
                                                                     -7.525102788
##
   98
                        -3.040490882
                                        2.233406258
                                                      -4.245246666
                                                                      1.290832361
         0.0157634717
##
   99
                        -2.978637120
                                       13.697721333
                                                      -7.685364312
                                                                      1.350303478
         0.4690443241
                       -11.590540001
##
   100
        -0.3750119670
                                       -5.384532006
                                                       0.005843163
                                                                      4.991068256
##
   101
        -0.1250962136
                         2.871228597 -26.851316770
                                                      -1.923287375
                                                                      2.396478652
##
  102
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## 1777 -11.009234867 -1.578400560
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## 1781
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## 1791
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## 1795
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## 1835
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## 1837
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## 1854
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## 1883
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## 1889
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## 1892
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## 1894
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## 1914
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                       4.270175e-01
                                                                 sept. wednesday
   29
                                                                    Jun wednesday
##
         1.463954612
                       9.746770e-01
                                        7.01872336
                                                      0.32066099
##
   30
        -0.583714804 -1.306269e+00
                                        4.23887693
                                                     11.95770423
                                                                    Jun
                                                                          tuesday
##
   31
         2.050443255
                      -8.356342e-01
                                      -20.80169095
                                                    -32.64618007
                                                                    Jun
                                                                        wednesday
##
   32
        -0.247270364
                       6.370378e-01
                                                      6.79000451
                                                                    Apr
                                                                          thurday
                                       -6.44513425
##
  33
        -1.571535716
                       1.721769e+00
                                        9.90619973
                                                     28.25325186
                                                                    Aug
                                                                          thurday
##
  34
        -0.266826092 -1.036471e+00
                                       -5.38857574
                                                     -2.78387241
                                                                    May
                                                                          thurday
## 35
        -3.839147738 -9.283960e-01 -14.53808993 -18.94928742
                                                                    Jun
                                                                          tuesday
```

```
##
   36
        -1.672091398
                       3.455335e-01
                                        5.59367728 -22.02291138
                                                                    Jun
                                                                          tuesday
##
                                                     10.83500076
   37
        -1.527983940 -1.008985e+00
                                                                    May
                                                                          tuesday
                                        7.40287315
##
   38
        -0.671235795
                       1.043450e+00
                                       -1.73006321
                                                     -0.14216697
                                                                    Jun wednesday
##
   39
        -0.474539666 -3.583119e-01
                                        2.61943962
                                                     -4.16535036
                                                                    Jun
                                                                        wednesday
##
   40
         0.117249575
                      -8.462288e-01
                                       13.69184818
                                                      5.19411314
                                                                  sept.
                                                                          tuesday
##
                                       -6.30119862
                                                    -11.84329582
   41
                       1.325513e+00
                                                                    Aug
                                                                        wednesday
         0.337474430
##
   42
        -1.587998497
                       1.418311e+00
                                        4.79146110
                                                      8.86033658
                                                                    Aug
                                                                          tuesday
##
   43
         0.277529180
                       6.253326e-01
                                        0.21129554
                                                     14.80430658
                                                                    Aug
                                                                          thurday
##
   44
         1.219584023
                       5.265423e-01
                                       -8.40947257
                                                    -38.51226147
                                                                    May
                                                                        wednesday
                                                                   July
##
   45
         1.175021333
                       3.658863e-01
                                       -2.92889457
                                                     -3.43508319
                                                                          tuesday
##
   46
        -0.044721285 -2.792481e-01
                                        7.68080798
                                                     16.99137010
                                                                    Aug
                                                                          thurday
##
   47
        -0.806353673 -4.066939e-01
                                       -6.67538945
                                                     16.35095940
                                                                   July
                                                                        wednesday
##
   48
                       5.284645e-01
                                                                    Jun
        -0.869335513
                                       10.49928944
                                                    -18.17663771
                                                                          thurday
                       2.041526e+00
                                                                        wednesday
##
   49
         1.401969987
                                        0.80457554
                                                     12.34168584
                                                                    Aug
##
   50
         2.661568068 -1.632609e+00
                                        0.85632180
                                                   -18.12131557
                                                                    Aug
                                                                        wednesday
##
   51
        -0.715883184 -1.682369e+00
                                       -8.52896571
                                                      7.21455400
                                                                    May
                                                                          tuesday
##
   52
                                                                          tuesday
        -1.004189135
                       1.847588e-01
                                        0.65337803
                                                     13.84488724
                                                                    Aug
##
   53
        -1.056656752 -8.660464e-01
                                                                          thurday
                                        5.27148232
                                                    -11.85991496
                                                                    Aug
##
   54
        -1.900723715 -7.792821e-01
                                       -1.19233002
                                                    -11.72583212
                                                                   July wednesday
##
   55
        -0.570029082
                       9.175744e-02
                                        3.29848405
                                                      6.81380154
                                                                   July wednesday
##
   56
        -1.786997525 -3.381202e-01
                                       -7.64087028
                                                     11.97677499
                                                                    May
                                                                          thurday
                       8.281458e-01
##
   57
         1.570177496
                                        6.86019576
                                                      0.94278202
                                                                   July
                                                                          thurday
##
   58
        -0.623232721 -1.323522e-02
                                        0.65661668
                                                    -20.39867902
                                                                    May wednesday
                                                                    Jun wednesday
##
   59
         1.237728519 -1.363631e+00
                                     -20.87147569
                                                      9.46366272
##
   60
        -3.320996908 -2.173752e-01
                                       -0.07346171
                                                      6.17846621
                                                                    Jun wednesday
##
   61
        -1.321785541
                       3.423418e-01
                                     -10.14142303
                                                     -4.21831614
                                                                   July wednesday
   62
                      -2.514272e-01
                                                                    Jun wednesday
##
        -0.372558855
                                       -3.14426920
                                                      2.80091316
##
   63
        -0.849571750
                       6.807118e-01 -14.31888936
                                                     -3.93711211
                                                                    Nov wednesday
##
   64
         1.254256858
                       1.290364e+00
                                     -13.29768733
                                                    -15.18023507
                                                                   July
                                                                          thurday
##
   65
        -0.825655183 -8.127602e-01
                                                                   July
                                        0.19912014
                                                      6.44553867
                                                                          tuesday
##
   66
         1.059748520 -1.612176e+00
                                       10.95633155
                                                     23.09661209
                                                                    Aug wednesday
##
   67
        -1.611298450
                       1.115454e+00
                                       -7.19290738
                                                     19.10992406
                                                                    Jun wednesday
##
   68
        -0.905896653
                       2.363193e-01
                                       -8.72138453
                                                     -2.44068551
                                                                        wednesday
                                                                  sept.
##
   69
        -0.346009027
                       3.300200e-01
                                       -4.23538925
                                                                    Jun
                                                     -1.69865727
                                                                          tuesday
##
   70
                      -3.632721e-01
                                                                    Oct wednesday
         -2.187624564
                                       -9.46359145
                                                     -0.66123124
        -1.068922622 -1.890904e+00
##
   71
                                       -4.10703907
                                                     -2.52371041
                                                                    Jun wednesday
##
   72
         1.638090794 -5.395068e-01
                                       -3.03555229
                                                     10.12749103
                                                                    Jun wednesday
##
  73
        -1.997019006 -1.230600e+00
                                        1.47697314
                                                     28.48943490
                                                                    Aug
                                                                          tuesday
   74
         0.594465417 -1.336300e+00
##
                                     -10.57587183
                                                     -4.07318773
                                                                   July wednesday
        -0.300013479
##
   75
                       5.187698e-01
                                                      8.21765258
                                                                    May
                                                                          tuesday
                                        0.81066636
##
   76
         0.142697656
                       1.317418e+00
                                       10.13096342
                                                    -36.29298318
                                                                    Jun wednesday
                      -3.489557e-02
                                                                    Aug wednesday
##
   77
         1.443564440
                                       -7.60996594
                                                     -1.14027043
##
   78
        -0.085964055
                       3.830249e-01
                                        3.90892354
                                                     26.17450831
                                                                    Aug wednesday
##
   79
                                                                   July wednesday
        -1.073418809
                       1.072667e-01
                                        2.09817895
                                                    -34.82464281
##
   80
         0.186828276 -1.419828e+00
                                        1.55447205
                                                     15.51109100
                                                                    May wednesday
  81
                       5.712225e-01
                                                                    Jun wednesday
##
         0.627819177
                                        2.32030519
                                                      9.61915589
##
   82
        -0.847203224 -8.263836e-02
                                       -0.90752126
                                                     -2.59360684
                                                                    May wednesday
##
   83
        -2.742106350
                       7.513527e-01
                                       -6.56996613
                                                     36.77117343
                                                                    Jun
                                                                          thurday
##
   84
        -0.819805101
                       1.501071e-01
                                     -10.33751024
                                                     -7.57865095
                                                                    May wednesday
##
   85
        -0.174981936
                       7.532810e-01
                                       -4.13478158
                                                     -9.68886296
                                                                    Jun wednesday
##
   86
                      -6.289016e-02
                                       -8.90355820
                                                                    Oct wednesday
        -0.028041925
                                                      2.59416384
##
   87
         0.591526604
                       7.575990e-01
                                       -7.62082636
                                                     19.31165495
                                                                   July wednesday
##
  88
        -0.092718750 -9.319875e-01 -12.65115053
                                                                   July
                                                                          tuesday
                                                     14.56198002
## 89
        -2.332535185 -6.940973e-02
                                      -6.03568716
                                                     18.95267480
                                                                    Jun
                                                                          thurday
```

```
##
   90
        -0.731276706
                       3.165474e-01
                                       -9.79260454
                                                     -7.02927120
                                                                          thurday
                                                                    Jun
##
                                        1.45447236
                                                   -27.23838422
   91
        -0.345014831 -6.865144e-01
                                                                    Aug wednesday
                                      -10.99468306
##
   92
         0.769103391 -4.936406e-01
                                                      3.44060938
                                                                    Jun wednesday
   93
##
         2.112023877 -1.216041e+00
                                       13.57622971
                                                     19.98200016
                                                                    Jun wednesday
##
   94
         1.114197430
                       1.024113e+00
                                       -8.18587305
                                                     23.13402875
                                                                    Jun wednesday
##
   95
        -0.516758025
                                       -1.31880344
                       1.325254e+00
                                                     -4.36150618
                                                                    Jun wednesday
##
   96
         1.960288978 -9.766854e-01
                                        1.31927321
                                                     -3.04009695
                                                                    Aug
                                                                          thurday
##
  97
        -0.830378738
                       4.155827e-01
                                        0.99713109
                                                      6.59298609
                                                                    May
                                                                        wednesday
##
   98
        -2.687710017 -1.158171e+00
                                        3.88734583
                                                      9.73967294
                                                                    Jun
                                                                          tuesday
##
   99
         0.285461551
                       7.143655e-01
                                       -8.66147363
                                                   -32.39318898
                                                                    May
                                                                          thurday
##
   100
         0.798270311 -7.642322e-02
                                       12.94169079
                                                    -12.29180862
                                                                   July
                                                                        wednesday
                                                                   July
##
   101
        -0.579899912
                      -1.808393e-01
                                       10.94683596
                                                    -10.60618538
                                                                          thurday
##
   102
                       3.152143e-01
                                                                    Jun
                                                                        wednesday
         1.598846316
                                       -4.09214961
                                                     20.22292868
                       3.505683e-02
##
   103
         0.432652264
                                       -4.93926516
                                                     -7.31750087
                                                                    Aug
                                                                        wednesday
   104
                       7.882912e-01
##
        -0.440252727
                                       -4.65291639
                                                      6.18286568
                                                                    Jun
                                                                          tuesday
##
   105
        -0.458047466
                       4.461610e-01
                                       11.46015043
                                                     17.60640331
                                                                   July
                                                                        wednesday
##
   106
        -0.240268632
                      -6.585153e-01
                                                                    Jun
                                                                          thurday
                                       -8.08737760
                                                     17.69576040
##
   107
        -2.518494639
                       2.471560e-01
                                                                        wednesday
                                        7.96516830
                                                    -18.71661711
                                                                    Aug
##
                                                                   July
   108
        -0.368535892
                      -1.506576e+00
                                       -0.93395538
                                                                          tuesday
                                                     -0.03356713
##
   109
         0.327800569
                       4.847561e-01
                                       -0.96353889
                                                      6.25044045
                                                                   July wednesday
##
   110
         1.968261738
                       4.067293e-01
                                        4.59127573
                                                    -10.64774248
                                                                    May wednesday
##
  111
        -0.091576266
                       4.589316e-01
                                       -4.09108248
                                                     13.33785796
                                                                    Jun wednesday
##
  112
        -0.555822463
                      -4.374745e-01
                                       -8.72336852
                                                     -2.36967349
                                                                   July wednesday
##
   113
        -2.092381903
                       1.246470e+00
                                       -0.73253093
                                                     -6.00071349
                                                                    May wednesday
        -0.498449216
##
   114
                       6.231272e-03
                                       18.45014548
                                                    -35.57400184
                                                                    Aug wednesday
##
   115
        -0.244097616
                       1.085911e+00
                                        7.99760165
                                                    -14.45953511
                                                                   July wednesday
                                                                    Jun wednesday
##
   116
         0.556992460
                      -3.675596e-01
                                        5.61803243
                                                     -0.50092014
##
   117
        -1.870449396
                       7.454491e-02
                                       -3.18512736
                                                     -6.13842860
                                                                  sept.
                                                                          thurday
##
   118
        -0.539986778
                       8.461665e-01
                                       -8.95476820
                                                      0.90372030
                                                                    May
                                                                          thurday
                                                    -18.31840685
##
   119
        -0.303894371 -1.051624e+00
                                       -0.57015029
                                                                    Aug
                                                                          tuesday
##
   120
        -0.562802550
                       1.289351e+00
                                       11.42763728
                                                     14.21219496
                                                                    Aug
                                                                        wednesday
##
   121
        -0.505014983
                       1.673892e+00
                                                     12.22613122
                                                                    Jun
                                                                          thurday
                                        1.65958863
##
   122
         1.946790252
                      -1.494691e+00
                                        4.62681155
                                                     27.51984547
                                                                        wednesday
                                                                    May
   123
                                                                    May
##
         0.315717536
                      -1.439113e-01
                                                                        wednesday
                                        5.24707694
                                                      3.84767777
   124
                       1.515789e+00
                                                                    Jun
##
        -1.374945625
                                        9.48257674
                                                     -6.28343107
                                                                          tuesday
   125
##
         1.283136881
                       5.088432e-01
                                       -2.07329972
                                                    -15.72125368
                                                                   July wednesday
##
   126
         0.228238265 -2.897649e-01
                                        6.47157229
                                                     26.63334708
                                                                    Jun wednesday
##
  127
                                                     -7.48432333
        -0.151254594 -1.814955e-01
                                      -13.85019068
                                                                        wednesday
   128
         2.362086072 -3.174725e-01
                                                    -12.98969460
##
                                       -1.12303248
                                                                   July wednesday
                                                                   July
##
   129
        -1.102439556
                       4.310468e-01
                                     -10.52650166
                                                     10.45635734
                                                                          thurday
   130
        -1.208751262 -1.035611e+00
                                       -3.83534599
                                                    -12.24482003
                                                                  sept. wednesday
   131
                       1.210999e+00
                                                                    Apr wednesday
##
        -1.008355170
                                       -8.07566828
                                                     -4.72761508
##
   132
         0.077443105
                       4.226305e-01
                                       -7.80965031
                                                     24.04994909
                                                                    Mar wednesday
##
         0.139222079 -1.586830e+00
   133
                                        0.56594467
                                                     39.55410741
                                                                   July
                                                                          thurday
##
  134
         0.635504283
                       7.881827e-01
                                       -3.39169774
                                                     20.20397884
                                                                   July wednesday
  135
##
         0.202446057 -1.760513e-01
                                       -2.96499031
                                                     13.31441540
                                                                   July wednesday
##
   136
         0.713988322
                       8.336527e-02
                                       11.98983155
                                                      1.49735340
                                                                    Aug wednesday
##
   137
        -1.562575186
                       5.194748e-01
                                        5.01586053
                                                     33.85398373
                                                                   July wednesday
   138
##
         1.020484405 -6.108844e-01
                                       -0.42583341
                                                    -28.44677698
                                                                    Aug wednesday
##
   139
         2.526632449
                      -8.254169e-01
                                        6.77267674
                                                    -17.02467002
                                                                   July wednesday
   140
##
                      -8.684359e-02
                                                                    May wednesday
         0.712708754
                                       -2.53165882
                                                     18.69608316
##
   141
        -0.881057495
                       8.051012e-01
                                        7.69188176
                                                     -8.99222037
                                                                    Jun
                                                                          tuesday
##
  142
        -1.359778677 -1.392856e+00
                                       -4.89393127
                                                      0.49760975
                                                                    May
                                                                          tuesday
## 143
         0.279537608
                       1.113315e+00
                                       14.26040125
                                                     -9.89778704
                                                                   July wednesday
```

```
## 144
         0.350123252 -1.542546e+00
                                       -0.23750154 -12.51204989
                                                                    Jun wednesday
##
                                     -10.23478851
                                                     21.01858513
  145
         0.101544648
                       8.670918e-01
                                                                   July wednesday
##
   146
        -1.536823700
                       3.053389e-01
                                        5.90070724 -11.01272745
                                                                    Jun
                                                                          thurday
   147
        -0.586451914
##
                       1.786920e-02
                                        4.17099759
                                                   -13.81399623
                                                                    May
                                                                          thurday
##
   148
        -0.716913695
                       -4.044330e-01
                                       -9.20732520
                                                      2.21128891
                                                                   July
                                                                          thurday
##
        -1.284678366
   149
                       8.062028e-01
                                       -5.56553453
                                                      4.66518308
                                                                    May
                                                                          tuesday
##
  150
        -1.826818511
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                                        5.26990547
                                                     -8.11349219
                                                                    May wednesday
##
   151
         0.162365566
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                                       -8.48086682
                                                     -0.19996153
                                                                    May wednesday
##
   152
        -1.166043472
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                                        7.42214494
                                                      1.81290477
                                                                   July wednesday
##
   153
        -0.508810876
                       1.754720e-01
                                     -15.17594841
                                                     -6.67705460
                                                                    Aug wednesday
##
   154
         1.151434495
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                                       -2.59258866
                                                    -32.74647475
                                                                    May wednesday
   155
                       2.480933e-02
##
         0.124409949
                                       -2.77876872
                                                    -20.51242135
                                                                   July
                                                                          tuesday
##
   156
                      -8.305708e-02
                                                   -10.74821252
                                                                    Jun
                                                                        wednesday
         0.392829203
                                       -2.27529164
                                                     14.29768854
                                                                          tuesday
##
   157
        -0.431221527
                       1.167641e+00
                                       -0.59900982
                                                                    Jun
   158
##
         2.499484746
                       1.802970e-01
                                        5.90956543
                                                     16.34653967
                                                                    Aug wednesday
##
   159
        -0.565866249
                       1.447646e+00
                                       -1.70563102
                                                    -20.95037307
                                                                   July
                                                                        wednesday
##
   160
                                     -13.14323040
                                                                   July
                                                                          thurday
         0.780128834
                      -1.123486e-01
                                                   -25.82101186
                                                                    Aug wednesday
##
   161
        -0.209676428
                       1.354680e+00
                                        2.64663546
                                                     18.93063825
                                                      5.26343354
##
   162
        -2.162436781
                       4.100046e-01
                                        0.63351571
                                                                    Jun wednesday
                       5.634884e-01
##
   163
        -0.898590615
                                       -1.34046629
                                                     -8.34139137
                                                                   July wednesday
##
   164
         1.526041963
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                                     -15.72195870
                                                    -16.48094719
                                                                    Aug
                                                                          thurday
##
   165
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                       4.158474e-01
                                       -0.25268274
                                                     11.23877981
                                                                    May wednesday
##
   166
         0.394068767
                       1.201945e+00
                                       -5.44053639
                                                    -38.64081934
                                                                    Jun wednesday
##
   167
        -0.786743656
                      -2.324243e+00
                                     -11.10916300
                                                     -0.23920400
                                                                    Aug
                                                                          tuesday
##
   168
         0.934703709
                       4.428375e-01
                                        9.42479236
                                                      9.82637298
                                                                    May
                                                                        wednesday
##
   169
        -0.748332809
                      -6.542320e-01
                                       -3.62955382
                                                      3.78478438
                                                                    Jun
                                                                          thurday
   170
##
         1.014315845
                       7.367143e-01
                                       -6.73720082
                                                      4.97460385
                                                                  sept.
                                                                          thurday
##
   171
        -0.068668379 -3.549262e-01
                                        5.34089469
                                                    -16.99907255
                                                                   July wednesday
                                                                    Jun wednesday
##
   172
        -2.083799707
                       1.214022e-01
                                        4.70332584
                                                     -6.37660034
##
  173
         1.806845477
                                     -15.51877405
                                                   -15.16439090
                                                                          thurday
                       1.405956e+00
                                                                    Apr
##
   174
        -0.440360666 -9.671532e-01
                                       -3.21721949
                                                     17.74126668
                                                                    Jun
                                                                          thurday
##
   175
        -1.009991397 -6.497075e-01
                                        4.37493607 -14.14475010
                                                                    Aug wednesday
##
   176
         2.289912153
                       6.805436e-02
                                        3.42442043
                                                     17.77541251
                                                                    Jun wednesday
##
   177
         2.186287166 -2.720677e-01
                                        3.89475489
                                                     -0.75321793
                                                                   July wednesday
   178
                      -2.048078e+00
                                                    -17.68707376
                                                                    May
                                                                        wednesday
##
         1.296267737
                                        4.69465850
##
   179
        -1.243516590
                       2.054264e-01
                                        8.73742026
                                                     -0.42828118
                                                                    Aug
                                                                          thurday
##
   180
         0.998805959
                      -5.976203e-01
                                       -2.03202631
                                                     -8.70746898
                                                                    Jun wednesday
   181
##
        -0.658377669
                       1.743710e-01
                                       -0.71499964
                                                     -1.54083884
                                                                 sept. wednesday
        -1.377805586
                       7.845698e-01
                                                                    Mar wednesday
##
   182
                                       -0.33901301
                                                     25.66568910
##
   183
         0.739527060
                       6.023467e-01
                                       -0.52431687
                                                   -24.33188733
                                                                    Apr wednesday
##
   184
        -1.976921095
                       1.251769e+00
                                        4.06383230
                                                    -21.26610687
                                                                    Aug wednesday
   185
        -1.608341233 -1.088271e+00
                                                                    Aug wednesday
##
                                     -11.95246297
                                                     -2.24543790
##
   186
         0.296000444 -2.679370e-01
                                      -10.26720227
                                                      6.92451547
                                                                    Aug wednesday
##
         0.813178127 -5.014843e-01
                                                                   July
   187
                                       -6.55262433
                                                      4.07066171
                                                                          thurday
##
   188
         0.339596769 -2.547247e-01
                                       -7.28223869
                                                     -2.95762166
                                                                    Aug
                                                                          tuesday
   189
##
        -0.974328655
                       9.524077e-01
                                       -5.89882482
                                                     28.89301954
                                                                    Aug
                                                                          thurday
##
   190
        -0.453381381 -3.299282e-01
                                       -2.96108920
                                                      6.41682779
                                                                   July wednesday
##
   191
        -0.695679143
                      -8.603615e-01
                                        3.67370703
                                                     -7.75217221
                                                                    Jun wednesday
##
   192
         1.098181707
                       1.035419e-01
                                       -5.00910833
                                                      7.81152660
                                                                    Apr
                                                                          thurday
##
   193
         0.951320166
                       6.284907e-01
                                       12.84232206
                                                     -5.44912808
                                                                   July wednesday
##
   194
        -1.389216816
                       7.623353e-01
                                                     -7.42556889
                                                                    Aug wednesday
                                       13.36676741
##
   195
         0.721909672
                       9.940617e-01
                                       -2.57179727
                                                     -7.80898328
                                                                    Jun wednesday
##
  196
        -0.114775749
                       6.335202e-01
                                        6.99640634
                                                                 sept. wednesday
                                                     24.72171465
  197
        -1.022847246 -3.499066e-01
                                        4.75774759
                                                   -22.68287424
                                                                    Aug wednesday
```

```
## 198
         2.485898484
                       2.724886e-01
                                       6.77708698
                                                      9.78198747
                                                                    Mar wednesday
##
                                       -7.87643601
   199
                       8.905349e-01
                                                     -9.48266553
                                                                   May wednesday
         0.062693857
                                                                    Jun wednesday
##
   200
        -0.772306977
                       2.859506e-01
                                       -1.58295622
                                                     25.14621186
   201
         1.454156004
##
                      -7.618906e-01
                                       0.74827074
                                                      6.96226455
                                                                    May wednesday
##
   202
         1.108759028
                      -9.395829e-01
                                       0.24449067
                                                     8.79976658
                                                                   July
                                                                          tuesday
##
   203
        -0.361371966
                       6.311059e-01
                                       0.94396180
                                                     12.62703054
                                                                    Aug wednesday
##
   204
        -0.846752682
                       4.335388e-01
                                     -12.03596144
                                                     -3.38465360
                                                                    Aug wednesday
##
   205
        -1.345713100 -2.332606e-01
                                       3.40365249
                                                   -21.10936129
                                                                    Jun wednesday
##
   206
        -1.101718347 -1.675813e+00
                                       10.51124576
                                                     -8.77817365
                                                                   July wednesday
##
   207
        -0.256491978 -4.742056e-02
                                       -1.52819440
                                                     10.63563979
                                                                    May wednesday
##
   208
         1.593980112 -3.699186e-01
                                       -3.92184170
                                                   -11.39419495
                                                                          thurday
                                                                    Aug
   209
##
        -1.184112617 -4.751435e-01
                                       -5.91063437
                                                   -21.68296366
                                                                   July wednesday
##
   210
         0.172119238 -4.564877e-01
                                                     -9.25634492
                                                                   July wednesday
                                       -3.49150619
         0.916556615 -1.749170e-01
##
   211
                                       1.55631191
                                                   -18.94672787
                                                                   July
                                                                          thurday
  212
##
         1.448501064
                       2.845914e-01
                                       -2.26975113
                                                     25.43571243
                                                                    Jun
                                                                          tuesday
##
   213
         0.330794513 -3.630845e-01
                                       -0.51961548
                                                      7.67217319
                                                                   July wednesday
                                       -1.01565157 -43.91930762
##
  214
                                                                    Jun wednesday
         0.620796728
                       1.352665e+00
   215
        -0.498095053
                      -3.218070e-01
                                                   -16.54086024
                                                                   July
                                       0.81686644
                                                                          tuesday
  216
                                     -10.58632460
##
         0.440307342
                       6.334662e-01
                                                   -26.19839778
                                                                    Jun wednesday
##
   217
         1.256391058
                       1.920831e-01
                                       -1.78058462
                                                     -4.25644964
                                                                   July wednesday
##
  218
         0.666471728
                      -9.733991e-03
                                       -1.96862845
                                                     -9.73764687
                                                                    Jun
                                                                          thurday
   219
                       2.318733e-01
##
        -0.210436885
                                       8.40984690
                                                      2.33716282
                                                                    May wednesday
  220
##
         2.340346694 -9.471400e-01
                                       0.85550558
                                                     -0.43736495
                                                                 sept. wednesday
##
   221
        -1.211734760 -1.444280e+00
                                     -10.21467765
                                                     14.72615405
                                                                   July
                                                                          thurday
                                                                   July wednesday
##
   222
         0.772458885 -6.957770e-01
                                       -2.92504630
                                                     -9.03874256
   223
         2.363376196
                      -4.369731e-01
                                       10.90801379
                                                    25.18239453
                                                                    Jun wednesday
   224
##
        -2.741428112
                       1.238355e+00
                                       -7.49844160
                                                    12.52238333
                                                                    Aug wednesday
##
   225
        -2.198264280 -8.332584e-02
                                       0.07301093
                                                   -10.97227822
                                                                    Jun
                                                                          tuesday
   226
##
         1.430027625
                      -1.513582e+00
                                       -0.62359862 -23.18387254
                                                                    May wednesday
##
   227
         1.587182044
                       1.480110e+00
                                       -5.60575932 -15.91316395
                                                                   July wednesday
##
   228
        -0.156381474
                       3.730340e-01
                                       3.16369540
                                                   -12.72915558
                                                                    Jun wednesday
##
   229
         1.044411887
                       3.630598e-01
                                       2.02096890 -21.87251393
                                                                    Jun wednesday
##
   230
        -1.376590932
                       5.672080e-01
                                       -8.00434540
                                                   -17.06925475
                                                                    Aug wednesday
   231
##
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                       1.715248e-01
                                       -8.63537882
                                                     -0.80858926
                                                                    Jun wednesday
   232
         2.564074791
                       1.806975e-01
                                                                    Aug wednesday
##
                                       -5.67892356
                                                      3.72705832
   233
         2.765716581
##
                       1.213326e+00
                                       0.51738904
                                                     -8.37902282
                                                                   July wednesday
##
   234
         2.079065728 -5.719561e-01
                                       -4.49994523
                                                      5.74214525
                                                                   July wednesday
##
  235
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                                                                    Aug wednesday
                                       4.29507189
                                                      9.72186201
   236
                                                   -30.65282497
##
         0.075663124
                       1.064886e+00
                                     -13.03770681
                                                                   July wednesday
  237
                                                                    Jun
##
         0.404553647
                       4.062420e-01
                                                     16.73689518
                                                                          tuesday
                                       2.84786944
   238
         1.649283964 -4.571188e-01
                                       6.02065187
                                                     -3.87551376
                                                                    Apr
                                                                          tuesday
   239
         0.739570982 -3.911816e-01
##
                                       -1.37130128
                                                    12.56604236
                                                                    Aug
                                                                          tuesday
##
   240
         0.804667493 -1.186308e+00
                                       0.70301311
                                                      3.61377523
                                                                    Jun
                                                                          tuesday
##
   241
         2.570515771 -1.840044e-01
                                       -3.84177654
                                                   -15.39753857
                                                                    Jun
                                                                        wednesday
                                                                    May
##
   242
        -0.008993976 -5.055422e-01
                                       2.76552366
                                                      3.72636630
                                                                          thurday
   243
##
         0.524141685 -8.444279e-02
                                       -5.57455793
                                                   -16.57548043
                                                                    Aug
                                                                        wednesday
##
   244
         0.886879723
                       1.374134e+00
                                       14.61097602
                                                     31.27580933
                                                                    Apr wednesday
##
   245
        -2.119071726
                       7.516223e-01
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                                                      8.20897599
                                                                    Apr
                                                                        wednesday
##
   246
        -1.124917099
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                                       -5.56358791
                                                      0.90657740
                                                                    May
                                                                          tuesday
##
   247
        -1.370536676 -4.315795e-01
                                       7.04374749
                                                     28.21804010
                                                                    Apr wednesday
##
   248
        -0.420045150 -7.181495e-01
                                                                    Jun wednesday
                                       -1.22612849
                                                   -26.67815594
##
   249
        -1.573817410
                       1.551830e-01
                                       -5.64842296
                                                   -12.43693325
                                                                    Jun wednesday
##
  250
         0.291686279 -3.877070e-01
                                       2.88922109
                                                   -14.67261903
                                                                    Aug
                                                                          tuesday
  251
        -0.036484243 -5.234686e-01
                                       5.01459699
                                                      1.58786843
                                                                   July
                                                                          tuesday
```

```
252
        -0.388090557
                       8.363816e-02
                                                                   July wednesday
                                       11.40966971 -20.14625348
   253
##
                       3.812970e-01
                                                                   July wednesday
         1.033647636
                                        4.56409293
                                                   -34.79458219
##
   254
         0.036147511
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                                        1.44718739
                                                     -1.09728802
                                                                    Apr
                                                                           tuesday
   255
##
         1.204718394
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                                       -1.17742931
                                                     -5.33831441
                                                                    Jun
                                                                           tuesday
##
   256
        -1.121717761
                      -5.990048e-01
                                        3.12295934
                                                      8.25567473
                                                                   July wednesday
   257
        -1.608559916
                       2.846309e-01
                                                     -3.05801441
                                                                    May
##
                                       -4.03960380
                                                                           tuesday
##
   258
        -1.411954419
                        1.464637e+00
                                      -11.39901928
                                                      8.27453019
                                                                   July wednesday
                                                                   July wednesday
##
   259
         0.149951699
                        2.621173e-01
                                       -1.53952271
                                                     10.12009745
##
   260
                       8.527048e-01
                                        5.08905657
                                                                    Aug
                                                                           tuesday
         0.065876906
                                                     -6.45525748
##
   261
         1.348972922
                        1.676867e-01
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                                                     -8.87110047
                                                                   July
                                                                           thurday
##
   262
        -0.732079669 -1.395045e+00
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                                                     -7.10301943
                                                                    Jun wednesday
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##
        -0.958058951
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                                                     -0.85399572
                                                                   July wednesday
                                                                  sept. wednesday
##
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                                                     19.29825932
         1.636614628 -1.510191e+00
##
   265
                                        6.12094679
                                                    -12.62570617
                                                                   July wednesday
   266
##
        -1.105886603 -1.400546e-01
                                       -1.49021623
                                                    -12.45505378
                                                                   July
                                                                           tuesday
##
   267
                        1.017036e-01
                                      -10.20020373
                                                      4.70707622
                                                                   July wednesday
         0.197122569
##
   268
                                                                    Apr
        -2.454675709
                      -1.161136e+00
                                       -7.71610984
                                                    -19.52487429
                                                                           thurday
   269
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##
                       8.639269e-01
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                                                     10.09501923
                                                                    Aug
                                                                           thurday
##
   270
         0.807264038
                        1.110812e+00
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                                                                   July
                                                                           tuesday
                                                                   July wednesday
##
   271
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                        1.451488e+00
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##
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                                                                    Aug wednesday
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                                                     24.39560580
                                                                   July wednesday
  274
##
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                                                                    Apr
                                                                           thurday
##
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                                                                   July
                                                                           thurday
##
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                                                                    Aug
                                                                        wednesday
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                                                    -10.66024321
                                                                    Jun
                                                                           thurday
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##
         0.040611088 -2.822422e-01
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                                                     -4.72317026
                                                                    Aug
                                                                            monday
                                                                   July
##
   279
         1.612850273 -3.964508e-01
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                                                                           thurday
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##
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                                       -6.06861177
                                                      6.28700066
                                                                  sept.
                                                                        wednesday
         0.779225638 -1.038816e+00
                                       11.02775527 -19.32872337
##
   281
                                                                    Jun
                                                                           thurday
##
   282
         0.107592407 -2.943065e-01
                                       -2.13636617
                                                   -12.49478376
                                                                    Jun
                                                                        wednesday
##
   283
         0.381035383
                        1.612373e+00
                                       -1.23019910
                                                     32.19141945
                                                                   July
                                                                           thurday
##
   284
        -0.171982605
                        4.820663e-01
                                                    -11.63094737
                                                                    Jun
                                                                           tuesday
                                        3.50421511
   285
##
        -1.224950874
                        1.275951e+00
                                       -5.26906669
                                                     23.66098056
                                                                   July
                                                                        wednesday
                                                                    May
   286
##
         0.165514528
                        1.039331e-01
                                        8.76245554
                                                     14.47057545
                                                                        wednesday
##
   287
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                                                                    Aug
                                                                           thurday
##
   288
         0.710396015
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                                        4.80136534
                                                      9.76431105
                                                                   July wednesday
   289
                                                                    Aug
##
        -0.607767437
                        1.323089e+00
                                       -1.38899680
                                                    -19.97847888
                                                                           thurday
   290
##
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                                       -0.38859418
                                                     19.20748498
                                                                  sept.
                                                                           tuesday
   291
##
        -0.971939057
                        1.262863e+00
                                      -11.30428984
                                                                   July wednesday
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   292
         0.253617723
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                                       -6.67850307
                                                     -0.77084108
                                                                    Jun
                                                                           tuesday
   293
                      -9.830785e-01
##
        -0.119894201
                                       -4.97350090
                                                      8.78365812
                                                                   July wednesday
##
   294
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                                        4.36700373
                                                      1.25675277
                                                                    May
                                                                           tuesday
                                                                   July
##
   295
        -2.411417682
                       7.407413e-01
                                       -0.22511297
                                                     18.54306895
                                                                        wednesday
##
   296
        -0.255880544 -5.136587e-01
                                        2.25084277
                                                     -7.22268931
                                                                    Aug
                                                                           thurday
   297
        -2.925554394
##
                       3.056093e-01
                                        2.28157068
                                                    -21.67690304
                                                                    Jun wednesday
##
   298
         0.145273232 -1.087696e+00
                                        0.24257666
                                                     -5.62063411
                                                                    Aug
                                                                           tuesday
##
   299
        -0.930876459
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                                       -3.39621698
                                                     -0.17770912
                                                                    May
                                                                        wednesday
##
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         3.534578461 -7.813095e-02
                                        8.89124031
                                                     -3.35919868
                                                                    May wednesday
##
   301
                       3.170744e-01
                                        0.36805508
                                                      4.04297616
                                                                    Aug
                                                                        wednesday
         1.092523820
##
   302
                                                                    Oct
         -0.501393964 -4.610800e-01
                                      -10.02024699
                                                    -16.21932033
                                                                           thurday
##
   303
         1.010216602 -1.009899e+00
                                       -4.37692173
                                                     12.33340185
                                                                    May wednesday
##
   304
        -2.821646644
                       1.690762e+00
                                                                    Jun wednesday
                                        0.50659035
                                                     -4.32610464
##
  305
         1.109007254
                       3.161178e-01
                                        8.75177606
                                                     -1.63526881
                                                                   July wednesday
```

```
7.36437603
   306
        -1.172334262 -9.030656e-01
                                       -2.70686758
                                                                     Jun
                                                                           tuesday
        -0.092293842
                                                                     Jun wednesday
##
   307
                        1.221891e+00
                                        0.96874174 -19.94597924
        -2.347811077
                                                                    Jun
##
   308
                        4.907959e-01
                                      -12.91873197 -12.89354385
                                                                           thurday
   309
##
         2.616613924
                        6.065842e-01
                                        1.05681312
                                                   -18.11961871
                                                                    July
                                                                        wednesday
                                                                   July
##
   310
         1.142983834
                        8.647558e-01
                                       -4.44031492
                                                    -35.47061686
                                                                        wednesday
##
   311
        -0.486058068
                       7.299759e-01
                                        2.20144314
                                                     -7.19144335
                                                                    Apr
                                                                           thurday
##
   312
         1.490627839
                        4.636309e-02
                                        8.72161239
                                                    -26.95786666
                                                                  sept.
                                                                           thurday
##
   313
        -1.724920936
                       9.327064e-01
                                       11.85147406
                                                    -24.37004537
                                                                     Jun wednesday
##
   314
         0.600481276
                        1.135196e+00
                                                     33.81822254
                                                                   July
                                                                        wednesday
                                        4.53394486
                                                                   July
##
   315
         0.559374105
                      -8.919785e-02
                                        4.53442981
                                                     -4.74730700
                                                                           tuesday
##
   316
         2.387422907
                       1.557599e-01
                                        7.87284060
                                                     10.32316478
                                                                    Mar
                                                                        wednesday
   317
##
         0.294733390
                      -5.951760e-01
                                       -0.50706229
                                                     24.68550095
                                                                    July
                                                                           thurday
##
   318
                       5.236685e-01
                                                                     Jun
         0.191391911
                                       12.91022676
                                                    -47.62242982
                                                                           thurday
                      -5.684105e-01
##
   319
        -0.427318252
                                       -1.59423334
                                                     -0.86579811
                                                                     Aug
                                                                         wednesday
   320
##
         0.531728928
                        1.316207e+00
                                       -0.01930792
                                                     32.18091583
                                                                     Aug
                                                                           tuesday
##
   321
        -0.950912207
                        1.193580e-02
                                       -3.90514014
                                                     15.97676479
                                                                    July
                                                                        wednesday
##
   322
        -0.476171555
                                                                    May
                                                                           thurday
                        1.062274e+00
                                       -2.19844247
                                                      0.21940780
##
   323
                        6.403109e-01
                                       -2.33737859
                                                                        wednesday
         1.019605083
                                                     13.01589077
                                                                     Jun
   324
##
         1.090417310
                      -9.669898e-02
                                      -14.21232785
                                                                           thurday
                                                     33.91246932
                                                                     Jun
##
   325
         0.249379434
                       1.133519e-01
                                       -4.44709545
                                                     -2.16558952
                                                                    Aug
                                                                           thurday
##
   326
        -0.929337012 -2.046073e+00
                                        2.29619455
                                                     -4.16239614
                                                                    May wednesday
   327
        -1.436427788 -2.581269e-01
##
                                       11.98863470
                                                     31.77844419
                                                                    July wednesday
   328
##
         0.949938836
                      -6.459170e-01
                                       -2.33341401
                                                      6.29605309
                                                                    July wednesday
##
   329
         0.742513029
                      -1.225023e+00
                                       -4.91032550
                                                    -13.21471278
                                                                   July wednesday
        -0.274866057
##
   330
                        4.806130e-01
                                        3.77747164
                                                    -23.26961102
                                                                    Mar
                                                                           tuesday
##
   331
         0.510128533
                        1.281064e+00
                                       -0.06409093
                                                      6.46491396
                                                                    July wednesday
   332
                                                                     Jun wednesday
##
         2.029099161
                        1.359780e+00
                                       -0.98654086
                                                     22.11008126
##
   333
         0.695967500
                        1.550445e+00
                                       -6.54827895
                                                     15.18604439
                                                                     Jun
                                                                        wednesday
   334
##
         0.808469231
                      -4.418327e-01
                                       -8.37412796
                                                      1.52408606
                                                                     Apr
                                                                           thurday
                       3.330317e-01
##
   335
                                                    -27.09389511
                                                                    July
        -0.943822178
                                       13.00411524
                                                                           thurday
##
   336
         0.319272825
                       -1.609456e-01
                                       -2.45785621
                                                     -2.00874510
                                                                     Aug
                                                                         wednesday
##
   337
        -1.285218654
                        1.429309e+00
                                                     -4.33714199
                                                                           thurday
                                        9.24872772
                                                                    Aug
##
   338
         0.091041328
                        4.261245e-01
                                       -5.09341115
                                                     -1.92078950
                                                                     Aug
                                                                           thurday
   339
##
         1.980331290
                        1.385338e+00
                                        0.12849345
                                                     12.40522869
                                                                     Jun wednesday
   340
                       -2.503648e-01
##
         -0.080828145
                                       -8.66599540
                                                     17.49461506
                                                                    July
                                                                         wednesday
##
   341
        -1.015535436
                       1.036349e+00
                                       10.23034160
                                                      6.60244042
                                                                    July
                                                                           thurday
##
   342
         0.954523089 -5.727302e-02
                                       -3.07686583
                                                      8.63858972
                                                                     Aug wednesday
   343
                                                                     Jun wednesday
##
        -1.317157595
                       5.195932e-01
                                       13.28623109
                                                      4.06545282
   344
                                                                   July wednesday
##
         0.411668036
                      -1.342547e+00
                                      -16.30819856
                                                    -22.99596673
##
   345
         0.949125799
                      -1.047829e-02
                                       -3.42854905
                                                     11.85574588
                                                                     Jun wednesday
##
   346
        -1.307268165
                       5.254254e-01
                                        6.17898489
                                                     12.12222171
                                                                     Oct
                                                                           tuesday
   347
                       1.227928e+00
                                                                    Apr wednesday
##
         1.121232046
                                       11.91443193
                                                      8.67755159
                                                     -2.00137416
##
   348
        -0.401352665
                      -5.503808e-01
                                        8.49644966
                                                                  sept. wednesday
   349
                                                                   July
##
        -0.576148822 -1.702801e-01
                                        0.98718329
                                                     -0.32341085
                                                                           thurday
##
   350
         0.856075838
                       5.614815e-01
                                       -3.24221698
                                                      8.57219484
                                                                     Jun wednesday
   351
##
        -0.109213753 -2.566580e-01
                                        0.29250188
                                                     21.69443323
                                                                     Jun
                                                                        wednesday
                                                                   July
##
   352
         0.909635864 -1.474055e+00
                                       -7.42871343
                                                    -18.37183646
                                                                           tuesday
##
   353
         0.134964352 -1.276112e-01
                                        7.28222926
                                                    -15.11013693
                                                                     Aug
                                                                         wednesday
##
   354
         0.196587908
                       4.136734e-01
                                       -2.42443516
                                                      2.41033515
                                                                    May
                                                                           thurday
##
   355
        -1.922012825
                        1.996463e-01
                                        9.90761522
                                                      6.40541008
                                                                           thurday
                                                                    Aug
   356
##
                        6.285405e-01
                                                                     Jun wednesday
         0.710238538
                                       -4.93065591
                                                     16.27771418
##
   357
        -1.302175440
                        1.302606e+00
                                        2.31953780
                                                     -7.78576266
                                                                     Jun wednesday
##
   358
        -0.921399744 -7.314707e-01
                                                                   July
                                       -9.16801251
                                                     -0.70508053
                                                                           tuesday
   359
        -1.861793123
                       3.512495e-01
                                        2.41101540
                                                                   July
                                                                           thurday
##
                                                     15.51792961
```

```
360
         0.145806619 -5.213525e-03
                                       -3.46481092
                                                      9.72105187
                                                                    May wednesday
##
   361
        -1.184802503
                       4.534547e-01
                                        2.78800836
                                                                   July wednesday
                                                      0.11489595
                                                   -25.12405612
                                                                    Jun wednesday
##
   362
         0.546484615
                       1.247142e+00
                                     -15.47792626
   363
##
        -0.653564883
                       1.580966e-01
                                        8.25397536
                                                      6.82607117
                                                                    Jun wednesday
##
   364
         0.788740280
                       2.874511e-01
                                        8.51526753
                                                   -11.45204762
                                                                   July
                                                                          thurday
        -1.002067770
                                                   -15.83215442
                                                                    Jun wednesday
   365
                       2.056576e-01
##
                                        5.93335386
##
   366
        -1.015352199
                       9.166425e-01
                                       -4.03627761 -10.87734524
                                                                    Jun wednesday
##
   367
         0.695771086
                      -1.079063e+00
                                       -1.82902285
                                                   -16.90983094
                                                                    May
                                                                          tuesday
##
   368
                       6.045330e-01
                                        3.16949447 -10.41836684
                                                                   July wednesday
         0.063722365
##
   369
         1.354342634
                       5.764293e-01
                                        3.37327582
                                                      4.44268812
                                                                   July wednesday
##
   370
         -0.189834237
                      -4.741492e-01
                                        1.10697025
                                                     -7.96043206
                                                                   July wednesday
   371
                                                                    Jun
##
         1.233047446
                       7.029225e-01
                                       14.86165100
                                                     11.92489520
                                                                          thurday
##
   372
                       4.516229e-01
        -4.654142818
                                        8.24456300
                                                    -13.89977779
                                                                    May
                                                                        wednesday
                       7.510355e-01
##
   373
         1.342703642
                                        5.31596454
                                                     -2.17986214
                                                                    Apr
                                                                          tuesday
   374
##
         0.086598063
                       6.544654e-01
                                        9.68487056
                                                      7.87295125
                                                                    Jun
                                                                          tuesday
##
   375
        -1.637085478
                       1.880351e+00
                                        9.37807221
                                                   -17.26522599
                                                                  sept.
                                                                        wednesday
                                                                    Jun
##
   376
        -0.467726396 -2.890428e-01
                                                                        wednesday
                                       -3.47764347
                                                   -26.45831521
##
   377
         0.535649217 -8.734989e-01
                                                    -17.73310391
                                        2.24843790
                                                                    Jun
                                                                          thurday
   378
                                                      7.66492836
##
        -0.228866082
                       3.869650e-01
                                       -3.57331582
                                                                 sept. wednesday
##
   379
         0.691495306
                      -1.288488e+00
                                       -8.65707547
                                                    -19.10194816
                                                                    May
                                                                        wednesday
##
   380
         0.911807361
                       2.870404e-01
                                       -3.48808198
                                                     -9.03478385
                                                                    Aug
                                                                          tuesday
   381
##
         0.915314831
                       3.722323e-01
                                       -5.38050934
                                                    -32.80654185
                                                                 sept.
                                                                          thurday
   382
##
                      -9.927536e-01
                                     -10.16814732
                                                                    Apr
                                                                          thurday
         1.014038200
                                                      0.72082741
   383
##
        -0.284957130
                       2.408058e-01
                                     -10.98227628
                                                     25.61669960
                                                                    Jun
                                                                          tuesday
##
   384
        -2.209633981 -1.025326e+00
                                        7.62352521
                                                     -6.21629020
                                                                    Jun
                                                                        wednesday
                                                                   July
##
   385
        -0.424805409 -2.967602e-01
                                       20.51071288
                                                    -26.16021685
                                                                          tuesday
   386
                                                                    May
##
        -1.203665083 -8.234906e-01
                                        2.23191907
                                                     17.01639997
                                                                        wednesday
##
   387
        -0.633426914 -5.127379e-01
                                       -2.04461617
                                                     -8.69720522
                                                                    May
                                                                          thurday
   388
##
        -0.777831486
                       1.633811e-01
                                       -0.51622575
                                                     -4.46039727
                                                                   July
                                                                          thurday
##
   389
                                                     29.39111579
                                                                    May
                                                                          thurday
        -0.902182457 -1.139780e+00
                                       -0.98008787
##
   390
        -1.886455499
                       7.697470e-01
                                       -0.26285516
                                                    -21.42175044
                                                                   July wednesday
##
   391
         0.680846722 -9.040906e-02
                                        6.24285550
                                                      6.88766625
                                                                   July
                                                                        wednesday
##
   392
         0.651333388
                       2.006549e+00
                                      -12.80164819
                                                      2.63783969
                                                                    Jun
                                                                          thurday
   393
                                        2.03279639
##
         1.214956341
                      -4.651158e-01
                                                     -4.32857745
                                                                    Jun
                                                                        wednesday
   394
                                                                        wednesday
##
         0.033157910
                       7.777049e-01
                                       -8.54710017
                                                      1.20510271
                                                                    Jun
   395
##
         1.550468682
                       2.105845e+00
                                       -2.15159168
                                                    -17.80552413
                                                                    Jun
                                                                          tuesday
##
   396
         0.851606550
                       8.150622e-01
                                        2.84189834
                                                     -4.70963991
                                                                    May
                                                                          thurday
   397
                                                                    Aug
##
        -0.140796752 -1.155731e+00
                                        5.32223798
                                                     21.60963076
                                                                          thurday
   398
                                                                    Aug
##
         0.191711163
                       1.719351e-01
                                       -7.23643388
                                                    -33.81189609
                                                                        wednesday
##
   399
        -0.351204753 -1.077688e+00
                                                   -36.50258717
                                                                   July
                                                                          thurday
                                        2.97070565
##
   400
         0.638356228
                       1.772897e-01
                                        8.02227726
                                                      3.59318153
                                                                    Aug wednesday
   401
                                                                   July
##
        -1.137743581 -9.678709e-01
                                        0.38038043
                                                      6.62319016
                                                                          tuesday
                                                     -6.00386652
##
   402
        -1.106594838 -2.762211e-01
                                       -3.26766322
                                                                   July
                                                                          tuesday
   403
                                                                   July
##
         0.334641055 -1.855671e-01
                                        4.04846537
                                                    -27.64397770
                                                                          tuesday
##
   404
         0.987590798 -2.196924e-01
                                     -12.10362645
                                                      0.93022225
                                                                    May wednesday
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##
         0.021005598
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                                        0.54265440
                                                     11.83887467
                                                                   July wednesday
##
   406
        -1.521340900
                       6.377434e-01
                                        5.80729072
                                                      6.69204888
                                                                    Aug
                                                                          thurday
##
   407
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                       1.896273e+00
                                        0.18634955
                                                   -15.98936935
                                                                    Aug
                                                                          tuesday
##
   408
        -2.486687962 -1.608245e-01
                                       -9.31071818
                                                    -18.50783427
                                                                  sept. wednesday
##
   409
        -1.035618836
                       4.192700e-01
                                                      3.50851121
                                                                   July
                                                                        wednesday
                                       -4.21300103
##
   410
         0.052576773 -3.223618e-01
                                                                    May
                                        4.32639915
                                                     13.08656877
                                                                          tuesday
##
  411
         0.024862534 -2.573001e-01
                                       12.54110247
                                                   -15.70168309
                                                                    May wednesday
## 412
         0.308592534 -2.500574e-01
                                       10.93844139
                                                     19.65228027
                                                                   July
                                                                          thurday
## 413
         0.192111072 7.878694e-01 -11.02005422 -11.05462300
                                                                    Jun wednesday
```

```
## 414
         2.723688694 -1.397992e+00
                                       -4.80913711
                                                      7.89937924
                                                                    Jun
                                                                           thurday
                                      -10.08061929
##
  415
        -2.625378390
                       1.131526e+00
                                                                    May wednesday
                                                     11.57107589
   416
        -0.114071466
                       2.229878e-01
                                       -9.66128321
                                                     -3.66236517
                                                                    Jun
                                                                           tuesday
   417
##
         1.095078230
                       3.105166e-01
                                        4.81508675
                                                     19.68875401
                                                                    Jun wednesday
##
   418
         0.093094386
                      -7.039588e-01
                                       -6.67637371
                                                      1.00393427
                                                                    May
                                                                        wednesday
                                       -8.39494918
##
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                                                    -26.43354234
                                                                    Oct
                                                                           thurday
##
   420
        -1.538443911
                      -7.557711e-01
                                       -9.50185035
                                                     10.54224607
                                                                    Aug
                                                                           tuesday
##
  421
        -1.432811989
                       7.452984e-01
                                        3.78715431
                                                      6.84740455
                                                                   July wednesday
##
   422
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                                        5.28915617
                                                     -4.02720696
                                                                    Jun wednesday
##
   423
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                                       10.29885258
                                                    -15.25662343
                                                                   July wednesday
##
   424
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                                       -4.70409295
                                                     -2.07649705
                                                                    May wednesday
   425
##
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                       3.732091e-01
                                       -2.96822500
                                                      3.69696568
                                                                    Jun wednesday
##
   426
         0.561719892 -1.605515e+00
                                                      2.49636301
                                                                   July wednesday
                                        4.40212456
                                                     17.66804720
                                                                           thurday
##
   427
         0.117037293 -4.468452e-02
                                       -1.28859814
                                                                   July
   428
##
         0.892314128
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                                       -1.41104562
                                                      8.24148738
                                                                    Mar wednesday
##
   429
        -0.388714432
                        1.196846e+00
                                       -4.20473794
                                                     32.24509763
                                                                    Jun
                                                                           tuesday
        -0.831837899 -6.513229e-01
##
   430
                                                                    Jun
                                       -1.68092330
                                                    -12.05232630
                                                                           tuesday
                                                                    Jun
##
   431
         0.134216587
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                                      -10.42637199
                                                     -4.04518959
                                                                           tuesday
##
   432
        -1.825868602 -3.904756e-01
                                       -1.33803312
                                                    -23.91102519
                                                                   July wednesday
##
   433
         0.443370022
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                                       -5.53760418
                                                    -21.97581025
                                                                   July
                                                                        wednesday
##
   434
        -2.125298830 -1.962152e-01
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                                                    -17.29547376
                                                                    May
                                                                           thurday
   435
##
        -2.064415810 -1.195729e+00
                                       -2.65453281
                                                     -0.23192918
                                                                    Aug
                                                                        wednesday
##
   436
        -1.096996812
                       4.950415e-03
                                       -7.88651991
                                                      3.42169228
                                                                  sept.
                                                                           thurday
##
   437
        -0.482457531 -7.622377e-01
                                       -2.15139571
                                                      2.02662194
                                                                    Aug wednesday
##
   438
         1.941420776 -9.137404e-01
                                       -7.51456209
                                                     18.94782652
                                                                    Aug
                                                                           thurday
   439
        -1.010004125 -5.305599e-01
                                        3.19142464
                                                    -14.96402581
                                                                    May
                                                                           tuesday
   440
         0.204154061 -1.338430e+00
                                                                   July
##
                                        6.34791459
                                                    -10.00903054
                                                                        wednesday
                                                     -1.47495327
##
   441
        -0.655445954
                       1.434558e+00
                                       15.57874045
                                                                    Jun
                                                                        wednesday
##
   442
        -1.963210754
                       8.829256e-01
                                      -16.85788492
                                                    -10.51152734
                                                                    Jun
                                                                           thurday
##
   443
        -1.615257857 -1.216481e+00
                                       -4.41162539
                                                                    Jun
                                                      4.19464879
                                                                           thurday
##
   444
        -0.119945915 -1.082718e+00
                                        4.46112800
                                                      0.37997102
                                                                    Jun
                                                                            friday
##
   445
        -0.807805013 -4.236987e-01
                                        8.63303450
                                                     17.40444762
                                                                   July wednesday
##
   446
        -1.937351743
                       6.653821e-01
                                        3.48944097
                                                     20.01993977
                                                                    Jun
                                                                           tuesday
##
   447
         2.441940229 -5.121390e-01
                                                     -25.00181855
                                      -13.67192627
                                                                    Aug
                                                                           tuesday
   448
         1.438753373 -1.224038e+00
                                                                   July
##
                                       -1.13786192
                                                     14.58817511
                                                                        wednesday
##
   449
        -0.092088430 -6.388943e-01
                                        1.68944234
                                                     16.87185367
                                                                    May
                                                                           thurday
##
   450
         1.319654658
                       6.071300e-01
                                       -3.50175894
                                                     13.98234821
                                                                    Apr
                                                                           thurday
   451
##
        -2.758031502 -6.183171e-01
                                       -6.07632299
                                                      3.22711820
                                                                    Aug wednesday
   452
##
         0.573040205 -7.954068e-01
                                       12.99290950
                                                     -2.18189076
                                                                  sept. wednesday
        -1.817432922
##
   453
                       5.197847e-01
                                                     -8.24845625
                                                                   July wednesday
                                        4.78019938
##
   454
        -0.926059943
                        3.218782e-01
                                        0.84866675
                                                      6.89298408
                                                                    Jun
                                                                           thurday
   455
##
         2.274715013
                       1.446569e-01
                                       -2.94788984
                                                     11.49992565
                                                                   July
                                                                           thurday
                                                     26.22538084
##
   456
         1.228120657
                        4.450900e-02
                                        6.27953259
                                                                    Aug
                                                                           tuesday
        -1.606943810 -2.114536e-01
##
   457
                                        5.45453469
                                                    -10.43072278
                                                                    Jun wednesday
##
   458
        -0.866797201
                       1.783266e+00
                                       12.57726608
                                                     12.23349522
                                                                   July wednesday
   459
##
         0.222916112
                      -4.881093e-01
                                       -5.04158608
                                                     -2.47470523
                                                                   July wednesday
##
   460
        -0.890899935
                       1.816263e+00
                                       -7.35995275
                                                      9.71285035
                                                                   July wednesday
##
   461
         1.186167911 -2.447077e-01
                                      -10.30496179
                                                     -9.37674311
                                                                   July wednesday
                        6.200032e-01
##
   462
         2.457626897
                                       10.46565975
                                                     -0.40324241
                                                                    Aug wednesday
##
   463
         2.386134330
                        2.898630e-01
                                        3.83534989
                                                     17.28106499
                                                                    Aug wednesday
##
   464
                        1.028641e-01
                                                                    Aug
         -0.057263842
                                       -5.93163484
                                                      2.96628942
                                                                           tuesday
##
   465
         0.321585012
                        4.883834e-01
                                       -5.46067430
                                                     23.01535759
                                                                    Jun wednesday
##
   466
        -0.868655133 -2.468320e-01
                                       -4.13686675
                                                                    Jun wednesday
                                                     26.20896803
##
  467
         0.645574375 -1.956177e-01
                                        2.80610444
                                                     -6.04573000
                                                                    Jun wednesday
```

```
468
         1.672520946
                       1.911764e+00
                                       -3.25985160
                                                    -9.01533715
                                                                   July wednesday
                                                   -39.79937596 sept. wednesday
##
  469
                       9.155430e-01
         1.046193370
                                        1.76936377
##
   470
         0.749747631
                       5.829586e-01
                                       -1.32080885
                                                     -6.00580525
                                                                 sept. wednesday
##
   471
         0.667129385
                       2.621188e-01
                                       -4.87710781
                                                     -0.48441756
                                                                   July
                                                                          tuesday
##
   472
        -0.241169066
                       7.289160e-01
                                       12.20996157
                                                     29.39513021
                                                                   July
                                                                          thurday
         0.102463250
   473
                                                                    Aug wednesday
##
                      -1.443978e+00
                                        4.55821121
                                                     -2.44627738
##
   474
         0.679752601
                      -1.109545e+00
                                       -5.81038930
                                                      7.49591634
                                                                   July
                                                                          thurday
##
  475
        -0.680257041
                       1.358892e+00
                                       -5.66878126
                                                     23.40398142
                                                                    May wednesday
##
   476
        -1.364630736
                      -1.036582e+00
                                        8.59232307
                                                    -28.31624647
                                                                    Jun wednesday
##
   477
        -1.281996490
                       3.643092e-01
                                     -13.87881393
                                                     11.43112979
                                                                    Jun wednesday
##
   478
        -3.647788448
                       1.537042e+00
                                       -2.31758005
                                                      1.71310844
                                                                    Jun wednesday
##
   479
        -0.295280675
                       1.108066e+00
                                       -3.62366634
                                                     16.91909010
                                                                    Aug wednesday
   480
                       4.835270e-01
                                                                        wednesday
##
        -0.907371109
                                        3.16062657
                                                     14.39724611
                                                                    May
                                       -5.74451353
                                                     27.43551212
##
   481
        -2.496013583 -1.185734e+00
                                                                    Aug
                                                                          tuesday
   482
         0.196591966 -2.201088e-01
##
                                       -6.65789780
                                                      5.93626353
                                                                    Aug wednesday
##
   483
        -0.366804317 -1.266442e+00
                                      -13.32514754
                                                   -10.65006265
                                                                    May wednesday
   484
        -0.436034844 -6.211666e-02
                                                                    May wednesday
##
                                        0.11695929
                                                    -14.61319308
   485
##
         2.609415055
                       5.157131e-01
                                       -6.79416596
                                                      3.18027622
                                                                    Aug
                                                                          tuesday
##
   486
         1.692286737
                       3.804005e-01
                                                                    Jun wednesday
                                        5.68529293
                                                      4.82025186
##
   487
        -2.163878335
                       1.196498e+00
                                       14.02673615
                                                      4.37954144
                                                                   July
                                                                          thurday
##
   488
        -0.920829513 -5.305171e-01
                                        0.56465450
                                                     -3.17579074
                                                                   July wednesday
                                                                    Jun
##
   489
        -0.240548125 -1.821420e+00
                                      -14.24365546
                                                    -16.49684597
                                                                          thurday
   490
         0.985106705 -3.316493e-02
                                                     -2.66744110
                                                                   July wednesday
##
                                       -1.96696603
##
   491
         2.132628903
                       1.520984e+00
                                       -0.46074231
                                                     -2.46583236
                                                                    May wednesday
##
   492
         2.219642423 -1.744882e+00
                                        1.68268148
                                                     24.57578928
                                                                   July wednesday
   493
        -0.044888580 -1.125296e-01
                                       -4.97176010
                                                     -3.99478939
                                                                    Apr
                                                                          thurday
        -2.177010781 -9.284036e-01
##
   494
                                       -2.73200686
                                                     12.47505381
                                                                    Jun
                                                                        wednesday
                       6.883423e-02
                                                    -18.94610790
##
   495
         1.014402882
                                       10.41662048
                                                                    Jun
                                                                          tuesday
##
   496
        -1.864389129
                       1.152792e+00
                                        8.91834733
                                                     -4.94002372
                                                                    May
                                                                          thurday
   497
        -0.731061054 -1.268464e+00
##
                                       -9.37422571
                                                     -0.31035702
                                                                   July wednesday
##
   498
         2.040041248 -5.505747e-02
                                        4.96231266
                                                     22.13800197
                                                                    May wednesday
##
   499
         0.043019471 -1.386441e+00
                                       -7.40048775
                                                   -17.95458521
                                                                   July wednesday
##
   500
         1.222862485
                      -1.648521e+00
                                        2.14483493
                                                     -6.47452317
                                                                    May
                                                                          tuesday
##
   501
         0.916067708
                       1.494758e+00
                                                                   July wednesday
                                       -4.57287003
                                                    -13.66090446
   502
                                                                   July wednesday
##
         -0.607882595
                       8.401880e-01
                                       -0.22677127
                                                      9.04904830
##
   503
        -0.247121293 -1.062956e+00
                                        6.27718801
                                                      6.72450326
                                                                    May
                                                                          tuesday
   504
        -1.250319641
                       2.621502e-01
                                        3.15129175
                                                      9.38317852
                                                                    Aug
                                                                          thurday
   505
##
         1.255959412 -1.559571e+00
                                       -9.92509357
                                                     -5.35501592
                                                                    Aug wednesday
   506
##
         0.085962609 -7.450621e-01
                                       -3.61219393
                                                     12.24917226
                                                                    Jun wednesday
##
   507
         4.149173715 -3.125952e-01
                                                      2.48505966
                                                                    May wednesday
                                        8.30397597
   508
        -0.752947143
                       7.597680e-02
                                        5.23961126
                                                      2.46883105
                                                                 sept. wednesday
   509
##
        -0.004215070
                       3.640016e-01
                                        0.52611415
                                                      6.94981846
                                                                    Jun wednesday
                                        4.12451365
##
   510
         2.051869923
                       1.674455e-01
                                                     -3.86330108
                                                                    Aug
                                                                          thurday
##
   511
         2.074213316 -9.058146e-01
                                       -8.43514147
                                                     -3.28511968
                                                                    Aug wednesday
##
   512
        -0.393001611 -5.879289e-01
                                      -10.75725682
                                                    -13.87099059
                                                                   July wednesday
   513
        -2.634746806 -1.537302e+00
##
                                        1.70629177
                                                     11.00070634
                                                                    Oct wednesday
##
   514
        -1.172349311
                       3.021787e-02
                                        0.39572389
                                                   -24.17792359
                                                                   July wednesday
##
   515
        -0.792453960 -1.429846e+00
                                       -0.44473236
                                                    -21.12199682
                                                                   July wednesday
##
   516
        -0.662279252 -7.462096e-01
                                        0.34513268
                                                     17.11441466
                                                                   July
                                                                          thurday
##
   517
        -0.709204073
                       1.921824e+00
                                       -8.38686799
                                                      0.95148371
                                                                   July
                                                                        wednesday
##
   518
        -1.129861818 -7.951926e-01
                                                                    May
                                        1.17356894
                                                     -0.35325651
                                                                          tuesday
##
  519
        -1.765195810 -6.942560e-01
                                       -4.65693677
                                                      0.12928408
                                                                    Aug wednesday
##
  520
         1.543812142 -1.191464e+00
                                                                   July
                                                                          thurday
                                       13.82716708
                                                     -8.37655692
## 521
        -0.575902327 -6.906619e-01
                                        9.31564116
                                                      4.59914817
                                                                    Jun wednesday
```

```
## 522
                       1.248133e+00 -13.30410064
                                                     -5.10922459
                                                                    Jun wednesday
         0.956397527
                                                                          thurday
##
  523
        -1.968791672 -6.606398e-01 -15.41794951 -18.29930226
                                                                    Apr
   524
        -1.435066418
                       5.758074e-01
                                       -2.00744191
                                                    -25.56816232
                                                                    Oct wednesday
   525
         0.945048706
                      -3.299325e-01
##
                                        9.54996076
                                                      9.11331065
                                                                   July wednesday
##
   526
         0.686061281
                       5.678393e-01
                                       -3.75336325
                                                     -1.07668632
                                                                    Aug wednesday
##
   527
                      -4.211659e-01
                                       -6.69877606
                                                                   July wednesday
         1.205119226
                                                      5.41915042
##
   528
         0.111543596
                       2.375160e-01
                                        3.63042288
                                                     -3.13803590
                                                                   July wednesday
## 529
         1.051423351
                       3.906141e-01
                                        4.45416176
                                                     26.06292993
                                                                   July
                                                                          tuesday
##
   530
                       4.272668e-02
                                       -2.94394066
                                                     -0.23817657
                                                                    May
                                                                          thurday
         1.040377314
##
   531
         1.664108910
                       2.769489e-01
                                       16.56966551
                                                      7.17498254
                                                                   July wednesday
##
   532
        -0.001819199 -2.683071e-02
                                        8.74333874
                                                     17.49850102
                                                                    May wednesday
   533
##
        -1.201783771 -5.097070e-02
                                       -7.00630338
                                                     12.80049546
                                                                    Jun wednesday
##
   534
        -0.001165686 -1.848958e-02
                                                     32.25159293
                                                                    Aug wednesday
                                       11.94348134
                       7.142156e-01
                                                   -14.73888340
##
   535
        -0.641790656
                                       -8.42306914
                                                                   July
                                                                          thurday
   536
##
         0.091307016
                       1.083215e+00
                                       -1.11431827
                                                   -20.40436618
                                                                    May
                                                                          tuesday
##
   537
                       8.205273e-01
                                                    -25.79773735
                                                                   July
                                                                          thurday
        -1.076042979
                                        4.14613949
##
   538
                                                                    May wednesday
        -1.404020277
                      -2.843447e-01
                                        1.10766525
                                                      4.72481378
##
   539
        -1.930055738
                       3.385077e-01
                                                    -31.55211636
                                                                    May wednesday
                                       11.25834160
                                                     26.47922746
##
   540
         0.130462587
                       4.093492e-01
                                                                   July wednesday
                                        7.70621597
##
   541
         0.998867541
                       5.934423e-02
                                        0.30898874
                                                    -17.16897725
                                                                  sept. wednesday
##
   542
        -0.459664641
                       8.519650e-02
                                        0.80981051
                                                      6.99984990
                                                                    May wednesday
   543
                                                                   July
##
         0.678918965
                       1.059268e+00
                                        2.00449034
                                                     15.06571793
                                                                          thurday
  544
##
         0.244987613 -4.526426e-01
                                                                    Jun
                                                                          thurday
                                       11.03526516
                                                     15.75674184
   545
##
         1.906639304 -5.983883e-01
                                        4.36789931
                                                     27.47087646
                                                                   July wednesday
##
   546
         0.868799965 -7.659924e-01
                                     -17.45737107
                                                      5.93332864
                                                                    May wednesday
   547
         0.747819675
                       1.775926e-01
                                     -10.22816743
                                                      0.58735451
                                                                   July
                                                                          thurday
   548
                                                                    Aug
##
        -1.782155575
                       1.077385e+00
                                        5.00200704
                                                     -1.47975288
                                                                          thurday
                                       -8.89327949
##
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         1.181844627 -8.184973e-01
                                                     -2.73940553
                                                                   July
                                                                          thurday
   550
##
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                                     -10.13148087
                                                     22.08288702
                                                                    Jun wednesday
##
   551
                       9.586761e-01
                                                                          thurday
        -0.516035164
                                        0.77373068
                                                      3.61216148
                                                                   July
##
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        -0.382830057 -3.965879e-01
                                       -2.15217120
                                                     27.98854984
                                                                   July wednesday
##
   553
        -1.683123235
                       9.640935e-01
                                       -4.89283311
                                                                    Aug wednesday
                                                     -8.41381283
##
   554
         0.586530748 -1.018256e-01
                                       -5.97799162
                                                     20.35649481
                                                                    Jun wednesday
##
   555
        -2.244849077 -8.751941e-02
                                      -20.62304383
                                                     -1.11301307
                                                                        wednesday
                                                                    Jun
   556
                      -7.329375e-01
##
        -0.680484767
                                        8.27607096
                                                    -25.77731411
                                                                    Jun
                                                                          thurday
##
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        -0.346644295 -2.366407e+00
                                       -1.59077364
                                                     18.67802735
                                                                   July wednesday
   558
         0.396014112 -7.570958e-01
                                        3.48452535
                                                     -9.50563331
                                                                    Apr wednesday
   559
##
         0.934738224
                       9.446216e-01
                                       14.46775547
                                                     -2.88437596
                                                                   July
                                                                          tuesday
   560
                                                                    Jun wednesday
##
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                                        3.55199873
                                                      8.72063696
##
   561
                       7.591837e-02
                                                                    May
                                                                          thurday
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                                                    -23.73860193
##
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         1.680604072 -8.122857e-01
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                                                     -9.27254138
                                                                    May
                                                                          thurday
   563
        -1.412611601 -4.421067e-01
                                                                    Jun wednesday
##
                                       -3.15525945
                                                      7.54236235
##
   564
         0.691479143 -1.111705e+00
                                        6.24626922
                                                     -9.27146330
                                                                    Aug wednesday
##
   565
        -1.295625065 -1.751823e+00
                                       -4.64732576
                                                    -19.80185165
                                                                    Aug wednesday
##
   566
         2.016990217
                       1.145621e-01
                                       -5.98246408
                                                      4.71460270
                                                                   July wednesday
   567
                       3.551416e-01
##
         1.296085671
                                       -0.44713262
                                                   -13.39482130
                                                                   July wednesday
##
   568
         0.974993592 -2.474788e+00
                                        7.49871441
                                                     18.31981133
                                                                   July wednesday
##
   569
        -4.007762994
                      -1.776598e+00
                                        0.04581253
                                                      7.41470792
                                                                    Jun wednesday
        -0.090163252
##
   570
                       6.660650e-02
                                       -9.22112108
                                                      7.33196466
                                                                   July
                                                                          tuesday
##
   571
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                                                     -2.96462308
                                                                    Jun
                                                                          thurday
                                       -3.49374659
##
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        -2.500611899
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                                                                   July
                                                                          tuesday
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                                                   -11.67270317
                                     -10.36317967
##
   573
         2.165088717
                       2.090413e-01
                                                    -12.16631916
                                                                    Aug
                                                                          tuesday
##
  574
        -0.650139780 -3.791101e-01
                                      14.31149979
                                                                    Aug wednesday
                                                      2.91258408
## 575
         0.323223055
                       1.580037e-01 -12.50725825
                                                      5.39970511
                                                                    Jun
                                                                          thurday
```

```
-1.715283111
                        1.325127e+00
                                       -5.77152916
                                                     -7.95697173
                                                                    Aug wednesday
        -0.999838482
##
  577
                       9.654330e-01
                                       -8.36858990 -21.63597734
                                                                 sept. wednesday
                       7.018954e-01
                                        9.38390984
##
   578
        -2.020179389
                                                    -12.69708166
                                                                    Aug
                                                                          tuesday
        -1.485583952
                                                                    Nov
##
   579
                      -6.723392e-02
                                       -7.18834173
                                                      0.02800840
                                                                          thurday
##
   580
        -0.148109054
                        1.072457e+00
                                       -5.89517200
                                                      3.48838210
                                                                   July
                                                                          tuesday
                                                                   July
   581
         1.234516562
                       9.340179e-02
                                                                        wednesday
##
                                       -4.15070330
                                                      8.52975035
##
   582
        -0.187106435
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                                        4.33928729
                                                      1.68144675
                                                                    Aug
                                                                          tuesday
##
   583
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                                       -1.45939986
                                                     -2.30136229
                                                                    Jun
                                                                        wednesday
##
   584
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                      -2.824014e-02
                                       -2.74672941
                                                     25.27387846
                                                                    Jun
                                                                          thurday
##
   585
         0.292695301 -6.795131e-01
                                        1.74517081
                                                    -21.92128772
                                                                   July
                                                                          thurday
##
   586
        -0.365726347
                       1.960891e+00
                                        6.00929404
                                                     -0.46092666
                                                                    Aug
                                                                        wednesday
   587
##
        -1.048523657 -4.959553e-01
                                        9.28071084
                                                     -2.65679279
                                                                  sept.
                                                                          tuesday
   588
        -0.662122187 -3.609573e-01
                                                                  sept.
                                                                          thurday
##
                                        2.62814265
                                                    -10.50396427
                                                      8.17135858
                                                                          thurday
##
   589
         1.046930153 -3.620076e-02
                                       -0.22376963
                                                                    Aug
   590
##
        -1.103134864
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                                       -2.34810600
                                                      3.96045212
                                                                    Jun
                                                                          tuesday
##
   591
         1.089083815
                       3.764403e-01
                                        8.94270650
                                                                   July wednesday
                                                     13.56212471
##
   592
        -0.349352047 -5.851101e-01
                                                                   July
                                                                        wednesday
                                       -3.71806716
                                                      8.86455520
   593
##
         0.583267003
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                                       -0.48450078
                                                      5.64167040
                                                                    Aug
                                                                          thurday
##
   594
        -0.580116800
                       5.160226e-01
                                        6.51596595
                                                      9.02526490
                                                                    Jun
                                                                          tuesday
##
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                                       -4.20104515
                                                     12.33964835
                                                                    Apr wednesday
##
   596
         1.273952017
                        1.250254e-01
                                       -5.21701474
                                                      4.24993308
                                                                    Aug wednesday
##
   597
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                       3.155674e-01
                                       -2.20975601
                                                     -1.81611359
                                                                    Aug wednesday
   598
        -1.202078836 -1.740748e-01
                                                   -17.93006494
                                                                   July
##
                                       -6.65985137
                                                                          tuesday
##
   599
         0.908051134 -1.356628e+00
                                       -0.97700213
                                                    -31.60334239
                                                                   July
                                                                          thurday
##
   600
        -0.721948476
                       1.469451e-01
                                        6.25445926
                                                     -7.30718943
                                                                    Jun wednesday
##
   601
         2.627650668 -2.399231e-01
                                        2.12830787
                                                     -6.09315017
                                                                   July
                                                                          thurday
   602
                                                                    Aug
##
         2.394948251 -1.115693e+00
                                       -6.11566577
                                                    -10.68874679
                                                                        wednesday
##
   603
        -0.360272702 -7.978849e-01
                                     -12.63397424
                                                      4.33866341
                                                                   July
                                                                          tuesday
##
   604
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                                       13.50442687
                                                    -23.47804873
                                                                    Aug
                                                                        wednesday
##
   605
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                                      -10.01692809
                                                     10.10502583
        -1.164635207
                                                                    May
                                                                          thurday
##
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                                        7.41142696
                                                    -11.90929575
                                                                    Oct wednesday
##
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         2.215895242
                        1.906153e-01
                                       -4.65446033
                                                     35.30047503
                                                                   July wednesday
##
   608
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                                        5.49650385
                                                    -22.51739186
                                                                   July wednesday
##
   609
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                       1.179230e+00
                                                                    Jun wednesday
                                        5.78317169
                                                     22.15491713
   610
                      -1.007207e+00
##
         0.606130125
                                       -9.07062667
                                                     -1.31095825
                                                                    Aug
                                                                          thurday
                                                                    Jun wednesday
##
   611
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                                       -4.43940615
                                                     -0.55137037
##
   612
        -1.495774770
                        1.427933e+00
                                       -7.85846736
                                                      1.08978825
                                                                   July
                                                                          thurday
  613
                       2.021389e-01
                                                                    Jun
##
        -0.315082642
                                        3.05522399
                                                     28.82188779
                                                                          tuesday
        -0.438710030
                                                                   July wednesday
##
   614
                        1.195442e-01
                                       12.59722389
                                                    -12.30925624
                                                                  sept.
##
   615
         0.115003719 -4.914835e-01
                                                     -4.31529503
                                                                          thurday
                                        4.15950013
                                                                   July wednesday
##
   616
         0.678891830 -6.415121e-01
                                        9.70557563
                                                    -15.73774072
   617
                                                                   July
##
        -1.914889472
                      -5.842588e-01
                                      -11.21944647
                                                     -1.43459008
                                                                          thurday
##
   618
         0.738652429
                      -3.124189e-01
                                       -3.42617518
                                                      5.52828915
                                                                   July
                                                                          thurday
                                                                   July wednesday
##
   619
        -0.623246082
                        1.114941e+00
                                       -1.95461899
                                                      7.13577524
##
   620
         1.958303409
                        1.085093e-01
                                       -8.69421392
                                                      7.73863448
                                                                   July wednesday
  621
                        2.015441e-01
##
         0.013223701
                                       -0.47753979
                                                     -9.26370939
                                                                   July wednesday
##
   622
        -0.756385918
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                                        5.38363325
                                                     -3.90841014
                                                                    Jun wednesday
##
   623
        -2.247531877
                      -5.909115e-01
                                       -8.37557018
                                                     -2.60877743
                                                                   July wednesday
##
   624
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                                       -3.47814702
                                                    -13.80914718
                                                                   July wednesday
##
   625
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                        4.746121e-02
                                       -2.58225622
                                                     -7.36975615
                                                                    Aug wednesday
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##
         1.980300207
                        4.997785e-01
                                                                    May
                                       -3.84774691
                                                     -5.62938424
                                                                          thurday
##
   627
         1.908219455
                        1.416724e-01
                                       -2.08193955
                                                     12.79206479
                                                                    Aug
                                                                          tuesday
##
  628
        -0.284735405
                       1.085776e+00
                                                     12.68638632 sept. wednesday
                                       -0.46990855
## 629
         0.063336348 -5.418439e-02
                                       -1.55468635
                                                     16.84357535
                                                                   July
                                                                          tuesday
```

```
630
         1.069737323 -4.452380e-01
                                                                   July wednesday
                                       14.17414232
                                                     11.65660915
##
  631
                       1.186055e+00
                                                                    Apr wednesday
         1.221578825
                                        5.56015931
                                                     -3.20354516
##
   632
         1.770835388
                       1.029368e+00
                                       -7.35450985
                                                     10.25395502
                                                                   July wednesday
                                                                   July
##
   633
        -1.230440488
                      -1.177269e+00
                                       -7.66711423
                                                     -9.88990173
                                                                          tuesday
##
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                                                     -2.92142652
                                                                    May
                                                                          thurday
##
   635
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                                                    -15.78935476
                                                                   July wednesday
         0.651436960
                                       14.07268431
##
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                                       -2.50078361
                                                     -6.06249720
                                                                    Jun
                                                                          tuesday
##
   637
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                                       -0.11384830
                                                    -13.73497826
                                                                   July
                                                                          tuesday
##
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                                       -8.81047408
                                                    -24.52190051
                                                                   July wednesday
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##
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                                       11.24700253
                                                      1.42661250
                                                                    Aug
                                                                        wednesday
##
   640
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                                                     10.99206787
                                                                    May
                                                                          tuesday
   641
##
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                                        4.18924471
                                                    -16.69069495
                                                                    Aug
                                                                          tuesday
##
   642
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                                                                   July wednesday
                                        4.41596165
                                                      8.50277562
        -1.746086961 -6.660695e-01
##
   643
                                       -6.90217360
                                                      1.59605687
                                                                    May wednesday
   644
##
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                                        4.68621780
                                                      8.99953877
                                                                   July wednesday
##
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        -0.394633876
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                                       -2.66952584
                                                                    Aug wednesday
                                                      4.74634190
##
   646
                                                                    Apr
                                                                          tuesday
         0.680444522
                       1.188050e+00
                                        5.63331792
                                                     32.39694136
   647
        -1.126579417 -8.541170e-02
                                        0.03030046
                                                                        wednesday
##
                                                     -1.21496444
                                                                    Aug
##
                                                                    Jun
   648
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                      -1.573714e-01
                                       -5.80362210
                                                     14.69052823
                                                                          tuesday
##
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                                        5.33233275
                                                     11.13228848
                                                                    Jun
                                                                          tuesday
##
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                                        0.69751968
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                                                                  sept. wednesday
##
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                                                                    Aug wednesday
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                                        1.95248184
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                                                                   July wednesday
##
##
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                                        4.30834459
                                                    -12.37663196
                                                                    May
                                                                          thurday
##
   654
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                                        1.49653524
                                                     12.51531572
                                                                   July
                                                                          tuesday
##
   655
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                                       -1.41849574
                                                     17.08616826
                                                                   July wednesday
   656
                       2.274191e-01
                                                                  sept. wednesday
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                                       -2.12101765
                                                      3.07650062
##
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                                                     14.97172268
                                                                   July wednesday
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##
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                                                      5.61748738
                                                                    Apr
                                                                          tuesday
##
   659
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                                     -19.22649307
                                                                   July wednesday
                                                    -11.83988416
##
   660
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                                       -6.80839930
                                                     -1.74207097
                                                                    Apr wednesday
##
   661
         1.199783020 -3.723960e-01
                                        6.73753395
                                                     -1.58541645
                                                                   July wednesday
##
   662
        -1.434521617
                       6.130275e-01
                                        4.53243048
                                                     16.48625475
                                                                    Jun wednesday
##
   663
         1.465545828 -7.864691e-01
                                                                          tuesday
                                       -4.71370825
                                                      7.37670855
                                                                  sept.
   664
         -0.161270080 -8.896682e-01
                                                                    May
                                                                          thurday
##
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                                                     13.82769096
##
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                                                                    Apr wednesday
##
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                       1.093543e+00
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                                                      6.62867842
                                                                    Aug wednesday
   667
                                                                   July wednesday
##
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                                                     -2.72040399
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                                                                    May wednesday
##
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                                                      4.25002229
##
   669
        -0.054476429 -5.827254e-01
                                                                    Aug
                                                                          thurday
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                                                     -2.35518045
##
   670
        -2.178745946
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                                        0.51221817
                                                     -5.84465252
                                                                    Aug
                                                                          thurday
   671
                                                                    Aug wednesday
##
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                                                     17.34982839
##
   672
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                                        3.60448398
                                                     -3.31067208
                                                                   July
                                                                          thurday
##
   673
                       9.583057e-01
                                                                    Jun
                                                                        wednesday
         1.083760011
                                       -7.93373571
                                                     -9.86398672
##
   674
         2.600342788 -2.178785e-01
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                                                    -16.90506038
                                                                   July
                                                                          tuesday
   675
##
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                                       -3.92107656
                                                     24.67201510
                                                                    Jun wednesday
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                                                                    Aug wednesday
##
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                                                      3.54572836
                                                                    May wednesday
##
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                                                     -9.21923157
                                                                   July wednesday
                                        6.49132454
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##
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                                                                    Aug
                                                                        wednesday
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                                       -3.89467490
##
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                                                    -11.70091092
                                                                    Apr
                                                                          thurday
##
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                                       -8.50267479
                                                     20.50325347
                                                                    Aug wednesday
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        -2.099597575
                       4.455663e-01
                                       -6.71882357 -22.86932288
                                                                    Jun
                                                                          tuesday
```

```
684
         2.283039395
                       9.111689e-02
                                       -8.99910929
                                                                   July wednesday
                                                      0.87041106
##
   685
                      -8.143793e-03
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                                                                   July wednesday
         0.524428125
                                                      1.47991708
##
   686
        -0.006581122
                        1.616137e-01
                                        0.21630008
                                                      2.82999354
                                                                   July wednesday
                                                                   July
   687
##
        -1.255490795
                        1.732935e-01
                                       -1.48127644
                                                     -2.98811980
                                                                           thurday
##
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                                                     25.58901188
                                                                    Jun wednesday
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                                                                    Aug
##
                                                                           thurday
##
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                                                                    Jun wednesday
##
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                                                     11.71280948
                                                                    Jun
                                                                           thurday
##
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                                                                    May wednesday
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                                                                   July
##
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                                                                        wednesday
##
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                                                                  sept.
                                                                           tuesday
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##
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                                                                   July
                                                                           thurday
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                                                                    Jun wednesday
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                                                    -20.05751734
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##
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                                                                        wednesday
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##
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                                                                   July
                                                                           thurday
##
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                                                                    Aug
                                                                        wednesday
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##
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                                                                    May
                                                                           thurday
##
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                                                     -16.21311067
##
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                                                                    Jun wednesday
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                                                                    Aug wednesday
##
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                                                                    Jun wednesday
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                                                                    Aug wednesday
                                                                   July
##
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                                                                           tuesday
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##
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                                                                   July
                                                                           thurday
##
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                                                                    Jun wednesday
##
   709
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                                                     15.50552835
                                                                   July
                                                                        wednesday
   710
                                                                   July
##
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                                                      6.54401435
                                                                           tuesday
##
   711
        -0.523159472
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                                        5.40132672
                                                     -7.87531617
                                                                    Jun
                                                                        wednesday
   712
##
         0.268323230 -1.508073e-01
                                       -3.73162855
                                                     14.17065419
                                                                   July
                                                                           tuesday
         0.951416380 -1.355183e+00
##
   713
                                       -0.29662934
                                                                    Aug
                                                      3.72794299
                                                                        wednesday
##
   714
        -1.169924253
                      -1.511426e+00
                                        2.85471556
                                                     -8.86948159
                                                                    Aug
                                                                           thurday
##
   715
        -1.086056271
                       3.814791e-01
                                        9.04400812
                                                      3.63023091
                                                                    Mar
                                                                        wednesday
##
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                                                     27.57554753
                                                                   July
                                                                           tuesday
##
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        -0.166823514
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                                                                   July
                                                     33.11407890
                                                                           thurday
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                                                                    Jun
##
                                       -4.65122957
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                                                                        wednesday
##
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                                                                   July
                                                                           tuesday
##
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                                                                   July
                                                                           tuesday
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##
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                                                                    Aug wednesday
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                                       -2.18343667
                                                     10.29912666
                                                                    Aug wednesday
##
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        -0.535531106
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                                                     -8.20704860
                                                                   July wednesday
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   724
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                                      -16.13960681
                                                     -8.53934128
                                                                    Jun wednesday
   725
                                                                    May wednesday
##
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                                       -0.23711752
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                                       -7.00513196
##
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                                                                    Aug wednesday
##
        -1.676598219 -6.888748e-01
                                                                    Jun wednesday
   727
                                       -0.84953214
                                                      4.03565443
                                                                           tuesday
##
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                                                                    Jun
   729
##
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                                                      3.18773384
                                                                    May
                                                                           tuesday
##
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                                       -0.52335860
                                                     12.50197378
                                                                    Apr wednesday
   731
##
         0.487842674
                       3.100025e-01
                                       -6.30370960
                                                     21.64258308
                                                                   July wednesday
##
   732
         0.109830754 -1.086455e+00
                                        8.91997423
                                                      6.81362777
                                                                    May wednesday
##
   733
        -0.650578570
                       1.074779e+00
                                        0.51812500
                                                                   July wednesday
                                                     -6.13207773
                                                                   July wednesday
##
   734
                      -1.128764e-01
                                                     28.20675798
         0.690372073
                                       -5.37693144
##
   735
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                      -2.347376e-01
                                       -5.63342058
                                                     -0.35334040
                                                                    Jun
                                                                           thurday
##
  736
         0.441005322
                       3.002333e-01
                                        4.87049886
                                                                    Aug wednesday
                                                     34.49814653
##
  737
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                       7.199527e-01
                                       -6.69815123
                                                     12.03466056
                                                                   July wednesday
```

```
738
        -0.333088202 -7.295910e-01
                                       -5.18425945
                                                      2.40677719
                                                                   July
                                                                          thurday
##
  739
                                       12.45788411
                                                     16.33226204
                                                                    Jun
         0.493591705 -1.964612e+00
                                                                          tuesday
##
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        -1.355808930
                       3.364826e-01
                                        1.80718333
                                                     -7.40076541
                                                                   July
                                                                          thurday
   741
                                        8.14602336
                                                                    Aug
##
        -0.315506034 -8.377973e-01
                                                     22.53267680
                                                                          thurday
##
   742
         0.193251840
                      -1.165349e+00
                                       -6.84437744
                                                     15.68087935
                                                                    May
                                                                          thurday
##
   743
         0.769358662 -3.870588e-01
                                       -2.51055465
                                                     -3.12759408
                                                                    Jun wednesday
##
   744
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                                        8.15570473
                                                    -13.67545733
                                                                  sept.
                                                                        wednesday
##
   745
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                                       16.57960969
                                                      8.27278942
                                                                    Jun
                                                                          thurday
                                                     -4.58219913
##
   746
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                      -5.754997e-02
                                        4.18998287
                                                                    Apr
                                                                          thurday
##
   747
        -2.630033645
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                                       -6.36330306
                                                     -7.00912693
                                                                    Jun
                                                                          thurday
##
   748
         1.028123409 -3.152346e-01
                                      -12.32680376
                                                     11.73876680
                                                                    Jun
                                                                        wednesday
   749
##
        -1.632999741 -4.631836e-01
                                        5.73070678
                                                     31.84415575
                                                                    Jun
                                                                          tuesday
                                                                   July
##
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         0.697627053 -1.239600e+00
                                        8.69714052
                                                      5.43491661
                                                                          thurday
                                                     -6.56059196
##
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                                        3.15285591
                                                                    Aug
                                                                        wednesday
   752
                       1.324888e+00
                                                                   July
##
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                                        3.45652678
                                                     -6.66300901
                                                                          tuesday
##
   753
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                                        1.18571367
                                                     20.46027216
                                                                    Jun
                                                                          thurday
##
   754
         0.136432952 -3.170950e-02
                                                    -21.33921629
                                                                   July wednesday
                                       -0.26076544
##
   755
         0.557051563 -1.893296e+00
                                       -0.39376833
                                                    -11.95799031
                                                                   July
                                                                        wednesday
   756
##
         0.825423417
                       1.981553e+00
                                        0.77975818
                                                     -4.49670006
                                                                    Oct
                                                                          thurday
##
   757
        -0.932604189
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                                       10.48996591
                                                    -32.84249229
                                                                    May
                                                                        wednesday
##
   758
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                                       -0.42652265
                                                     -0.29758482
                                                                    Apr
                                                                          thurday
   759
         1.595134127 -6.793567e-01
                                                    -15.32313116
                                                                   July wednesday
##
                                      -10.93640429
  760
                                                                    Aug
##
         0.764395498 -8.663117e-01
                                       -4.90424217
                                                     15.47276624
                                                                          thurday
   761
##
        -0.781937032 -8.705422e-02
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                                                    -15.10089993
                                                                   July
                                                                          tuesday
##
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                       6.875020e-01
                                       -3.66308314 -20.83918694
                                                                    Jun wednesday
   763
        -0.043221847 -2.300394e-01
                                       10.69019428
                                                     13.25385448
                                                                  sept.
                                                                          thurday
   764
        -2.722252099 -9.213033e-01
                                                                   July wednesday
##
                                       10.18381015
                                                      0.51054151
##
   765
         0.408700431
                       1.590842e+00
                                       12.19360193
                                                    -39.55605265
                                                                    Jun wednesday
                                                                    Apr wednesday
   766
         0.078623518 -2.877088e-01
##
                                        6.30321902
                                                      9.26430044
##
   767
         0.288171048
                       7.194090e-02
                                       -2.12327529
                                                     25.39904828
                                                                  sept.
                                                                          tuesday
##
   768
        -2.446408470
                      -8.994796e-01
                                        5.48310907
                                                     16.23061081
                                                                    Aug
                                                                          thurday
##
   769
         0.230875759
                       1.263051e+00
                                       -0.91377549
                                                      1.45177737
                                                                   July
                                                                          tuesday
##
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                                       -6.32296944
                                                     -3.12043980
                                                                  sept. wednesday
##
   771
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                      -5.947862e-02
                                        0.26191358
                                                                    Jun
                                                                        wednesday
                                                     -1.60088323
                                                                    May
   772
        -2.107122856
                       8.273005e-01
                                                                          thurday
##
                                       15.34457957
                                                     -5.34227392
                                                                          thurday
##
   773
         2.126430151
                       1.865239e-02
                                        5.35705180
                                                     -3.18663329
                                                                    Jun
##
   774
        -0.911697176
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                                        6.04901528
                                                    -11.44248009
                                                                    Jun
                                                                          thurday
##
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        -0.024327522 -1.609571e+00
                                       -7.47184666
                                                                   July wednesday
                                                    -21.80776190
   776
         0.614140234 -8.751509e-01
                                                                  sept. wednesday
##
                                        6.97282047
                                                     -3.57515244
##
   777
        -0.724032447 -1.394298e-01
                                       -1.53867878
                                                     11.16691776
                                                                   July wednesday
##
   778
         0.953836803
                       2.201929e-01
                                       -4.99688825
                                                      6.30974093
                                                                    May wednesday
   779
         1.427788959
                       6.061981e-01
                                                    -17.94768770
                                                                    Aug wednesday
##
                                        1.74355251
##
   780
        -0.985763980
                       1.586959e-01
                                       -2.65072968
                                                     21.55520604
                                                                    Jun wednesday
##
   781
                       1.661313e-01
                                                                    Oct
                                                                          tuesday
         0.967561272
                                       -4.53899405
                                                    -11.92801553
##
   782
        -1.045156947
                       5.473901e-01
                                        0.61925599
                                                     -7.66244398
                                                                    Jun wednesday
                                                                   July
   783
        -0.593600623 -2.178082e-01
##
                                       -6.29434485
                                                     26.86811702
                                                                          thurday
##
   784
         0.425062243 -9.478031e-03
                                        3.51979040
                                                     -2.26691282
                                                                    Apr
                                                                        wednesday
   785
##
         0.688624216 -9.509917e-01
                                       -2.24615465
                                                     17.75753836
                                                                    Jun
                                                                          tuesday
##
   786
         1.226001031
                       5.223351e-01
                                       -4.83495049
                                                     -1.45476847
                                                                   July
                                                                          tuesday
##
   787
        -1.328805784
                       2.824501e-01
                                        1.69387248
                                                     17.68647001
                                                                   July wednesday
   788
##
        -0.102473078
                      -9.865162e-01
                                                    -20.90466402
                                                                    Aug wednesday
                                        9.21361174
##
   789
        -2.987443517
                       4.493263e-01
                                       -0.12956084
                                                    -13.15986174
                                                                   July wednesday
##
   790
        -0.195604078 -4.132544e-02
                                      -10.36087383
                                                      9.37291736
                                                                   July wednesday
##
  791
         0.892407127 -2.340372e-03
                                       -2.75465378
                                                      5.88119609
                                                                    Jun
                                                                          tuesday
```

```
792
        -2.192945535 -6.661351e-01
                                       -7.13670753 -13.77350369
                                                                    May
                                                                          thurday
                                       -7.11587259
##
  793
        -0.354324193 -7.781220e-01
                                                                    May
                                                      2.46161989
                                                                          tuesday
##
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         0.035018406
                       1.132792e+00
                                       2.69563659
                                                     -1.15818264
                                                                    Apr
                                                                        wednesday
   795
         1.098735739
##
                      -6.495287e-01
                                       -4.41847788
                                                   -10.80473846
                                                                    Aug
                                                                          thurday
##
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        -0.426801858
                       5.224862e-02
                                       -9.81125099
                                                   -11.94266637
                                                                   July
                                                                       wednesday
   797
         1.574240133
                       6.495436e-01
                                       -8.56463780
                                                   -10.66145817
                                                                    Aug wednesday
##
##
   798
         1.391817810
                       1.359712e-01
                                       -4.41150082 -10.96759134
                                                                    Jun wednesday
##
  799
        -1.749744920
                      -4.150002e-01
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                                                   -19.44238913
                                                                   July
                                                                          tuesday
##
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        -1.194192248 -3.034762e-01
                                       14.60750847
                                                     -9.51170515
                                                                    Aug
                                                                          thurday
##
   801
         0.284510330 -9.932995e-01
                                        1.93794553
                                                     12.67094644
                                                                 sept. wednesday
##
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         0.064563283 -8.810394e-01
                                     -16.49071035
                                                      2.13459757
                                                                    Aug
                                                                          thurday
   803
##
         0.151163473 -8.979409e-01
                                       2.93625639
                                                      0.45240781
                                                                    Jun wednesday
##
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        -0.977626904 -4.429049e-01
                                                   -18.83254075
                                                                    Jun wednesday
                                       -1.29841732
                       7.671184e-01
##
   805
        -0.365590523
                                       -2.98925275
                                                      8.53170748
                                                                   July wednesday
##
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        -2.204765073
                       1.052189e+00
                                       -6.19691671
                                                     -2.80506993
                                                                    May wednesday
##
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         1.074052903 -5.024627e-01
                                       -9.87077215
                                                     18.03651740
                                                                   July wednesday
##
   808
        -1.754232116 -5.695630e-01
                                                                    Jun
                                                                          tuesday
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                                                     -6.26609233
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                                                                   July wednesday
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                                                   -21.03321778
##
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        -0.843469617 -3.033881e-01
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                                                                    May wednesday
##
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        -1.817150598
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                                                                    May wednesday
##
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                                                                    Aug wednesday
##
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        -0.078117482
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                                       -0.65685398
                                                     -9.73403406
                                                                   July wednesday
  814
##
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                                                                    Jun wednesday
##
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                                                                   July wednesday
##
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                                                      3.91424925
                                                                    Jun wednesday
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                                                     10.75923509
                                                                    Aug
                                                                          thurday
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                                                                  sept. wednesday
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                                                     18.06643616
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         0.986198097 -1.850404e-01
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                                                    -15.98914126
                                                                   July
                                                                          tuesday
        -0.992984232 -2.783287e-01
##
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                                       5.44633495
                                                     -6.59664730
                                                                    May wednesday
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##
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                                                                    Aug wednesday
                                       3.70843118
##
   822
        -1.733425294
                       5.682331e-01
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                                                      1.04667133
                                                                    Oct wednesday
##
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                                       -6.05794065
                                                     -4.15161764
                                                                    Apr wednesday
##
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                                                                    Aug wednesday
   825
##
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                                       -2.38280850
                                                      5.51214671
                                                                    Jun wednesday
   826
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                                                                        wednesday
##
                                      -12.21402519
                                                     10.36690314
                                                                    Jun
##
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                                                     5.03005464
                                                                    Jun
                                                                          thurday
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                                                                    May wednesday
  829
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                                                                   July wednesday
##
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                                                     12.87374925
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                                                                 sept. wednesday
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                                                                    May
                                                                          thurday
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                                                   -17.36889575
                                                                   July
                                                                          thurday
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                                                                    Jun wednesday
##
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                                                     -4.64942688
##
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        -1.914850960
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                                                     14.87881481
                                                                    May wednesday
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                                                                    Aug wednesday
##
   835
                       9.361937e-01
                                       2.72920110
                                                   -21.76742012
##
   836
         1.419766388 -2.224150e-01
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                                                      3.19808149
                                                                    Jun wednesday
   837
##
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                                                     17.85967063
                                                                   July
                                                                          thurday
##
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        -2.434283898 -9.111193e-02
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                                                                    Jun
                                                                       wednesday
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                                                                    Jun
                                                                          thurday
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                                                                   July
                                                                          tuesday
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                                                                    May
                                                                        wednesday
##
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                                                                   July
                                                                          tuesday
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                                                                    May wednesday
##
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                                                                    Jun wednesday
                                                      6.96371054
  845
        -0.263065177 -1.140693e+00
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                                                                    Apr wednesday
```

```
846
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                       3.055716e-01
                                        7.21419201
                                                                    Oct wednesday
                                                      9.10103589
                                                                    May
##
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        -0.078392030 -1.023635e-01
                                        3.06647957 -18.79235857
                                                                          tuesday
##
   848
         1.377587197 -8.002343e-01
                                        3.14406167
                                                      8.15720534
                                                                   July
                                                                          tuesday
   849
##
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                                       -6.66031277
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                                                                    Jun wednesday
##
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                                       -6.90377527
                                                     -3.21056142
                                                                 sept. wednesday
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                       7.341094e-02
                                                      4.96820561
                                                                    Jun wednesday
##
                                       -8.41152160
##
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        -1.505400330 -6.218335e-01
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                                                      6.93250639
                                                                    Jun
                                                                          tuesday
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        -1.720976770
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                                       -1.93605342
                                                      6.11921156
                                                                   July wednesday
        -2.102383012 -1.197303e+00
##
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                                      -14.26447322
                                                     13.27244475
                                                                   July
                                                                          tuesday
##
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                                                     -7.62799524
                                                                    Jun wednesday
##
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                                                                   July wednesday
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                                                                    Aug wednesday
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                                       -0.08395409
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                                                                   July wednesday
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##
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                                                    -24.75003873
                                                                  sept. wednesday
##
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                                                     -8.28383408
                                                                    Jun wednesday
                                        9.38374046
##
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                                                                 sept. wednesday
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                       9.438754e-01
                                                                    May wednesday
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                                                     -7.11262895
##
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                                                     31.50046382
                                                                    Apr
                                                                          tuesday
##
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                                                                    Apr wednesday
##
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                                                                    Jun
                                                                          thurday
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                                                                   July wednesday
##
         1.523713567
                                                                   July wednesday
##
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                                                                   July
##
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                                                                          tuesday
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                       1.366241e-01
                                        2.13017266
                                                      5.11067361
                                                                    May wednesday
   872
                                                                  sept. wednesday
##
         1.448496308
                       4.024867e-01
                                      -11.42584355
                                                     17.99200081
##
   873
        -0.293236528
                       1.107320e-01
                                        6.03039531
                                                      9.61536816
                                                                   July
                                                                           friday
##
   874
        -0.125393843 -1.383362e+00
                                        0.99887406
                                                     -4.47243859
                                                                    Jun wednesday
##
   875
         0.898787710 -2.071358e-01
                                        1.62015176
                                                      7.94825890
                                                                   July wednesday
##
   876
         2.158272278 -8.628300e-01
                                        3.99436396
                                                    -19.46543913
                                                                   July wednesday
##
   877
        -0.291141021 -5.791682e-01
                                        7.72649127
                                                      7.52398169
                                                                   July wednesday
##
   878
        -1.447519383
                      -4.827945e-01
                                        3.71556568
                                                    -10.07913163
                                                                    May
                                                                          thurday
                                                                 sept.
##
   879
        -1.343680663
                       1.696763e-01
                                                    -12.23434265
                                        2.22343142
                                                                          thurday
                                                                   July
   880
                       7.265842e-01
##
        -2.549482413
                                       -1.62360422
                                                     20.14560991
                                                                          tuesday
##
   881
        -0.190346245
                      -1.074218e+00
                                       -2.19473829
                                                     21.31154105
                                                                   July wednesday
   882
        -1.965123694
                      -3.854219e-01
                                       -1.16700182
                                                     -0.29346583
                                                                 sept.
                                                                          thurday
   883
                       4.290192e-01
                                                                    May
##
        -0.798374062
                                       -6.73599758
                                                     11.43259569
                                                                          tuesday
   884
##
         0.492991820
                       1.302624e+00
                                       -5.31383419
                                                     20.00765041
                                                                    Aug
                                                                        wednesday
##
   885
         0.118405926
                       3.269449e-01
                                       -6.16835582
                                                    -13.22997816
                                                                          thurday
                                                                   July
##
   886
         0.570502026
                      -2.795227e-01
                                        6.40385983
                                                      3.22883104
                                                                    Jun
                                                                          thurday
   887
                                                                    May wednesday
##
        -0.965410015
                       1.045040e+00
                                      -11.36970078
                                                     15.43836764
                                       -2.35837161
##
   888
        -1.688784193 -4.023648e-01
                                                     -4.31831057
                                                                    Jun wednesday
##
   889
         0.719759970
                       8.754703e-02
                                       10.11645391
                                                    -17.62156473
                                                                    Jun wednesday
                                                                    Aug wednesday
##
   890
         0.708717293 -4.347498e-01
                                        3.93906671
                                                     16.22191777
   891
         2.972322311 -7.356566e-01
##
                                     -10.92352331
                                                      7.92162960
                                                                  sept. wednesday
##
   892
        -1.068451349
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                                       -7.11920986
                                                     -1.63255703
                                                                   July wednesday
##
   893
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                                        0.05445609
                                                     39.93390578
                                                                   July wednesday
##
   894
         0.672642927 -1.003449e+00
                                        8.75343875
                                                     36.59717764
                                                                   July wednesday
##
   895
         1.942992079
                       5.819758e-01
                                        2.43773940
                                                                    Oct wednesday
                                                      6.52027614
##
   896
         0.555368539
                      -2.423276e-01
                                                                    Jun wednesday
                                       -6.74866520
                                                    -17.95257879
##
   897
         1.723269095
                       1.101529e+00
                                        9.23674793
                                                     13.71437314
                                                                   July wednesday
##
  898
         0.072147531
                       1.032543e-01
                                        1.50723844
                                                      8.90397697
                                                                    Jun wednesday
  899
        -1.448601854
                       1.028734e+00
                                        1.48082491 -11.23203432
                                                                   July wednesday
```

```
## 900
         1.647103978
                       3.298489e-01
                                      -2.21914715
                                                                  July
                                                     6.23428257
                                                                          thurday
                                       0.61023063
##
  901
         0.835514043 -2.744247e-01
                                                    -7.52976060
                                                                  July
                                                                          thurday
   902
         1.450869276 -1.277724e+00
                                       -0.35120858
                                                    19.88645736
                                                                   Nov
                                                                          tuesday
   903
        -1.273229014 -1.237805e+00
##
                                      -2.82294292
                                                   -24.01818089
                                                                   Oct
                                                                          tuesday
##
   904
        -1.219073158 -4.734517e-01
                                      -8.96922912
                                                    22.05479012
                                                                   May
                                                                       wednesday
   905
        -1.805574264 -2.698404e-01
                                                                   Apr wednesday
##
                                      -3.41893833
                                                    -2.34108141
##
   906
        -0.263464432
                       8.753308e-01
                                       -4.41905649
                                                     5.33647398
                                                                   Aug
                                                                       wednesday
##
   907
        -0.536091484 -5.211819e-01
                                       -1.25078664
                                                    -7.29846396
                                                                 sept.
                                                                          thurday
##
   908
        -0.366660064 -5.794327e-01
                                       -9.43905956
                                                    -3.82888685
                                                                  July wednesday
##
   909
         0.106391337
                       6.900815e-01
                                      -4.91574600
                                                     2.83495889
                                                                   Jun wednesday
##
   910
        -0.298471268 -6.789090e-01
                                       1.30223746
                                                    16.75787250
                                                                   May
                                                                          thurday
##
   911
        -1.673559365
                       1.281159e+00
                                       -3.81699578
                                                     3.61659572
                                                                   Aug wednesday
##
   912
        -0.680339232 -8.530724e-01
                                                    16.50887080
                                                                   May wednesday
                                       4.96816219
        -0.189611675 -5.396679e-01
                                                                   Aug wednesday
##
   913
                                       -4.83347951
                                                   -21.10123821
  914
                                                   -28.43876839
##
         2.014039223 -2.551878e-01
                                       1.66296562
                                                                   May wednesday
##
   915
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                       3.496354e-01
                                       -1.48537453
                                                    -6.02349347
                                                                   May wednesday
##
   916
        -0.970583446 -1.217784e+00
                                                                   May wednesday
                                       7.72118837
                                                    21.01341981
   917
        -0.200939441 -4.718589e-01
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                                                                   Jun wednesday
                                       -2.49708939
                                      -8.86087910
##
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                                                   -10.89874083
                                                                   Jun wednesday
##
   919
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                                       -3.13053005
                                                    15.02095594
                                                                   July
                                                                          thurday
##
  920
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                                       2.13516443
                                                   -20.02847623
                                                                   July wednesday
  921
         0.873003473 -9.981541e-01
##
                                       -4.77833310
                                                    10.75866987
                                                                   May wednesday
## 922
                                       -8.20408678
         0.102530898 -1.857164e-01
                                                    16.02971048
                                                                   Jun
                                                                          tuesday
  923
##
         2.209362766
                       5.199152e-01
                                       2.11132853
                                                    11.76555813
                                                                  July wednesday
##
  924
         1.485980359
                       1.102655e+00
                                       1.29264764
                                                    -7.27792837
                                                                   July wednesday
   925
         0.370371177 -1.026475e+00
                                       8.49177130
                                                     2.74813261
                                                                   Jun wednesday
   926
         0.925720687 -2.706158e-01
##
                                       0.63365487
                                                    24.18549231
                                                                   Aug wednesday
##
   927
         1.451976230
                       1.863513e-01
                                       0.03199501
                                                   -33.75284133
                                                                  July wednesday
   928
##
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                                      14.23148098
                                                   -17.56960083
                                                                   Jun wednesday
##
  929
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                                                    -0.76096240
                                                                   Aug wednesday
                                       -1.25777059
##
   930
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                       7.393216e-01
                                       5.64482602 -15.89569372
                                                                   May wednesday
##
   931
        -1.260096953 -1.251525e+00
                                                   -13.35295547
                                                                   May wednesday
                                      -3.94588015
##
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                                                   -31.36242094
                                                                   May wednesday
##
   933
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                                                                   Aug wednesday
                                       -6.64219335
                                                    12.65602678
   934
        -0.940907017
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                                                                   Oct
##
                                       4.08327933
                                                    -3.38368930
                                                                          thurday
##
   935
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                                                                   Apr wednesday
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                                                                   Jun wednesday
  937
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                                                                  July
##
                                       5.47339702
                                                    23.50560419
                                                                          tuesday
   938
                                                                 sept.
##
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                                                     1.29307426
                                                                          thurday
  939
                                                    -2.51676732
##
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                                     -10.91731152
                                                                   May wednesday
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         0.702283158
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                                       4.39368278
                                                    -1.57522891
                                                                   May wednesday
  941
                                                                  July wednesday
##
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                                       -1.65130645
                                                   -31.52816115
##
   942
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                                       -4.49164928
                                                   -24.98676548
                                                                 sept. wednesday
   943
                                                                  July wednesday
##
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                                       0.39411267
                                                   -12.10811874
##
   944
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                                                    -3.15583481
                                                                   May wednesday
                                                                  July
   945
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##
                                       2.31145726
                                                    26.49502295
                                                                          tuesday
##
   946
         0.641805945 -1.854858e+00
                                       7.42250445
                                                   -21.44647424
                                                                   Aug wednesday
##
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         1.008564615 -2.695460e-01
                                       -4.97512380
                                                     0.81683682
                                                                   July
                                                                          thurday
##
   948
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                                                    -0.19510005
                                                                  July
                                                                          tuesday
##
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                                                    -9.56092159
                                                                  July wednesday
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##
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                                                                   Aug wednesday
                                      17.52198761
                                                    -1.21718071
##
   951
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                                       2.11603691
                                                    21.02864275
                                                                   Aug wednesday
##
   952
        -1.381405666 -5.478612e-01
                                                     6.70902875
                                                                  July
                                                                          thurday
                                       1.20106277
## 953
         0.163688533 -1.403223e-01
                                       6.20528592 -19.49904895
                                                                   May wednesday
```

```
954
         0.471505332 -6.492551e-01
                                        0.37578066 -14.42139602
                                                                    Aug wednesday
                                                     -6.91737464
##
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                                        6.06061883
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                                                     19.04636050
                                                                    Aug wednesday
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##
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                                       -0.75922972
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                                                                    May wednesday
##
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                                      -10.96709438
                                                     -9.01929690
                                                                    Aug wednesday
        -1.014802300
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                       1.576822e-01
                                                                    May wednesday
##
                                        0.27658817
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##
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                                        0.56576057
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                                                                    May wednesday
##
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                                                                    May wednesday
##
   962
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                                                     -3.42055770
                                                                    Jun wednesday
##
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                                                                    May
                                                                          thurday
##
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##
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                                                                    Jun wednesday
   966
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                                                                    May wednesday
##
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                                        9.29426938
                                                     28.01792126
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##
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                                                                   July
                                                                          thurday
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                                                      0.28444461
                                                                    Jun wednesday
##
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                                                     22.46434367
                                                                          tuesday
                                                                    Aug
##
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                                       -5.02347781
                                                      0.96500655
                                                                    Jun wednesday
##
   974
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                                                     -3.63067326
                                                                    Jun wednesday
##
   975
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                                       -0.14203614
                                                     13.39274694
                                                                    May wednesday
   976
##
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                                                                    Jun wednesday
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                                                                          tuesday
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                                                                          thurday
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                                                                    Apr
                                                                        wednesday
##
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                                                                    May
                                                                        wednesday
                       2.859916e-01
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                                                     -4.42749867
                                                                    May
                                                                          thurday
##
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                                                                          tuesday
##
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                                       -1.03306442
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                                                                    May
                                                                        wednesday
##
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         0.896932808 -3.829080e-02
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                                                                   July
                                                                          thurday
                                                     -0.43525114
##
   986
        -0.018518703
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                                       -1.96189669
                                                     -6.53620602
                                                                    Jun
                                                                        wednesday
##
   987
        -2.552997600 -9.874812e-01
                                                                        wednesday
                                       -6.06597783
                                                     -9.92738636
                                                                    Jun
   988
##
         1.034078671
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                                        1.21592156
                                                      2.65347563
                                                                    Aug
                                                                          thurday
##
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                                                                    Aug
                                                                          tuesday
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                                                                   July wednesday
   991
                                                                    May
##
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                                                                          thurday
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##
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                                                      7.10916920
                                                                    Aug
                                                                          tuesday
##
   993
        -2.160593407 -6.268489e-01
                                                                   July wednesday
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                                                      8.76675029
                                                                  sept.
                                                                          tuesday
   995
                                                                   July wednesday
##
         2.057949947
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                                                     -6.79500311
##
   996
         1.682245015
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                                      -10.11554763
                                                     -8.30056068
                                                                    Oct wednesday
                                                                    Jun wednesday
##
   997
         0.265495309 -9.104864e-01
                                       -1.55926624
                                                     -2.86457783
##
   998
         -0.880595235 -5.408921e-01
                                       -5.69563676
                                                     10.58439811
                                                                   July wednesday
##
   999
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                       6.198350e-01
                                        3.39236341
                                                    -21.36879235
                                                                   July wednesday
##
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                                        0.27222197
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                                                                    May wednesday
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                                                                   July
                                                                          tuesday
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         1.158818993 -1.139347e+00
                                       -6.39172710
                                                    -23.72877578
                                                                    Apr
                                                                          tuesday
   1003
        -0.076957710
                       2.192153e-01
                                       -1.84693048
                                                                          tuesday
                                                     24.43568360
                                                                    Aug
##
   1004
        -2.188470511 -1.154878e+00
                                       -4.78709599
                                                                    Oct wednesday
                                                      0.43529205
   1005
         0.632914371 -7.043723e-01
                                        1.98381672
                                                      3.84895834
                                                                   July wednesday
   1006 -1.673985286
                       7.600534e-02
                                       -4.52296110
                                                      7.85765740
                                                                   July
                                                                          thurday
  1007 -0.086139546 -3.120248e-02
                                        3.37665981 -18.18504952
                                                                    Jun
                                                                          thurday
```

```
## 1008 -0.895521263 -6.615246e-01
                                                    -8.42385323
                                       5.33213039
                                                                   May wednesday
   1009 -0.367043004
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                                                                  July wednesday
                                       0.45698761
                                                    22.86905922
   1010
         0.361962917 -7.774211e-01
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                                                   -14.80965025
                                                                   Jun
                                                                         tuesday
   1011 -1.052346609
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                                       9.54799719
                                                     5.99878327
                                                                 sept. wednesday
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                                      -5.96710999
                                                     5.62547472
                                                                   May wednesday
   1013 -0.805198196
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                                                                  July
                                       1.58192845
                                                     6.99059738
                                                                         thurday
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                                                                   Jun wednesday
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                                                                   Aug wednesday
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                                                                         thurday
                                                                   Aug
   1019
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                                                                   Aug wednesday
##
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                                                                  July wednesday
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                                                                         thurday
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                                                                         tuesday
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                                                     2.74783512
                                                                   Jun wednesday
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                                                                   Aug wednesday
                                       0.63419722
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                                                    33.16938592
                                                                   May
                                                                         tuesday
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                                                                   Jun wednesday
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                                                                   May
                                                                         thurday
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                                                     2.18813238
                                                                   May
                                                                         thurday
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                                                                   Aug
                                                                       wednesday
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                                                                   Jun
                                                                         tuesday
##
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                                                                   Aug wednesday
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                       6.833485e-01
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                                                                   Aug wednesday
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                                                    -1.11076589
##
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                                                                   Jun wednesday
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                                                     5.33736373
                                                                   Mar
                                                                         thurday
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                                                                   Jun wednesday
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                                                    16.50576175
                                                                   Jun
                                                                         thurday
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                                                                         thurday
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                                       5.20493727
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                                                                   Aug
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                                                                   Aug wednesday
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                                                                  July wednesday
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                                                     1.94548661
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                                                                   May
                                                                         tuesday
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                                                     5.92559050
                                                                  July
                                                                         thurday
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                                                                   May
##
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                                       4.96248245
                                                     5.36598065
                                                                         thurday
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                                                     1.90461254
                                                                 sept. wednesday
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                                                                   May wednesday
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                                                    -7.89842179
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                                                    -9.45905017
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                                                     3.74945293
                                                                  July
                                                                         tuesday
  1060 -0.624242855 -1.319086e+00
                                                                  July
                                       1.92436887
                                                    25.56147145
                                                                         thurday
## 1061
         1.768229548 -1.503348e+00
                                       1.40760428
                                                    23.12501710
                                                                         tuesday
                                                                   Jun
```

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## 1062 -0.248337269 -6.021106e-02
                                                     6.43833861
                                      14.33834553
                                                                   Aug
                                                                         tuesday
                                                                   Jun wednesday
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                                                   -7.41403511
                                       1.95700738
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                                                    -4.27675160
                                                                  July wednesday
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                                                  -30.48303193
                                                                   Jun wednesday
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                                                                   Oct wednesday
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                                                                   Jun
                                                                         tuesday
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                                                                   Apr wednesday
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                                                                         thurday
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                                                     6.89036923
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                                                     6.19193213
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                                                                   Mar wednesday
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                                                                   Aug
                                                                         thurday
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                                     -11.73280603
                                                                         tuesday
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                                                                  Julv wednesdav
   1080
                                                    5.64212921
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                                                                  Aug wednesday
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                                                                   Jun
                                                                         thurday
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                                                                   Jun
                                                                         thurday
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                                                    23.22953006
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                                       2.51482707
                                                    9.81505974
                                                                         tuesday
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                                                                         tuesday
##
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                                                                   Aug wednesday
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                                                                         thurday
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                                                                         tuesday
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                                                                   Jun
                                                                         tuesday
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                                                                   Oct
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                                                                   Aug
                                                                         thurday
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```

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                                                                         tuesday
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                                                                         thurday
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                                                                         thurday
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                                                                   May wednesday
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                                                                         thurday
                                                                   Mar
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                                                                  July wednesday
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                                                    15.82776250
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                                                                         tuesday
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                                                                         tuesday
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                                                                         tuesday
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                                                                   Mar wednesday
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                                       4.90481263
                                                    23.53942614
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                                      -7.29124649
                                                   -14.54426220
                                                                   Aug wednesday
## 1168
         1.157504576
                       8.733579e-01
                                                    -4.84593513
                                                                   May
                                       1.40854656
                                                                         tuesday
## 1169 -0.152106384
                      1.189117e+00
                                       1.49013874
                                                   -4.33913243
                                                                  July wednesday
```

```
## 1170
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                                       5.21585782
                                                     0.43778042
                                                                  May wednesday
  1171
         3.069828245
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                                                                 July wednesday
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         1.438566184
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                                       8.53144864
                                                     1.17772787
                                                                  July
                                                                         thurday
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                                      -0.91847358
                                                  -19.30528128
                                                                   Jun wednesday
   1174
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                                       2.72022527
                                                    19.23516824
                                                                   Jun wednesday
  1175
                                                    -6.43743164
        -0.881684130 -7.007589e-01
                                      -9.93736732
                                                                   Aug
                                                                         thurday
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                                      -4.77041434 -10.88339191
                                                                  May wednesday
## 1177
         0.841067742
                       3.405182e-01
                                       3.44578683 -17.39914816
                                                                   Jun
                                                                         tuesday
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        -0.841702048
                       3.655025e-01
                                      10.56145223 -11.09676819
                                                                  July wednesday
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         2.027824064 -7.178149e-01
                                       1.10896695
                                                     9.99740138
                                                                  July wednesday
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         1.100638690 -1.547802e+00
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                                                  -11.24868093
                                                                  July wednesday
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                                                    -7.01811829
                                                                sept. wednesday
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                       2.286008e-01
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                                                     8.09255011
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        -0.115964035
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                                      -9.35148885
                                                  -10.43454547
                                                                   Jun
                                                                         tuesday
         1.898947858
                       1.913238e+00
                                                                   Jun wednesday
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                                       4.65703431
                                                     5.49861271
         2.547958954
                                       3.07884064
                                                                       wednesday
   1187
                       1.501814e+00
                                                    -0.15242550
                                                                sept.
   1188 -1.002020765
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                                       4.10106515
                                                    -5.99072927
                                                                   Jun
                                                                         thurday
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                                      -9.60913301
                                                    -8.95972597
                                                                  May wednesday
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                                       3.62146153
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                                                                  Aug
                                                                         tuesday
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                                      -3.86505197
                                                     9.90503976
                                                                  May wednesday
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                                      -7.25552402
                                                     4.24557397
                                                                   Jun
                                                                         tuesday
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                                       2.00354391
                                                  -26.06829914
                                                                  May wednesday
## 1194
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                                                    -4.91550220
                                                                   Jun wednesday
  1195
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                                      -1.00945014
                                                    -4.57128655
                                                                 July
                                                                         tuesday
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                                      -3.30341482
                                                     7.15676907
                                                                sept. wednesday
   1197 -0.270040981 -9.875715e-01
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                                                    17.59228239
                                                                 July wednesday
   1198 -1.741712298 -1.301114e+00
                                      -8.76930564
                                                    -8.31363781
                                                                sept.
                                                                         thurday
  1199
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                                                  -18.63578469
                                       6.77924336
                                                                  July wednesday
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                                                    11.85374074
                                                                  July wednesday
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                                       2.85614298
                                                     5.09711669
                                                                  Aug wednesday
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                                      -8.01608272
                                                     1.65123856
                                                                  July
                                                                         tuesday
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                                                    -0.94812282
                                                                  May wednesday
         1.082410026 -5.419452e-01
                                                                  May wednesday
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                                      -7.35982367
                                                    0.92825170
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                                                     1.15044985
                                                                  July wednesday
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                                                     5.66448880
                                                                  Mar wednesday
  1207
         0.768868935
                                                                  July
                       1.406130e+00
                                      -5.51861787
                                                     5.07357028
                                                                         thurday
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                                                                   Apr wednesday
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                                                  -16.25928942
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                                                                   Jun wednesday
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                                                    18.78349818
                                                                   Aug wednesday
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                                                    -9.60799581
                                                                   Jun wednesday
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                                                    6.64684587
                                                                  May
                                                                         tuesday
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                                                                  Mar wednesday
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                                                     4.76115939
                                                                  May wednesday
                       3.799825e-01
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                                      -0.54629675
                                                    12.38962894
                                                                  May wednesday
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                                                                  July wednesday
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                                                  -13.71695816
                                                                   Aug wednesday
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                                      -0.68155594
                                                    -5.75019563
                                                                  July
                                                                         thurday
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                                      -0.32695755
                                                  -24.47486644
                                                                  Aug wednesday
##
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                                                                  May wednesday
## 1221
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                                                                   Jun wednesday
## 1222 -0.560305579 -4.584163e-01
                                                   -4.90645670
                                                                  Oct
                                      -0.19579924
                                                                         thurday
## 1223
         0.381283764 6.269622e-03
                                      -5.38687785 -15.08148420
                                                                  Aug
                                                                         tuesday
```

```
## 1224 -1.545609112 -7.022574e-01
                                       1.66695059 -13.86613899
                                                                   Jun wednesday
## 1225
         1.403905590 -1.505644e-01
                                                                   May wednesday
                                       0.57591850
                                                     3.36254636
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         0.896859702 -2.174880e-01
                                                                   Jun wednesday
                                       5.46853738
                                                     4.14010055
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                       1.387466e+00
                                       1.86126273
                                                    -3.11608064
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                                                                   Aug wednesday
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                                                                   Aug wednesday
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                                                                  July wednesday
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                                                    13.01653804
                                                                  July wednesday
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                                                                 sept. wednesday
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                                                                   Jun
                                                                         tuesday
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                                                                      wednesday
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                                                                 sept.
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                                       4.21517360
                                                    12.62380677
                                                                   Jun
                                                                         tuesday
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                                                                   Jun
                                                                         tuesday
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                                                                         tuesday
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                                                     3.61192152
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                                                                         tuesday
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                                                                         thurday
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                                                                   Nov wednesday
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                                                                         thurday
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                                                                  July
                                                                       wednesday
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                                                                 sept.
                                                                         tuesday
   1258
                                                                   Aug wednesday
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                                                                         thurday
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                                                   -17.15435999
                                                                   May
                                                                         thurday
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                                                                  July
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                                                                         thurday
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                                                                   Apr
                                                                         thurday
                                                                   Jun
                                                                         thurday
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                                                                       wednesday
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                                                                   Jun
                                                                         thurday
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                                                                  July
                                                                         tuesday
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                                                                   Jun wednesday
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                                                     0.33488985
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                                                                   Aug
                                                                         tuesday
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                                                     5.02511142
                                                                   Jun wednesday
## 1277
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                                       7.63698238
                                                    -2.99696044
                                                                  July wednesday
```

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## 1278 -2.058850853 -6.809352e-02 -11.16326151
                                                    -3.54072410
                                                                   Aug wednesday
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                                                                   May wednesday
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                                                                   Jun wednesday
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                                                                         tuesday
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                                                                   Apr
                                                                          friday
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                                                                   Jun
                                                                         thurday
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                                                                  July wednesday
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                                                                  July
                                       1.74854092
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                                                                         thurday
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                                                                  July
                       4.819819e-01
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                                                                         tuesday
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                                                                  July
                                                                         thurday
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                                                                         thurday
##
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                                                                      wednesday
                                                                   Jun
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                                                    -30.58749768
                                                                   Jun
                                                                         tuesday
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                                                    -5.78843704
                                                                   Jun wednesday
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                                                    13.96562254
                                                                  July
                                                                         thurday
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                                                                   Jun wednesday
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                                                     1.21586513
                                                                   Aug wednesday
         1.901756489 -2.555640e-01
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                                       2.04337931
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  1315
                                                                sept. wednesday
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                                                                  July
                                                                         thurday
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                                                                   May wednesday
   1319
         0.298743481
                                                                   Jun wednesday
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   1320
         0.567367227
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                                       5.29958528
                                                    -1.54346452
                                                                   Apr
                                                                         thurday
                                                                   Jun
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                                      -6.60632364
                                                    14.83467330
                                                                         tuesday
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                                      -6.35830307
                                                    -9.57302479
                                                                  July wednesday
        -0.589135497
                                                     7.06622947
   1323
                       4.435340e-01
                                      -9.32554423
                                                                   Aug
                                                                         thurday
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         0.018491869 -2.082906e-02
                                      -2.47297154
                                                     9.42569209
                                                                   Jun wednesday
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                                      -2.50600692
                                                     6.74903463
                                                                   Jun wednesday
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         0.450526240 -1.351304e+00
                                       4.52951021
                                                     7.72182514
                                                                  July wednesday
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                                      -5.30164260
                                                                   Oct wednesday
                                                     2.94105656
##
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                                      -7.77774938
                                                                   May
                                                    -7.36933564
                                                                         tuesday
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         1.048044389 -7.655031e-01
                                       7.68631825
                                                    21.96987526
                                                                  July
                                                                         tuesday
  1330
         0.136925241
                       1.067042e+00
                                                                   May wednesday
                                      -6.18928301
                                                     1.39893988
## 1331 -2.226898344
                      1.024725e+00
                                       5.51835950
                                                    -9.57384787
                                                                  July
                                                                         thurday
```

```
## 1332
         0.763465532
                       2.753270e-01
                                      -0.55299464
                                                     3.69836880
                                                                   Jun wednesday
   1333
         1.834577973 -1.894489e-05
                                                                  July wednesday
                                       8.07325015 -17.31961956
   1334 -0.873990768 -1.086804e+00
                                      -3.90635521
                                                    11.00255473
                                                                  July wednesday
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                                       2.72926212
                                                   -15.07102008
                                                                   Jun wednesday
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                                       5.27683409
                                                    11.99658042
                                                                  July wednesday
   1337
         0.081730729
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                                                   -21.23930815
                                                                   Apr
##
                                       1.62880376
                                                                         tuesday
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                                       6.92136320
                                                     2.93804058
                                                                   Apr
                                                                         thurday
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                                      -1.46174183
                                                    -7.32625914
                                                                  July wednesday
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                                       8.96372499
                                                    20.12585739
                                                                   Aug wednesday
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                                       8.48881820
                                                    -3.15195115
                                                                   Jun wednesday
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                                                   -13.24595873
                                                                   Jun wednesday
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                                                   -20.76172026
                                                                   May
                                                                       wednesday
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                                                     6.18217341
                                                                   Aug
                                                                         tuesday
                       1.072889e+00
                                                   -17.39812967
   1345 -0.886339767
                                      17.83789225
                                                                   Aug
                                                                         thurday
                                                                  July
   1346 -0.423141681
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                                       7.65772891
                                                    27.87262891
                                                                         tuesday
   1347
        -1.104005574
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                                      -5.54152803
                                                    -1.50357217
                                                                   Jun
                                                                         thurday
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                                      -7.85046692
                                                    -1.40422691
                                                                   Jun wednesday
   1349
                       1.845307e+00
                                      -3.34535802
                                                                       wednesday
         2.296649833
                                                    20.21113190
                                                                   Oct
   1350
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                                      -1.57684393
                                                   -12.27502017
                                                                         thurday
                                                                  July
   1351
        -1.717628029
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                                      -1.95652724
                                                    -1.74103143
                                                                 sept. wednesday
##
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                                      -3.84601145
                                                     2.54824319
                                                                  July wednesday
   1353
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                                      -9.94227704
                                                    -3.42293505
                                                                   Aug wednesday
  1354
                                                                   Jun
         0.392684689
                                      -5.74623280
                                                    26.41501975
##
                       1.148408e+00
                                                                         thurday
   1355
         1.107052255 -4.575080e-01
                                       8.98214017
                                                    -7.72976082 sept. wednesday
##
   1356
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                                                     3.00229607
                                                                   Jun wednesday
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                                      -5.23700299
                                                    19.53390374
                                                                   May
                                                                         tuesday
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                                       3.08327022
                                                     4.09733669
                                                                 sept. wednesday
                       1.149447e+00
##
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                                                                  July wednesday
                                                    16.14215573
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                                       7.08300970
                                                    -3.24189388
                                                                   Jun
                                                                         thurday
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                                      -8.11615833
                                                    -4.28801812
                                                                  July
                                                                          friday
   1362
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                                                     4.75299858
                                                                 sept. wednesday
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                                                                  July wednesday
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                                      -1.78705816
                                                   -21.18115236
                                                                       wednesday
                                                                   Apr
   1365
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                                      -5.50819367
                                                    -4.47075119
                                                                   Jun
                                                                         tuesday
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                                       0.26900819
                                                     9.02283749
                                                                   Apr
                                                                         tuesday
##
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                                      -0.26276306
                                                    -7.65643162
                                                                sept. wednesday
   1368
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                                      -0.61451343 -16.65844962
                                                                   Jun
                                                                       wednesday
   1369
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                                      -4.28365954
                                                   -23.01638072
                                                                   Apr
                                                                         tuesday
   1370
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                       4.002792e-01
                                      -3.32486678
                                                    -9.60348957
                                                                sept. wednesday
         2.954493142 -3.698448e-01
                                      -6.99666897
                                                  -20.13316956
                                                                   Jun wednesday
   1371
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                                      -3.07215997
                                                    -0.83906379
                                                                   Aug
                                                                         thurday
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                                                     6.23107007
                                                                  July wednesday
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                                       3.34564205
                                                    35.00832718
                                                                  July wednesday
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                                      -7.73278624
                                                    -2.25643317
                                                                   Aug wednesday
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                                                     6.60027390
                                                                   May wednesday
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                                      -3.15615203
                                                    33.64522127
                                                                   Aug wednesday
   1378
        -4.024288997 -1.460752e+00
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                                                    13.56050353
                                                                   Aug
                                                                         thurday
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                                       6.35530375
                                                     7.74640781
                                                                   Jun wednesday
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                                       4.29070436
                                                     5.62736966
                                                                   May
                                                                       wednesday
   1381
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                                       4.31949832
                                                    20.63087337
                                                                         tuesday
                                                                   Jun
##
   1382
         1.387586773
                                                                   Jun wednesday
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                                      -7.47816701
                                                   -22.66304570
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                       1.409203e+00
                                       9.68476807
                                                    37.72046460
                                                                   Jun wednesday
  1384
         1.503580487
                                                                   Jun wednesday
                       1.120530e+00
                                      -0.19192733
                                                    -3.25078979
## 1385 -0.442705819
                       5.486095e-01
                                       2.02646794 -13.53802430
                                                                   Jun wednesday
```

```
## 1386 -1.015131426
                       1.162448e+00
                                       5.45215976
                                                     5.70192183
                                                                   May wednesday
                                      -5.92242490
                                                                         tuesday
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                                                                   Jun
                                                     0.93909099
   1388
         1.252271835
                       7.152828e-01
                                       1.14074640
                                                     9.22293069
                                                                 sept. wednesday
   1389
                                      -1.22612310
                                                                   May
         0.370893642
                       7.741525e-01
                                                   -26.60592601
                                                                         thurday
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                                                    14.03957789
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                                                                   Jun wednesday
                                                    -6.46986836
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                                                    23.76540064
                                                                  July wednesday
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                      -4.808248e-01
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                                                     3.22722270
                                                                   May
                                                                         tuesday
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                                                                  July wednesday
                                                    13.02228534
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                                                     4.29546988
                                                                  July wednesday
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                                                     1.72128726
                                                                  July
                                                                         thurday
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                                                   -11.85788565
                                                                   Jun wednesday
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                                                                   Aug wednesday
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                                       1.39352979
                                                     8.79960033
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                                      -1.80641426
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                                                                  July
                                                                         tuesday
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                                                                   Jun wednesday
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                                                    -25.24326082
                                                                   Jun
                                                                         thurday
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                                                                   Aug
                                                                       wednesday
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                                       5.98557539
                                                                       wednesday
                                                   -14.60523595
                                                                   Jun
   1404
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                                                                   Jun
                                                                         tuesday
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                                                                   May wednesday
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                                                                   Jun
                                                                         thurday
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                                                                   Jun wednesday
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                                                                   Jun
                                                                         tuesday
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                                                                         thurday
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                                                                         tuesday
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                                                                  July
                                      13.43061725
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                                                                         tuesday
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                                                                   Feb wednesday
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                                                                         thurday
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                                                                         tuesday
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                                                                       wednesday
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                                                                  July
                                                                         thurday
##
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                                                                         tuesday
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                                                                  July wednesday
##
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                                                                         tuesday
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                                                                  July wednesday
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                                                                   Aug wednesday
## 1438
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                                                                   May wednesday
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                                                     1.33216138
## 1439
         0.929046779
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                                      -0.29094048
                                                    15.33383273
                                                                   Apr wednesday
```

```
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                                                                  July wednesday
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                                                                   May wednesday
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         1.326366458
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                                                                   Aug wednesday
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                                                                   Aug wednesday
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                                                                   May wednesday
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                                                                   Aug
                                                                         thurday
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                                                    -1.20428443
                                                                   Apr
                                                                         thurday
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                                                                  July wednesday
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                                                                   Jun wednesday
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                                                                  July wednesday
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                                                                   Aug wednesday
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   1452
                                     -13.76373983
                                                   -20.96359086
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                                                                   Jun wednesday
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                                                                  July wednesday
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                                                                 sept.
                                                                         thurday
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                                                     0.75200360
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                                                                         thurday
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                                                    20.69858689
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                                                                  July
                                                                         thurday
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                                                                   Jun wednesday
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                                                                   Aug
                                                                         thurday
##
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                                                                  July wednesday
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                                                                   Nov wednesday
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                                                                   Jun wednesday
                                                                   Aug wednesday
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                                                   -31.06514056
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                                                     8.78676474
                                                                   Jun wednesday
                                                                   Aug wednesday
   1469 -1.591992416
                                                     9.25445281
                       4.132300e-02
                                       1.76314865
   1470
         0.046374103
                       8.584248e-01
                                      -5.71324697
                                                   -24.10456165
                                                                   May
                                                                         thurday
   1471
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                                       7.75306710
                                                    -4.48316587
                                                                sept. wednesday
   1472
        -0.120465351
                     -7.857490e-01
                                       1.16801264
                                                    -6.39587610
                                                                   Jun wednesday
   1473
         1.647225232
                       2.815299e-01
                                                                   Aug wednesday
                                      -7.14296090
                                                    10.20215235
                                                                   Jun wednesday
   1474
        -1.410925822
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                                      -8.56841850
                                                    14.13505171
   1475
        -0.758994057
                       2.104695e+00
                                      -1.55203531
                                                    -0.38852957
                                                                  July
                                                                         thurday
         1.217006038 -1.304192e-01
                                     -10.30979038
                                                    14.79184951
                                                                   Jun wednesday
   1477 -0.002356799 -1.144642e-01
                                       5.32212356
                                                   -15.93079593
                                                                sept.
                                                                         tuesday
                                                                  July wednesday
   1478
        -1.123823778
                       1.093999e+00
                                       1.71715565
                                                    -9.03593798
   1479
         0.571478977 -1.292911e-01
                                      10.05932922
                                                   -10.53943667
                                                                   Aug wednesday
   1480
         1.079584625
                       1.777722e-01
                                       2.37295926
                                                    10.18393019
                                                                   Jun
                                                                         tuesday
   1481
                                                                   Aug wednesday
         0.365574944
                      -1.079744e+00
                                      -5.35697666
                                                    19.69475358
##
   1482
         1.457227738
                       4.562611e-01
                                       9.38388508
                                                   -23.95700434
                                                                  July wednesday
                                                                  July
##
   1483
         0.957486424
                       1.079382e+00
                                      -3.77433897
                                                     2.79464733
                                                                         thurday
  1484
         1.634432128
                       1.426662e+00
                                       1.67415591
                                                    11.50077229
                                                                  July
                                                                         thurday
        -0.714103029
                                       7.54498607
   1485
                       4.731052e-01
                                                     6.39435584
                                                                 sept. wednesday
   1486 -0.771216057
                       1.369429e-01
                                     -11.25121310
                                                    -9.24175326
                                                                  July wednesday
   1487
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                                       0.40771042
                                                    29.08595556
                                                                   May wednesday
   1488
        -0.164595980
                       1.186349e-01
                                      -2.66397788
                                                    13.66979543
                                                                  July wednesday
   1489
         0.337281399
                                       7.36005487
                                                    -5.83371907
                                                                   Aug wednesday
                       1.153615e+00
   1490
         1.832503529
                                                                sept. wednesday
                       1.133513e+00
                                      -1.41584433
                                                    -1.70500705
   1491 -0.636803746 -5.055604e-01
                                      -1.81948942
                                                    -5.03648798
                                                                   Jun wednesday
  1492 -0.451425300 -4.336298e-01
                                      -4.31190949
                                                   -16.92153492
                                                                   Jun wednesday
## 1493 -0.554138992 -1.156113e+00
                                      -2.15895015
                                                    10.15867362
                                                                  July
                                                                         tuesday
```

```
## 1494
         0.337079551
                       2.306862e-01
                                       6.06808559
                                                     8.42687004
                                                                   May
                                                                         thurday
                                                                         thurday
## 1495 -1.286674930
                       1.517666e+00
                                       4.51075598 -18.16347479
                                                                   Jun
   1496 -1.436926142
                       1.563677e-01
                                      -2.08663693
                                                     9.53658328
                                                                sept. wednesday
   1497 -0.347395706 -2.941209e-01
                                       1.51856681
                                                     3.40171983
                                                                   Jun wednesday
   1498
        -0.645723539 -5.730384e-01
                                       4.51652456
                                                     1.24315390
                                                                   May
                                                                       wednesday
                                      -3.26241816
   1499
         0.908637573 -2.539065e-02
                                                     3.39457909
                                                                   Apr
                                                                         thurday
   1500
         1.454560555 -4.850790e-01
                                      -3.66245163
                                                     3.73259581
                                                                  July wednesday
  1501 -1.382066604 -5.397810e-02
                                       7.32682714
                                                   -21.80363065
                                                                   Jun
                                                                         thurday
   1502 -0.008176531 -2.354675e-01
                                       3.99502740
                                                    -1.27239220
                                                                  July wednesday
   1503 -1.801780565
                       8.111100e-02
                                       1.43216033
                                                   -10.00902028
                                                                   Jun wednesday
   1504 -0.299103302
                       5.041661e-01
                                       1.93738425
                                                    12.22269686
                                                                   May
                                                                         thurday
                                  NA
   1505
         1.942607196
                                      -1.72397663
                                                     9.13850636
                                                                   May wednesday
   1506
         0.346623337 -6.638364e-01
                                                   -23.78255999
                                                                   Aug wednesday
##
                                      -2.31564209
                                      -2.15766735
                                                                   May wednesday
   1507
         0.705032163
                       2.852473e-01
                                                   -13.92352717
   1508
                                      -6.61177853 -31.18961976
         1.476795807 -4.646108e-01
                                                                   May
                                                                         thurday
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         1.393315198 -1.937733e-03
                                      -5.27185357
                                                     5.98576783
                                                                   Apr
                                                                         tuesday
   1510
         0.965271638 -1.535348e+00
                                                                   Oct wednesday
                                     -11.90771919
                                                    27.59809041
   1511 -1.225870029
                                      -3.56548670
                                                                 sept. wednesday
                       2.430971e-01
                                                    19.83684489
                                                   -35.07238445
   1512
         0.444427177
                       5.674938e-01
                                      -8.56866885
                                                                   May wednesday
   1513
        -0.564555698
                       5.911902e-02
                                     -11.08930175
                                                    11.67654499
                                                                   Aug
                                                                         tuesday
##
   1514
         1.578145906 -7.746772e-01
                                      16.81559661
                                                    -5.25594508
                                                                sept.
                                                                         thurday
   1515
         0.371352019
                       3.619795e-01
                                       3.30504096
                                                    12.04939347
                                                                   Jun wednesday
  1516
         0.873851988
                       1.360618e-01
                                                   -10.67427982
                                                                sept. wednesday
##
                                       5.68305090
   1517
         2.326218221
                       8.168362e-01
                                      -1.95329102
                                                    21.87266766
                                                                  July
                                                                         thurday
                                                                   Jun
   1518 -1.414228290
                       2.406707e-02
                                      -6.63164188
                                                   -10.47718398
                                                                         thurday
   1519
         1.920411205
                      -1.667434e-02
                                      -0.14076314
                                                    -4.73099097
                                                                   Jun wednesday
   1520
         1.083939895
                                                                  July wednesday
                       4.545846e-01
                                       8.06586347
                                                    -2.33682379
                                       8.52100691
                                                     9.00312345
   1521 -1.919877003
                       3.786527e-01
                                                                   Jun
                                                                       wednesday
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                                      -2.68018775
                                                    11.68557577
                                                                 sept.
                                                                         tuesday
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                                                                   Jun wednesday
                                       7.65193172
                                                    -2.86486278
   1524
        -0.973212004
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                                      -2.79517399
                                                    -7.35760263
                                                                   May
                                                                       wednesday
   1525
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                                      -1.67855564
                                                    13.01959866
                                                                   Jun
                                                                         thurday
   1526
        -2.326305201
                       1.372722e-01
                                      -4.02961491
                                                    12.68009166
                                                                   May wednesday
   1527
         1.009480280
                       5.810808e-01
                                      -1.36256673
                                                                   Aug wednesday
                                                     2.06442558
                                                                   May
   1528
         1.159747839
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                                                                         tuesday
                                      -0.37678025
                                                    14.21639032
##
   1529
        -1.413053365 -5.354712e-01
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                                                     0.66177635
                                                                   Aug wednesday
   1530
         0.650532026
                       2.616760e-01
                                      -1.34023432
                                                    37.56582540
                                                                  July
                                                                         thurday
   1531
         1.123963126 -5.953325e-01
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                                                                   Apr wednesday
                                     -11.24535957
        -0.838750401 -1.421752e+00
   1532
                                     -15.22020362
                                                     7.32652165
                                                                   May
                                                                         tuesday
   1533
         0.895226853
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                                       9.26216825
                                                    -9.66704805
                                                                   Apr wednesday
                                                                  July wednesday
   1534 -0.646572050 -4.754155e-01
                                       9.96771946
                                                    -7.09893521
   1535 -0.552587112
                                      -0.82141012
                                                                   Jun wednesday
                       5.480994e-01
                                                   -39.32370183
   1536
        -0.916143268
                       1.053117e+00
                                      -8.03359725
                                                     0.39927163
                                                                   Jun
                                                                         thurday
                                                                   Jun wednesday
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         2.035570129 -8.207014e-02
                                     -10.23716544
                                                    -3.10042175
   1538
        -0.066606521 -4.049641e-01
                                       8.62351128
                                                    -0.65178415
                                                                sept. wednesday
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                                      -4.00298154
                                                     3.05763136
                                                                  July wednesday
##
   1540
         3.356214938
                       6.026618e-01
                                      -7.14884662
                                                    -2.86321515
                                                                   Oct wednesday
   1541
         2.139183260 -8.747205e-01
                                       0.27120330
                                                   -15.70562163
                                                                   Aug wednesday
   1542
         0.560236051
                       1.016706e+00
                                       1.96168011
                                                    -6.24644863
                                                                   Aug
                                                                         thurday
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        -2.031655761
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                                      18.52845228
                                                     1.58463390
                                                                  July wednesday
   1544
         0.609873940
                                                                   Jun wednesday
##
                       1.037340e+00
                                      -5.86990455
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         0.637672049
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                                                     3.45805434
                                                                  July
                                                                         tuesday
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                                       5.48895081
                                                     6.70877375
                                                                   May wednesday
## 1547
         0.682775904
                      1.659748e+00
                                       0.89285822
                                                     8.68964898
                                                                   Aug
                                                                         tuesday
```

```
## 1548 -0.913983017
                       2.508834e-01
                                                                  July wednesday
                                       6.12350674
                                                    -8.50373799
                                                                         tuesday
   1549
         0.050327867 -3.975786e-02
                                                                   Jun
                                     -10.67862085
                                                    -1.85723206
   1550 -0.131321404
                       2.945265e-01
                                      -0.21009155
                                                    11.98194526
                                                                   May wednesday
   1551 -1.620468280
                       1.320056e+00
                                      13.61886084
                                                    -6.61772477
                                                                  July wednesday
##
   1552
        -0.398070987
                       6.572102e-01
                                      -4.16647635
                                                     8.76994845
                                                                   Aug wednesday
                                     -12.21520772
   1553
         1.494459687 -1.540271e+00
                                                                   Apr wednesday
##
                                                     1.73091574
   1554
         0.262523436
                       2.350964e-01
                                      -3.03029710 -14.65812128
                                                                   Aug
                                                                         tuesday
   1555
        -0.831431430 -6.477613e-01
                                      -5.52560510
                                                   -11.43414541
                                                                   Jun
                                                                         tuesday
   1556
         0.357586271 -1.822442e-01
                                                   -10.70577214
                                                                   Aug wednesday
                                       2.28633278
   1557 -1.792665788 -5.153380e-02
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                                                   -23.55288648
                                                                   May wednesday
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                                       6.30413465
                                                    -3.42762764
                                                                   Oct wednesday
   1559
        -0.497748263 -8.423191e-01
                                       5.44198752
                                                    -5.74382798
                                                                   Aug
                                                                       wednesday
   1560
         0.630102708 -6.406537e-01
                                                                   Jun
                                                                         tuesday
##
                                       3.03733680
                                                    10.81275987
   1561
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                                      -7.47800417
                                                    13.33782240
                                                                  July
                                                                         tuesday
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                                                    13.91798096
                                                                   Jun wednesday
   1563 -1.069437472 -4.666512e-01
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                                                    34.11459679
                                                                   Jun wednesday
                                                    -1.00925798
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                                                                   May wednesday
   1565
        -0.491199460 -3.452428e-01
                                                                   Apr wednesday
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                                                     3.87240315
   1566 -0.686210879
                       4.277746e-01
                                     -10.16795799
                                                     0.35680870
                                                                   Jun wednesday
         0.707857066 -1.661971e-01
                                     -15.50329981
                                                   -27.67331251
                                                                   Jun
                                                                         tuesday
##
   1568
        -1.716452363 -6.444157e-01
                                      -1.54753949
                                                   -10.46818368
                                                                   Jun
                                                                          monday
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                                      -0.87774898
                                                    -1.51768917
                                                                  July wednesday
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                                      10.28590921
                                                    16.08501328
                                                                   Oct wednesday
##
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                                                    22.26063700
                                                                  July wednesday
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                                                                  July
                                                                         tuesday
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                                                    32.58992704
                                                                   Jun
                                                                         thurday
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                                                    -6.06625366
                                                                   Aug wednesday
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                                                   -12.10696395
                                                                   Jun wednesday
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                                                                   Aug wednesday
   1577
                                      -9.06401064
                                                                  July wednesday
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                                                    -5.30232957
   1578
        -2.969080272 -2.314621e-01
                                      -4.73974067
                                                    -2.08690839
                                                                   Aug wednesday
   1579
         0.361318035 -1.879845e-01
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                                                    -4.44965125
                                                                  July
                                                                         tuesday
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                                                    -0.75671764
                                                                       wednesday
                                                                   Aug
   1581 -1.679869851
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                                                                   Jun
                                                                         thurday
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                                       7.24826911
                                                    16.92447002
                                                                   Jun wednesday
##
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                                                    13.44730104
                                                                  July
                                                                         tuesday
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         2.879311418 -4.969241e-01
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                                                    -3.35803501
                                                                   Aug wednesday
   1585
                                                                   Mar wednesday
        -0.155895535 -1.625495e-01
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   1586
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                                                                   Aug wednesday
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                                                                  July
                                      11.90361326
                                                                         tuesday
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         1.940958587 -9.061408e-01
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                                                    -2.79281545
                                                                   Aug
                                                                         thurday
   1589
                                                                  July
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                                       9.70554683
                                                    24.49169896
                                                                         tuesday
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                                                    -9.90456114
                                                                   May
                                                                       wednesday
                                                                   Aug
   1591 -0.882935591
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                                       9.89609432
                                                    -9.49326462
                                                                         thurday
                                                                         thurday
   1592
         0.656666559
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                                      12.04555277
                                                   -18.20532803
                                                                   Jun
   1593
##
         1.741571328
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                                       8.33805340
                                                    17.88401950
                                                                  July
                                                                         thurday
##
   1594
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                                                                   Jun
                                                                         tuesday
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                                      -3.70912959
                                                     2.29724773
                                                                   Jun
                                                                       wednesday
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                                       0.11675349
                                                    -1.50410974
                                                                         thurday
                                                                   Aug
   1597
        -1.850326438
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                                      -1.99496039
                                                    -7.38682846
                                                                   May
                                                                         thurday
##
   1598
         0.678335848 -3.354415e-03
                                                                   Aug
                                      -2.46022724
                                                    -8.02182148
                                                                         thurday
   1599
         1.298455145 -1.256165e-01
                                      -6.71712550
                                                    10.26308376
                                                                   May wednesday
   1600
         0.468687011 -2.940659e-01
                                                                  July wednesday
                                      -3.14830609
                                                    -3.62312895
## 1601 -1.919212989 -5.208784e-01
                                       8.61035126 -11.69864566
                                                                   Mar wednesday
```

```
## 1602 -1.627471743
                      4.261123e-01
                                       0.60363966 -13.51053865
                                                                  July wednesday
   1603
         1.024988068 -1.513644e-01
                                                                   Oct wednesday
                                      -2.82309233 -17.99545312
   1604
         2.811106060 -1.036917e+00
                                       4.99769625
                                                    25.37827089
                                                                   Jun
                                                                         tuesday
   1605
         0.606346145
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                                       1.54514031
                                                    20.32956475
                                                                   May wednesday
##
   1606
         2.771953128
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                                       0.82800212
                                                    -5.59705942
                                                                   May
                                                                         thurday
   1607
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                                                     7.08306256
                                                                  July
##
                                      -7.00303358
                                                                         tuesday
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         0.390546076
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                                                    18.21887712
                                                                  July wednesday
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                                                   -16.81628115
                                                                  July wednesday
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                                                  -14.40887191
                                                                   Aug wednesday
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                                       3.65229361
                                                    20.10110730
                                                                  July wednesday
   1612
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                                                     3.58267465
                                                                  July wednesday
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                       3.644578e-01
                                       0.86854949
                                                    12.01845240
                                                                  July
                                                                         thurday
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         0.779384480
                       3.083264e-01
                                                                   Jun wednesday
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                                       5.70606063
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                                                                         thurday
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   1616 -2.296267012 -3.276715e-02
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                                                                   Apr wednesday
         0.521261224 -8.130130e-01
                                                                   May wednesday
   1617
                                       4.72886426
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                       2.704413e-01
                                                                  July wednesday
   1618
                                       2.91213219
                                                    -4.69722767
        -0.292465247 -1.000014e+00
   1619
                                      -5.20994367
                                                     0.71093495
                                                                   Aug
                                                                         thurday
                                      -2.04255436
   1620 -2.276588290 -2.131351e-01
                                                    -4.93627351
                                                                   Jun wednesday
   1621
         0.423051282
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                                       6.16167277
                                                     5.54905817
                                                                   May wednesday
##
   1622
         1.601054322 -2.797316e-01
                                       2.44794165
                                                    21.03657553
                                                                   Jun wednesday
   1623
         1.107296944
                       8.080182e-01
                                      -3.79059990
                                                    -0.50368129
                                                                   May
                                                                         tuesday
  1624
         0.179995198
                       7.284512e-01
                                                  -13.33552834
                                                                   Apr
##
                                      -1.22357628
                                                                         tuesday
   1625
         1.562971802
                       1.853016e-01
                                      -1.62926908
                                                  -16.24733136
                                                                   Apr wednesday
   1626 -2.444866456 -2.986241e-01
                                       5.53705155
                                                  -15.68152435
                                                                   Aug wednesday
   1627 -0.020212667 -9.115896e-01
                                      -4.22215927
                                                    -3.13982644
                                                                   Aug
                                                                      wednesday
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   1628
                                      -6.07839771
                                                    -2.66527410
                                                                   Jun
                                                                         thurday
   1629
        -0.254255467 -1.039114e-01
                                       2.32548384
                                                    -4.27199179
                                                                         thurday
                                                                   Aug
                       2.862027e-03
   1630 -0.822439930
                                      -5.64963028
                                                   -29.08787071
                                                                  July wednesday
   1631 -2.221375987
                       3.609015e-01
                                      16.37963264
                                                                  July wednesday
                                                    12.37293618
   1632
         0.671260928 -1.755040e+00
                                               NA
                                                    -2.25941123
                                                                   Jun wednesday
   1633 -1.052036510 -4.396452e-01
                                      -4.01249071
                                                    13.36847927
                                                                         tuesday
                                                                   May
   1634
         1.910424912
                       1.280145e+00
                                      -5.72239500
                                                    -0.65384548
                                                                   Jun
                                                                         tuesday
   1635
        -0.943644299
                                      -5.57352623
                       3.365015e-02
                                                     3.55649118
                                                                  July
                                                                         tuesday
         1.055803506
   1636
                       5.670140e-01
                                      -1.53577422
                                                     4.22268714
                                                                   May
                                                                         thurday
##
   1637
        -0.817172532 -4.096171e-01
                                      -9.23547554
                                                    20.00292832
                                                                   Apr
                                                                         thurday
   1638
        -1.210700598 -2.795181e-01
                                       3.39292644
                                                     7.04485613
                                                                   Aug
                                                                       wednesday
   1639
         0.807884717
                       8.566979e-01
                                     -11.24739044
                                                  -31.67734895
                                                                   Jun
                                                                         tuesday
   1640 -1.132856390
                       1.493080e+00
                                       3.80228824
                                                     4.33624045
                                                                   Jun wednesday
   1641 -1.130736786 -3.219540e-02
                                      -0.55997961
                                                  -28.68121709
                                                                  July wednesday
   1642
         0.951942041 -5.462817e-01
                                       1.54411784
                                                   -14.93513681
                                                                   Oct
                                                                         thurday
   1643
         1.529921505
                       1.342639e+00
                                      -1.29917832
                                                    -5.53305984
                                                                 sept.
                                                                         tuesday
                                                     8.69498697
   1644 -0.669420028 -1.387184e+00
                                       1.44976146
                                                                   Apr
                                                                         tuesday
                       9.988764e-01
                                                                   Jun
   1645
         0.639900044
                                       9.02400170 -13.62840925
                                                                         tuesday
   1646
         0.459863206 -2.262244e-01
                                       0.76225277 -21.95496831
                                                                  July wednesday
   1647 -1.197453754 -5.203072e-01
                                       8.26902770
                                                    10.42287221
                                                                  July wednesday
   1648
         0.545754884 -2.532528e-01
                                      -6.25982105
                                                    -0.06611430
                                                                  July
                                                                         thurday
   1649
         0.335901801
                       2.157100e+00
                                     -10.26816873
                                                     0.80504608
                                                                  July
                                                                         thurday
   1650 -0.790678436 -4.587061e-01
                                      -3.14949907
                                                    15.69941139
                                                                   Jun
                                                                      wednesday
   1651 -2.402122655
                       1.006319e+00
                                       4.10096611
                                                                         thurday
                                                    24.06742966
                                                                  July
                                                                   Jun
##
   1652
         1.799080680
                       3.903281e-01
                                      -3.21987456
                                                    10.17157801
                                                                       wednesday
                       3.816054e-02
   1653 -0.170791891
                                      -8.57717235
                                                   -26.59416654
                                                                   Jun
                                                                         tuesday
  1654 -0.333454112 -1.194243e+00
                                                                   Jun wednesday
                                      -5.27415234
                                                    -6.05277198
## 1655
         1.530185923 -1.057896e+00
                                      -3.90538665
                                                     9.76745932
                                                                  July wednesday
```

```
## 1656 -1.025628426 -1.681787e+00
                                       2.16311532
                                                    12.28915499
                                                                   Apr wednesday
                                                                 July
   1657 -1.374226338
                       3.548105e-01 -10.87642126 -11.17493335
                                                                         thurday
   1658 -0.919185219
                       1.646332e-01
                                       3.89105278
                                                     1.21185586
                                                                sept. wednesday
   1659 -1.985257996 -2.314552e-01
                                     -11.96863424
                                                   -16.07011182
                                                                  May wednesday
   1660 -0.060733481 -1.036729e-01
                                       6.23968393
                                                    10.74405418
                                                                  May
                                                                         thurday
   1661 -0.257114306 -1.115250e+00
                                                    -5.90341526
                                                                sept. wednesday
                                      -3.74301196
   1662
         0.048439689 -3.185295e-01
                                      -4.80235307
                                                    -2.71972641
                                                                   Jun wednesday
   1663 -0.814349401 -4.760232e-01
                                      -0.97696220
                                                    17.88682557
                                                                   May
                                                                         tuesday
   1664 -0.221246240 -4.803410e-01
                                       3.14609601
                                                    12.00276567
                                                                   Aug
                                                                         tuesday
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         3.031370643 -1.733780e+00
                                       7.59785532
                                                     8.29340629
                                                                  July
                                                                         tuesday
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         0.858723543 -1.772326e+00
                                      -5.13431633
                                                  -17.06786542
                                                                   May wednesday
   1667
        -1.068978835
                       2.611550e-01
                                       2.54102393
                                                   -13.06675993
                                                                  July wednesday
        -1.563394667 -8.378658e-01
                                                                  July wednesday
   1668
                                      -7.06614665
                                                    -5.89797684
        -0.233251090 -1.311378e+00
                                                    20.29660835
   1669
                                       0.40605365
                                                                   Jun
                                                                         thurday
   1670
         0.128460964 -1.012089e+00
                                     -10.08658598
                                                   -12.58520577
                                                                  July wednesday
   1671
         0.191881668
                       1.177172e+00
                                                                   Aug wednesday
                                       3.08603455
                                                    -6.50576616
##
                       1.585976e+00
                                                                  July wednesday
   1672
         0.386937354
                                       8.19115770
                                                     4.47199913
                                                                  July
   1673
         0.434261678
                       5.827738e-02
                                      -2.00936713
                                                    15.92406271
                                                                         tuesday
                                       7.03929195
   1674 -1.600742919
                       6.337624e-01
                                                                   Jun
                                                     0.97345504
                                                                         tuesday
   1675
         0.971117249
                       1.322668e+00
                                       0.36593193
                                                    24.42223759
                                                                   Aug
                                                                         tuesday
##
   1676
         0.339634652
                       4.229127e-01
                                       0.50798542
                                                    33.19545912
                                                                  May wednesday
   1677 -0.276438202 -1.450714e-01
                                      -4.53854868
                                                    11.58749722
                                                                  July
                                                                         tuesday
   1678 -3.515434239
                       3.760333e-01
                                                    20.15401201
                                                                   Jun wednesday
                                      11.12144917
   1679 -1.462845704 -4.608414e-02
                                      -0.09344521
                                                    -3.51420724
                                                                  July wednesday
   1680 -0.611520578 -1.044992e+00
                                       9.08219600
                                                    -3.26270886
                                                                   Apr
                                                                         tuesday
   1681 -1.403143797 -4.808304e-01
                                      -2.76277861
                                                    -9.75874527
                                                                   Jun wednesday
   1682
         0.312146135 -6.537903e-01
                                       2.91606115
                                                    -4.09644357
                                                                  July
                                                                         tuesday
                                                                   May
   1683 -0.290163602
                       6.983758e-01
                                       9.25627006
                                                   -15.62832497
                                                                      wednesday
   1684 -0.538595368 -3.387287e-01
                                     -13.43863320
                                                    19.10656233
                                                                  July
                                                                         tuesday
   1685 -0.450040020 -2.473258e-01
                                                                  July
                                      -9.38117122
                                                    -3.41891364
                                                                         thurday
   1686 -0.019681864
                       7.707919e-01
                                       6.80276379
                                                    12.54048200
                                                                   Apr wednesday
   1687 -0.707548084
                       6.762841e-02
                                       0.38063018
                                                    21.83336624
                                                                   Apr wednesday
   1688 -0.970855249 -1.586016e-01
                                       4.72358389
                                                    10.58918781
                                                                   May wednesday
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                                       4.51433079
                                                   -13.96723048
                                                                   Aug wednesday
        -0.689835023 -1.335602e+00
   1690
                                      -6.50902198
                                                    25.35816388
                                                                   Aug
                                                                         thurday
   1691 -1.775541028 -1.993197e-01
                                       6.44733282
                                                    12.09416072
                                                                  July wednesday
   1692
         1.386245761 -2.517127e-01
                                      -7.56094397
                                                     7.41068595
                                                                  July
                                                                         tuesday
   1693
         1.092907088 -2.653505e-02
##
                                       4.45527595
                                                  -16.55063850
                                                                   Aug wednesday
   1694
         0.363466914
                       9.305230e-01
                                      -8.99256741
                                                    -1.83526031
                                                                  July
                                                                         tuesday
   1695
         2.064144983
                       2.347658e-01
                                      -7.70656790
                                                   -10.61667380
                                                                   May wednesday
##
   1696 -0.104172755
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                                       3.07484846
                                                    -7.55215937
                                                                   Aug wednesday
                                                                  July wednesday
   1697 -2.088716647 -8.408460e-01
                                       5.75368136
                                                    -2.82772521
   1698 -1.609292152 -8.472372e-01
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                                                     2.04684323
                                                                   Jun wednesday
   1699 -1.024065048 -1.412100e+00
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                                                   -20.04538066
                                                                  July
                                                                         tuesday
   1700 -2.502379259 -9.688354e-01
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                                                    -4.71272610
                                                                   May wednesday
   1701 -2.368193222
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                                       5.00794311
                                                    17.31671856
                                                                   Jun wednesday
   1702
         0.318795506 -6.198879e-01
                                       2.95162340
                                                    21.00658027
                                                                   Jun wednesday
   1703
         0.985320166 -5.328250e-01
                                      -7.45139806
                                                   -28.46507235
                                                                sept. wednesday
   1704
         1.182479323 -2.118890e-01
                                       4.97809275
                                                    19.80520394
                                                                   Apr wednesday
   1705
        -0.768413918 -9.996038e-01
                                      -6.33104460
                                                                   Aug wednesday
                                                     4.40442929
##
   1706
         0.367668685
                       9.217346e-01
                                                                  July
                                       9.08714285
                                                    10.65253133
                                                                         tuesday
   1707
         0.788586556
                       7.229797e-01
                                       0.51762875
                                                     6.78122060
                                                                   Jun wednesday
## 1708 -1.940175436
                       4.290769e-01
                                       2.40203775
                                                                   Jun wednesday
                                                    11.86209288
## 1709 -0.952330405 -9.007266e-01
                                      -0.76224712
                                                    14.13197657
                                                                         thurday
                                                                  July
```

```
## 1710
         0.005574722 -1.482146e+00
                                       8.27706639
                                                                   Jun wednesday
                                                    14.94111187
  1711 -0.565126904 -1.059589e+00
                                                                   Jun wednesday
                                       9.20277695
                                                     6.20917780
   1712
         1.757038866
                       5.005052e-01
                                       0.77341252
                                                    15.09809322
                                                                   May
                                                                         tuesday
   1713 -0.004522694 -1.306053e+00
                                       2.18560460
                                                     1.34706674
                                                                   Jun wednesday
   1714
         0.568518858 -7.520783e-01
                                       1.12792226
                                                    -1.59760719
                                                                   Apr
                                                                      wednesday
  1715 -1.481864423 -3.105719e-03
                                                                   Jun
                                                                         thurday
                                      -1.85222249
                                                   -11.79589660
  1716 -0.814166968 -4.985198e-01
                                      -0.87158029
                                                    25.22807392
                                                                sept.
                                                                         thurday
                                                                  July wednesday
## 1717 -1.961540764 -5.927133e-01
                                       7.50749149
                                                    11.06077490
   1718
         0.272174954 -1.729094e+00
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                                                    -8.66213180
                                                                  July
                                                                         thurday
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                       9.955818e-01
                                      -2.04582717
                                                   -24.61704036
                                                                  July wednesday
   1720
         0.465634841
                       1.332612e+00
                                      -2.32677275
                                                    -3.58078809
                                                                   Jun
                                                                         tuesday
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                      -1.434985e+00
                                       0.56184276
                                                    11.67557706
                                                                   May
                                                                       wednesday
   1722 -0.491191614
                       5.285280e-01
                                       8.56798116
                                                    17.78193712
                                                                  July
                                                                         thurday
   1723
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                                                     2.66945810
                                                                   May wednesday
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                                                   -13.62434683
                                                                   Jun wednesday
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                       1.170027e+00
                                      -4.26999674
                                                    -9.73542332
                                                                   Jun wednesday
   1726 -0.652150732 -1.425133e+00
                                                                  July wednesday
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                                                    -2.27135456
   1727 -0.166471121 -2.291295e-01
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                                                                   Jun wednesday
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                                                                   Aug wednesday
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                                                                   Aug wednesday
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                                       9.21532686
                                                    -9.18513158
                                                                   Apr
                                                                         tuesday
  1732
         0.260117629 -2.872194e-01
                                      -8.72525392
                                                    -8.00858372
                                                                  July wednesday
##
                                                                   Jun wednesday
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         0.072189350 -4.292510e-01
                                       3.43655922
                                                    10.00936397
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                                                                  July wednesday
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                                                   -10.59834154
                                                                  July wednesday
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                                                    -3.02408821
                                                                  July
                                                                         thurday
   1737
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                                                    -0.04204154
                                                                   Jun wednesday
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                                                     2.40216087
                                                                   Aug wednesday
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  1739
                                                                   May wednesday
                                      -5.90017109
                                                    -2.42657695
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         2.619404055
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                                                    -3.62163319
                                                                  July
                                                                         tuesday
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                                                                   May wednesday
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                                                    12.77309688
                                                                  July wednesday
   1743
         0.501382656
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                                                                   Oct wednesday
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                                                     4.83652558
                       6.095406e-01
                                                                   Mar wednesday
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                                                   -30.20020567
                                                                  July wednesday
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                                                                   Jun wednesday
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                                                   -20.21986530
                                                                   May wednesday
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                                                                   Aug wednesday
                                                     7.19772981
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                                                                   Aug wednesday
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                                                    13.46882538
                                                                sept. wednesday
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                                                   -37.76145287
                                                                   Jun
                                                                         thurday
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                                                                  July wednesday
   1753
                                       5.97926883
                                                   -17.35137412
  1754
         2.104228176
                       6.137030e-01
                                       4.91364165
                                                     2.17621976
                                                                  July
                                                                         tuesday
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                                       1.18138177
                                                    10.86615495
                                                                  July
                                                                         thurday
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                                       7.02619310
                                                    -3.65661560
                                                                  July wednesday
   1757 -2.539248812 -1.575439e+00
                                      -1.80788118 -27.36758639
                                                                  July wednesday
   1758
         1.412702108
                      1.885024e-01
                                       3.97673840
                                                     1.31636157
                                                                   Aug wednesday
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         0.454147331 -3.504981e-02
                                      10.01888076
                                                    -0.34511961
                                                                   Aug wednesday
##
   1760
         0.529015494
                                       1.71670863 -20.83160920
                                                                  July wednesday
                       1.146629e-01
   1761
         0.341296163
                       3.711579e-02
                                      -8.34205354 -22.91931925
                                                                   Jun
                                                                         tuesday
## 1762 -1.986371887 -2.075754e-01
                                       0.47749223
                                                                 July
                                                                         thurday
                                                    13.86464163
## 1763 -1.795597042 -4.582243e-01
                                       4.26074975 -19.10697251
                                                                   Jun wednesday
```

```
## 1764 -0.338243775
                       5.771862e-01
                                                                  July wednesday
                                       4.04634245
                                                    11.70380246
   1765
                                                                   May
         0.633059600
                       2.950142e-01
                                      -3.66422598
                                                     8.67684095
                                                                         tuesday
   1766
         1.310221073
                      -3.930157e-01
                                      -5.24592031
                                                     5.83130402
                                                                  July wednesday
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                                                   -11.01355479
                                                                   Aug wednesday
   1768
         0.765534632
                       5.281104e-01
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                                                    -2.33248902
                                                                   Jun wednesday
                                      -2.35072332
   1769
         0.627770070
                       7.451990e-01
                                                    -1.42028822
                                                                   Aug wednesday
##
   1770
        -3.666937216 -4.911283e-02
                                      -8.19213677
                                                    -4.16343616
                                                                   Jun
                                                                         tuesday
                                                    -7.62465381
   1771
         0.151144354 -9.522537e-02
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                                                                   Jun wednesday
                                      -0.17509869
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                                                    -5.67294586
                                                                  July
                                                                         thurday
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         1.473441329 -1.645202e+00
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                                                                   Jun wednesday
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                                                                   Jun wednesday
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                                                    -4.25679644
                                                                  July
                                                                         tuesday
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                                                                  July
                                       1.41712392
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                                                                         tuesday
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   1777
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                                                    34.72350539
                                                                  July
                                                                         tuesday
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                                      -0.06691370
                                                    20.55667880
                                                                   Apr
                                                                         tuesday
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                                       5.15555151
                                                    22.11738179
                                                                   May
                                                                      wednesday
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                                                   -20.03824666
   1780
                                      -2.56481654
                                                                   May
                                                                       wednesday
                                                                  July
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                                                    11.68146358
                                                                         tuesday
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                                       1.42109824
                                                                   Apr
                                                                         tuesday
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                                                   -10.49228074
                                                                  July wednesday
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                                                  -18.40173890
                                                                   Jun
                                                                         tuesday
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                                      -7.52804964
                                                    12.88476279
                                                                  July wednesday
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                                                                   Jun wednesday
                                                     7.72107730
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                                                     8.26593016
                                                                  July wednesday
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                                                     0.80360654
                                                                   Apr wednesday
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                                                     8.08935098
                                                                   Apr
                                                                         thurday
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                                                    27.64720126
                                                                  July wednesday
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                                                    21.81899685
                                                                   May wednesday
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                                       3.00286766
                                                    15.05953570
                                                                   Aug wednesday
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                                                                   Jun wednesday
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                                                    21.12205216
                                                                   Apr
                                                                         thurday
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                                     -11.06332374
                                                   -22.59166798
                                                                  July
                                                                         tuesday
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                                                    -8.02309825
                                                                 sept.
                                                                       wednesday
   1797
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                                                    22.27951124
                                                                   Jun
                                                                         tuesday
         0.062507828
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                                       3.16709015
                                                     5.48411880
                                                                   May
                                                                         thurday
   1799
##
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                                      -6.93180452
                                                    -4.39418399
                                                                   May wednesday
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                                       2.04641471
                                                     9.59091716
                                                                   Mar
                                                                         tuesday
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                                      16.96918211
                                                    -2.68422609
                                                                  July wednesday
         2.635487191
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                                                                   Oct wednesday
   1802
                                      -0.14757920
                                                   -23.61843381
##
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                                                    -0.44403246
                                                                  July wednesday
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                                                    10.78420623
                                                                   May
                                                                         thurday
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                                                    12.02245538
                                                                   May
                                                                         tuesday
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                                                   -22.77853241
                                                                   Jun
                                                                         tuesday
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                                      -2.01636964
                                                    13.15404723
                                                                   Mar
                                                                       wednesday
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                                     -10.16641626
                                                    10.75307185
                                                                  July
                                                                         thurday
   1809
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##
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                                                                   Oct wednesday
##
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                                                                sept. wednesday
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                                      -8.18991362
                                                    -2.25829828
                                                                  July wednesday
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                                                    -2.18005088
                                                                   Jun
                                                                         tuesday
   1813
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                                                  -12.62186570
                                                                   Aug wednesday
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                                                    14.53470510
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                                                                  July
                                                                          monday
  1816 -2.585014002 -7.808841e-01
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                                                    -9.89439784
                                                                   Jun wednesday
## 1817
         1.147218810
                       2.448632e-01
                                      12.83926650 -33.57817756
                                                                   Aug wednesday
```

```
## 1818
         1.376888128 -1.207584e+00
                                       3.05345082
                                                    17.57952839
                                                                   Apr wednesday
   1819
         1.777645161 -8.715953e-01
                                       5.24411406
                                                                  July wednesday
                                                    10.84146203
   1820
         0.509026897 -1.351534e-01
                                                                  July wednesday
                                     -10.46548839
                                                   -23.06644086
   1821
                                                                   Jun
         1.639932477
                       2.620908e-01
                                      -3.26349164
                                                     1.33137168
                                                                         tuesday
   1822
        -0.298620437 -1.150032e+00
                                       4.21469293
                                                    20.24725914
                                                                   Jun
                                                                         tuesday
   1823 -1.116056723
                       1.163680e+00
                                                                  July
                                      -4.49539512
                                                     6.21053253
                                                                          monday
  1824 -0.390724817 -6.884823e-02
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                                                    -5.78894419
                                                                   May wednesday
  1825 -0.037801855 -2.697174e-01
                                       2.70472203
                                                   -10.95906246
                                                                   May
                                                                         tuesday
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                                       9.56990765
                                                                sept. wednesday
                                                    -6.48654153
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                                       1.65220150
                                                     4.16910560
                                                                   May wednesday
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                                                    14.83494489
                                                                   Aug wednesday
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                       1.014056e+00
                                       8.18691386
                                                   -27.22936049
                                                                   Jun wednesday
                                                                  July
   1830
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                                      -8.31950620
                                                     0.07355199
                                                                         tuesday
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                                                    28.90211650
                                                                   Jun wednesday
   1832 -2.519260213
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                                                                  July
                                                                         thurday
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                                      -3.23118986
                                                                  July
                                                                         tuesday
                                                     0.34363421
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                                       2.42569729
                                                     6.87616469
                                                                   Aug wednesday
                                                                   Aug wednesday
   1835
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                                                    19.82618518
   1836
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                                                                  July wednesday
                                                    22.43704937
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                                                    23.82497202
                                                                   May
                                                                         thurday
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                                                    -3.46661788
                                                                   Jun
                                                                         thurday
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                                                     9.46377551
                                                                   Jun wednesday
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                                                     2.59673981
                                                                   Apr wednesday
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                       1.514722e+00
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                                                    10.59393419
                                                                   May
                                                                         tuesday
   1844
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                                       0.36919400
                                                    -2.02179607
                                                                   Aug
                                                                       wednesday
                                                    21.67824327
##
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                                                                   Jun
                                                                         tuesday
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         2.327105812
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                                       4.13959583
                                                    20.63465375
                                                                sept.
                                                                       wednesday
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                                                                   Jun
                                                                         thurday
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                                                     2.23699047
                                                                   May
                                                                         thurday
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                                                                   Jun
                                                                       wednesday
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                                                     2.53957083
                                                                   Jun
                                                                       wednesday
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                                                                   Jun
                                                                         thurday
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                                                    20.07343794
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                                                    -33.62188090
                                                                sept. wednesday
   1855
                                                                   Jun
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                                                     2.65921976
                                                                         thurday
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                                                                   Jun wednesday
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                                                    14.23583625
                                                                   May wednesday
   1859
                                                                   Aug wednesday
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                                                                   Aug wednesday
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                                                                   Jun
                                                                         thurday
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                                                    24.49277779
                                                                         tuesday
                                                                   Aug
   1863
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                                                    13.80368444
                                                                   Jun
                                                                       wednesday
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                                                  -15.93994984
                                                                   Apr
                                                                         tuesday
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                                                                   Jun
                                                                       wednesday
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                                                                   Jun wednesday
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                                                    11.72722267
                                                                 sept. wednesday
##
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                                                                   May wednesday
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                                                                         tuesday
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                                      -9.54148011
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                                                                   Aug wednesday
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                                                    -8.05434262
                                                                  July wednesday
```

```
## 1872 -1.043205312 -2.025025e+00
                                      -4.33109945
                                                    11.68463635 sept. wednesday
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                                                                   Jun
                                       6.16010550 -10.09147974
                                                                         tuesday
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                                                                   Jun wednesday
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                                                                   May
##
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                                                                         tuesday
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                                                                         thurday
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                                                                   Jun wednesday
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                                                                       wednesday
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                                                                         tuesday
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                                                                         thurday
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                                                                       wednesday
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                                                                         thurday
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                                      -3.12026376
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                                                                         thurday
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                                                     9.51252564
                                                                   Jun
                                                                         thurday
   1905
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                                                                   Aug wednesday
   1906
                       6.289071e-01
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   1907
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                                                                   May
                                                                         thurday
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                                                                   May wednesday
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                                                                   Aug wednesday
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   1912
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                                                                   Jun
                                                                         tuesday
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                                     -13.62980691
                                                     1.49996264
                                                                  July wednesday
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                                                                   Jun
                                                                         thurday
        -0.357873336 -2.250522e+00
                                                                   Jun wednesday
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                                       4.66847488
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   1916
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                                                                  July wednesday
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                                                                  July
##
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                                                                         thurday
                                                                   Oct
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                                                   -20.40586399
                                                                       wednesday
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                                                     9.77370883
                                                                  July
                                                                         tuesday
   1921
        -0.511896354
                       6.618246e-01
                                       3.40649689
                                                    -16.91846635
                                                                   May
                                                                         thurday
##
   1922
         0.310002838 -1.536910e-01
                                                                   Jun wednesday
                                       1.65007577
                                                    24.75552488
   1923
         0.814079766 -4.162350e-01
                                      -6.91897444
                                                    13.48384309
                                                                   Aug
                                                                         tuesday
  1924
                      1.026758e+00
                                                                sept.
         1.926222042
                                      -5.09896502
                                                    -8.70433658
                                                                         tuesday
## 1925 -1.692908463 -1.853051e-01
                                      12.73899093
                                                     7.30391705
                                                                  July
                                                                         tuesday
```

```
## 1926
         1.197733342 -2.897869e-01
                                      -2.20419811 -10.66057381
                                                                 July
                                                                         thurday
## 1927
         0.021919168 -1.684939e-01
                                       1.66235656 -11.22512916
                                                                   Jun wednesday
                                                                   May wednesday
   1928 -1.636394860
                       2.779935e-01
                                       4.26771343
                                                    -8.65258406
   1929 -0.263759808 -4.966783e-01
                                                                   Aug wednesday
                                      -1.33601549
                                                   -21.39563696
   1930
         0.747685920 -2.004825e-01
                                      -5.93950629
                                                    -5.18472765
                                                                  May
                                                                         tuesday
   1931 -0.342750822 -4.483027e-02
                                      16.91799074
                                                     4.98920235
                                                                  July
                                                                         tuesday
  1932
         0.829176555 -8.126167e-01
                                       0.66767314
                                                    17.45387932
                                                                   Jun wednesday
  1933 -0.960553543
                       1.966414e+00
                                       2.22634172
                                                     6.80897158
                                                                   Aug wednesday
   1934
         0.479226488 -1.015837e-01
                                      -1.77323545
                                                    14.20120990
                                                                  May wednesday
   1935
         2.037101501
                       1.477392e-01
                                       6.63873420
                                                    25.20661751
                                                                   Jun
                                                                         thurday
   1936 -0.699128026
                       8.816391e-01
                                      -3.09578162
                                                     2.50839211
                                                                  July
                                                                         tuesday
   1937
         0.230475281
                       4.649420e-01
                                      -3.70173650
                                                     0.23865553
                                                                   Aug
                                                                      wednesday
   1938
        -0.490113552
                     -5.718705e-01
                                                  -11.38516401
                                       3.27154171
                                                                   Jun
                                                                         thurday
         1.136905885
                       6.381118e-01
   1939
                                      -4.31686524
                                                    23.81466115
                                                                  July wednesday
  1940 -0.670971591
                       1.010768e+00
                                      -4.04433481
                                                   -31.55349741
                                                                  July
                                                                         tuesday
   1941
         0.358480304
                       7.234013e-01
                                      -5.64466547
                                                     4.43167259
                                                                  July wednesday
                                      -7.98935450
   1942
         0.046031213 -1.598156e+00
                                                                  May wednesday
                                                    14.45436439
   1943
        -0.688625640
                                       6.61027598
                                                                  July wednesday
                       3.489227e-01
                                                    24.91539133
                                                    -9.60194235
   1944
         1.463256147 -4.207935e-01
                                       0.11094949
                                                                 July wednesday
   1945
         0.240351575 -1.664568e+00
                                       4.47070829
                                                     9.71147106
                                                                  May wednesday
   1946 -1.007586800 -4.874184e-01
                                      -2.71853092
                                                  -10.81517107
                                                                   Apr wednesday
  1947 -0.246697834
                       5.198481e-01
                                       1.01516244
                                                    36.32138018
                                                                   May wednesday
  1948 -0.549163650 -7.314326e-01
                                     -13.44342932
                                                                sept.
                                                     3.53584520
                                                                         tuesday
   1949 -2.014212375
                       5.486635e-02
                                       9.41413189
                                                     3.53107634
                                                                 July
                                                                         thurday
   1950 -1.778892644
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                                       4.37036033
                                                    17.85156754
                                                                  May
                                                                         tuesday
   1951 -0.645854345 -1.211274e+00
                                      11.98420359
                                                   -12.73065092
                                                                sept. wednesday
   1952
         1.054441880
                       2.562216e-04
                                      -6.91132440
                                                     7.53900947
                                                                   May
                                                                         thurday
##
   1953
         1.885069301
                       4.716234e-02
                                       4.72929014
                                                    -7.62079154
                                                                   Oct wednesday
##
   1954
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                                                    -7.35852028
                                                                   May wednesday
                                      10.08193604 -10.60587420
  1955
         0.943767122
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                                                                   Jun wednesday
   1956
         0.728503972
                      -2.924138e-01
                                      -3.88518392
                                                  -27.05981337
                                                                  July
                                                                         thurday
   1957 -0.399326193
                       1.257338e-01 -15.09612751
                                                     3.40559066
                                                                  May
                                                                         thurday
   1958
        -1.050794972
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                                      10.03982475
                                                     8.83483897
                                                                   Aug wednesday
   1959
        -0.519048089
                       1.341009e+00
                                      12.69637833
                                                     2.89301817
                                                                  July wednesday
   1960
         0.510430024
                       3.268808e-01
                                                                   Jun
##
                                      -6.98792683
                                                     5.42404570
                                                                         thurday
                   x31
##
                         x32
                                        x33
                                                       x34
                                                                      x35
##
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##
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   3
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##
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##
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##
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##
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##
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##
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## 17
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```

```
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##
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##
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##
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         0.9673784618
## 26
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##
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##
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##
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## 1835
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## 1836 1.8599351792 -331.44 -14.756034571
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## 1837 -0.3674677340 -1095.73 -20.505616157 -6.764783533 24.492648969
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## 1839
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                  x41
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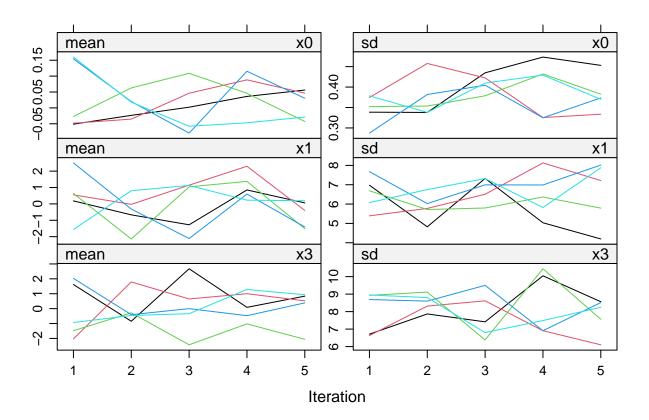
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## 1830 -4.240293e+01
                                                19.063856250 0
## 1831 -2.554474e+01
                     -6.371143351 -0.8341955480
                                                  2.000318813 0
## 1832 -7.585067e+00 11.508632844 2.0766710069
                                                20.873757985 1
## 1833 2.613799e+00
                      9.313054943 1.3223555949
                                                21.200672261 0
## 1834 6.135438e+01
                       0.412814126
                                   1.1516599845
                                                16.488590671 0
## 1835 -9.729945e+01
                     -0.497723796 3.2011351534 -17.530068175 0
## 1836 -4.880682e+01
                     -1.722367846 1.4886389851
                                                -2.024422122 1
## 1837 -2.974086e+01
                       2.316081981 -0.2517288777 -10.414719022 1
       6.768701e+01
                     -4.040459823 -1.8712658733
## 1838
                                                 4.500161610 0
## 1839 -8.962160e+00
                     -2.550369348 -1.4761381574 11.468600252 1
## 1840 -4.447521e+01
                     -6.057221505 0.6174117276
                                                -1.227282390 1
## 1841 -1.010521e-01
                      3.256211231 -0.5972501338
                                                 0.157601107 0
## 1842 4.176306e+01
                     -2.180454288 -1.5399217606
                                                  3.916479940 0
## 1843 -3.399703e+01
                       ## 1844 7.102022e+00
                     -0.335312047 1.1210916394
                                                  3.120448073 1
## 1845 -5.684855e+01
                     -0.957326699 -0.4637206169
                                                -6.361430003 1
## 1846 -1.040610e+00
                     -0.453555766 3.3973367662
                                                28.341895782 0
## 1847 3.125043e+01
                       5.146533862 -5.4517691531
                                                20.926648231 1
## 1848 7.890483e+00
                     -0.990638379 0.8757073945
                                                13.902745700 0
## 1849 -2.043265e+01
                     -1.326810972 -2.2793894030
                                                 4.828782289 1
## 1850 -1.792791e+01
                       4.103868264 -1.9151998244
                                                  0.288473784 1
## 1851 -2.501495e+01
                       8.129260003 0.3306541685 -24.187835810 1
                       3.500606742 -1.7082048186 -10.270553235 1
## 1852 -3.786119e+00
## 1853
       4.742456e+01
                       1.874305996 0.3665211000
                                                23.302881018 1
## 1854 6.782616e+01
                       9.334604280 -1.6143086753 16.861696485 0
## 1855 -5.241894e+01 -8.638710061 0.1896392083 -25.472058285 0
## 1856 -3.989319e+01
                      8.834857316 0.0587788106 -18.507180763 0
## 1857 -2.912541e+01 -3.025041465 0.7646588060
                                                7.502940109 0
```

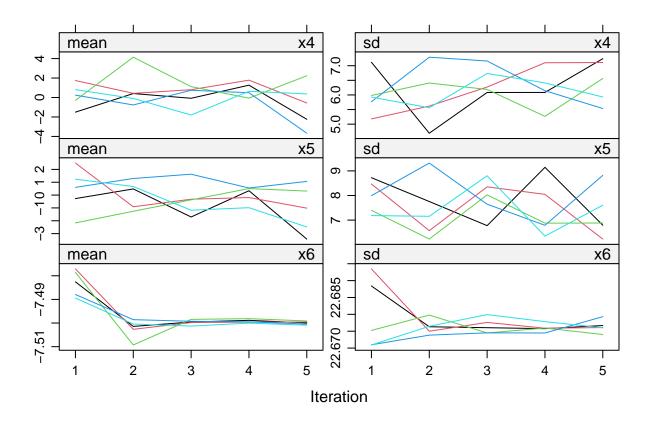
```
## 1858 -2.943716e+01
                       2.805394264 -1.6083587893 -12.478810075 1
## 1859 -3.740410e+01 -1.249826555 1.5247373559 -21.064335257 0
## 1860 -1.600197e+01
                      -3.410632112 -1.6936362582 -7.758453339 0
## 1861 -2.335024e+01
                       2.181591181
                                   4.6658553019
                                                   6.411521745 0
## 1862
        1.048816e+01
                      -0.020046490
                                   0.5953899278
                                                 -8.474467600 0
## 1863 -6.688922e+01
                     -3.933988397
                                   1.7442832283 -11.112501974 0
## 1864 4.961000e+00
                       1.871277364 0.9920955685
                                                  3.288378730 0
                                                 -1.577115790 0
## 1865
        1.245242e+01
                       3.598835734
                                    0.3772580422
## 1866 -3.330835e+01
                      -1.445185582
                                    1.1707440240
                                                  0.713175343 0
## 1867 -3.824088e+01
                      -0.086135492
                                   0.4459700422
                                                 -6.481949125 0
## 1868 -5.993878e+01
                      -6.047059875
                                   0.4761137830 -17.757125087 1
## 1869 6.388717e+00
                       5.268541838
                                   2.3032713289 11.893523879 1
## 1870 -5.054337e+01
                      -0.964553526  0.6919329702  17.086694940  0
## 1871 1.052009e+01
                       1.649597839 -1.7112316533 10.405237350 1
## 1872 -5.263097e+01
                       0.464340939 -1.1023555450 -25.439810681 1
## 1873
        3.919987e+01
                       3.917012033 2.3722173058 -19.351230720 1
## 1874 -7.959581e+00
                       3.789614261 -0.1145776987 10.853159832 1
                      -0.594537321 5.8090196413 -12.063991003 0
## 1875 -8.849346e+01
## 1876 3.219594e+01
                      -1.526296960 -1.7686568606
                                                  5.234786071 0
## 1877 -5.026983e+01
                       1.997663237 -2.9367215517 -17.056605247 1
## 1878 -4.523850e+01
                     -3.652176905 1.0464191758 -11.339188546 0
## 1879 1.648767e+01
                      -8.548924887 -0.1768619399 -0.123513253 0
                       ## 1880 -5.462650e+01
## 1881 -1.180969e+01
                      -2.425643953 -0.0674820571
                                                 10.037783872 1
## 1882 -4.260008e+01
                       0.529132612 -0.8080644827
                                                 -0.382458279 0
## 1883 5.985059e+00
                      -3.383802204 -1.0158920664
                                                 -2.908178236 1
                       3.169845305 1.8488482279
## 1884 -2.820954e+00
                                                 12.183632875 1
## 1885 -6.172594e+01
                       4.155099206
                                   1.3922602632 -11.141887990 0
                       5.972651728 3.2496842212 22.047446766 1
## 1886
       5.748324e+01
## 1887 3.119720e+01
                       2.756730565 -1.3925276566
                                                 14.952454220 1
## 1888 -2.103056e+01
                      -5.069433692 1.9340177446
                                                  17.974124524 1
## 1889
        1.340905e+00
                       5.849212414 -3.8306020359
                                                  -9.114712370 0
## 1890
       3.797214e+01
                       5.954887189 -1.0513413364
                                                 12.579619920 0
                      -2.060525416 -2.1658099960
## 1891 -1.036903e+01
                                                  7.949831309 1
                       3.625674106 -0.9285195656
## 1892
        6.172417e+01
                                                  8.160804565 0
## 1893 4.801974e+01
                       6.009644520 2.7643819997
                                                 16.388251186 1
## 1894 -4.764850e+01 -12.893999480 -5.0338854388 -28.094937887 0
                     -4.270364581 -1.8065182232 21.425295674 1
## 1895 -1.685901e+01
## 1896 -6.073081e+01
                       0.643937885
                                   2.1302172793 -11.264411713 0
## 1897 -3.228602e+00
                       2.216387388 -0.9261793407 -22.111642767 0
## 1898 -1.214557e+01
                       3.952568318
                                   2.5101399793
                                                 -9.810780856 0
## 1899 -4.144083e+01
                       0.639945132 1.5451926889
                                                  0.566555000 0
## 1900 -4.667313e+00
                       5.483154431
                                    1.4623790755
                                                   3.939814882 0
## 1901 -4.718916e+01
                      -3.864871974
                                   0.3451946002
                                                 -8.471819290 0
## 1902 -1.329505e+01
                      -4.388260373
                                    1.4036062135
                                                  8.695204539 1
## 1903 -7.411163e+01
                                    0.7677092079 -22.886764418 0
                      -0.396418067
## 1904 -5.324486e+01
                       8.911200175
                                    0.4527770709 -23.643966298 0
## 1905 -8.459247e+00
                     -2.686844665
                                   2.3535404101 -1.580445647 1
## 1906 -7.095931e+01 -10.326099504 -0.5787587207 -22.499411708 0
## 1907 -1.460888e+01
                       0.501077709
                                   2.0287384634
                                                 14.782328874 0
## 1908 1.384206e+01
                       0.580180696 -1.2413488146
                                                 15.455938998 0
## 1909 -5.500344e+00
                       6.706854240 2.0184415577
                                                  8.574663700 1
## 1910 -2.180773e+01 -1.222992079 -0.3722230452 -12.439659143 0
## 1911 8.596922e+00
                      2.690986252 -1.9381938642 -25.725439899 0
```

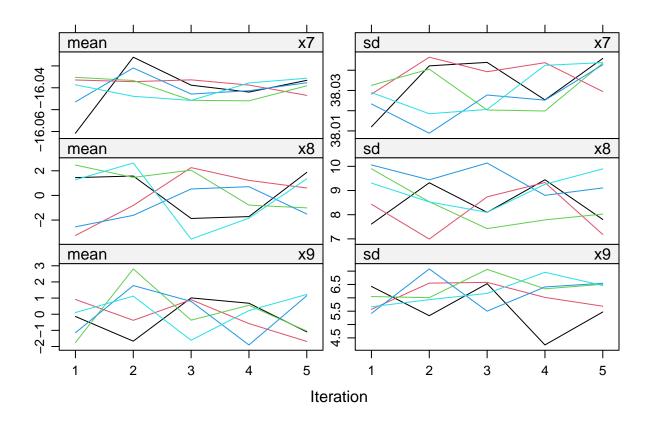
```
## 1912
         2.872686e+01
                        2.483199023 0.9246009836
                                                     4.270770035 1
  1913
         6.100727e+00
                       -1.200248135 -2.2909354313
                                                    11.384446230 1
  1914
         4.881941e+01
                       -1.807727028 -0.8987424149
                                                     8.677405371 0
  1915 -3.708214e+01
                        0.393613953
                                      1.9844346486
                                                    -8.590820139 0
  1916 -2.580192e+01
                       -1.464737032 -0.7755472233
                                                    14.613786991
  1917 -3.900417e+01
                        2.177910476
                                     0.0375430067 -24.155796104 0
## 1918 -5.387789e+01
                       -0.340257929
                                      5.1517264314 -11.976904431 0
## 1919 -4.623338e+01
                       -4.107653534 -2.1786565561
                                                    12.037022615 1
  1920 -1.836425e+01
                        1.953263266 -1.3071026841 -10.113427617 0
## 1921
         1.533648e+01
                       -3.936713368
                                     1.1747995919
                                                    18.018689526 0
  1922 -7.717418e+01
                        3.156469529 -0.9768792481 -17.867370126 1
  1923 -6.996711e+01
                       -5.930251887 -0.4993166747 -24.084166903
  1924 -8.861834e+01
                        3.898849957
                                      1.1213835740 -31.955311508 0
## 1925
         1.500435e+01
                        6.221285993 -2.5257182603
                                                    -7.272781721 0
## 1926
                       -0.697438256
         1.519033e+01
                                     0.7407370550
                                                     8.814958751 1
## 1927
         7.841114e+01
                        3.926820214 -2.8493196440
                                                     8.257609856 0
  1928
         2.545336e+01
                       -6.060615631 -3.8502516409
                                                     0.409449392 0
  1929 -2.181280e+01
                        8.981836908 -0.5721779536
                                                    -4.800610770 0
        3.013233e+01
                       -6.175937703 -3.0850212037
  1930
                                                     4.360328744 1
  1931 -1.036408e+01
                       -3.897295183 -0.6812263647
                                                   -26.020243823
  1932 -1.147893e+02
                       -3.075753224
                                     2.3643883573
                                                   -26.231769163 1
## 1933 -5.218524e+01
                        4.575708703 -2.4108795744
                                                    -5.273430902 1
## 1934 -2.208918e+01
                        0.597992525
                                      0.3568522721
                                                    -2.202522852 0
  1935
         1.614217e+01
                       -5.155610705 -0.5480873795
                                                    24.890012939 1
  1936 -3.145387e+00
                       -3.459115233 -1.0319981789
                                                    -3.360414121 0
  1937
         3.513497e+01
                       -4.390553390
                                     1.1021214020
                                                    11.414354549 0
  1938
         2.635007e+01
                       -1.877378202 -0.7927320399
                                                    10.909643874
  1939 -5.290854e+00
                        0.641393888
                                      2.1034570436
                                                    -0.239986196 0
        2.483509e+01
                                                    17.202994907 1
  1940
                       -3.977917701
                                      1.2700275071
## 1941 -6.203836e+01
                        1.908188010
                                     0.5259075101
                                                   -13.290048031 0
  1942 -2.539612e+01
                         1.217533861 -1.8929106659
                                                     4.126016415
  1943 -6.761489e+01
                        5.981400885 -2.7410867397 -15.372894792 0
  1944
         4.518077e+01
                        3.556870877 -0.4920876514
                                                     3.878309292 1
  1945 -1.941193e+01
                        7.011292654 -1.3388372588
                                                     5.418920292
   1946
         1.163009e+01
                        2.037758799
                                      1.2905869634
                                                    17.098499426
  1947 -1.061757e+02
                        6.654317065 -0.1086882974
                                                   -32.524590380 0
## 1948
         3.577848e+01
                       -4.107575439
                                     2.3174089250
                                                    19.654750316 0
## 1949 -1.772026e+01
                        2.309151524 -2.2322795076
                                                    13.317760912 1
  1950 -7.299212e+00
                       -1.803816077
                                      0.3731524397
                                                     7.780971047 0
  1951 -2.401814e+01
                       -8.420216268 -1.3952002005 -25.848865173 0
  1952
         7.025687e-01
                       -0.109933371
                                      2.3183906154
                                                    19.845283547 1
  1953
         3.096387e+00
                       -1.883032722 -2.2940749646
                                                   -10.139277951
  1954
         3.356407e+01
                       -6.457284860 -2.7535237335
                                                   -23.696504553
  1955
         4.013024e+01
                        5.909018848 -0.6681177653
                                                   -11.631659997 0
##
## 1956
         4.250446e+01
                        0.754091341
                                      1.3081973473
                                                     4.809222162 1
## 1957 -7.192581e+01
                                                    -8.253256303 0
                        3.319015420
                                      1.5490707119
  1958
         1.900350e+01
                        5.499884522
                                      1.8519208779
                                                    30.087238489 1
  1959 -1.128512e+01
                       -4.927882199 -1.5254369283
                                                     3.443904770 1
  1960 -2.824780e+01
                       -0.549099003 3.4513621385
                                                     9.312602334 0
    [ reached 'max' / getOption("max.print") -- omitted 158040 rows ]
```

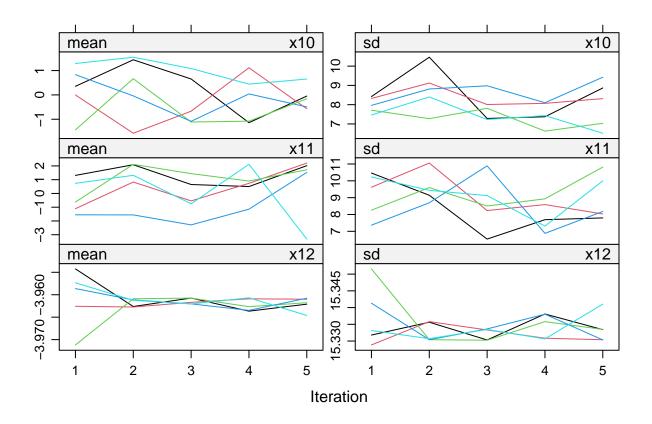
The key data issue that needs to be addressed is the missing data. As previously noted there are 1466 missing values across the data set. It seems that the data is missing at random. This missing data approach provides flexibility in that missing data can be excluded from the observations without dramatic impact.

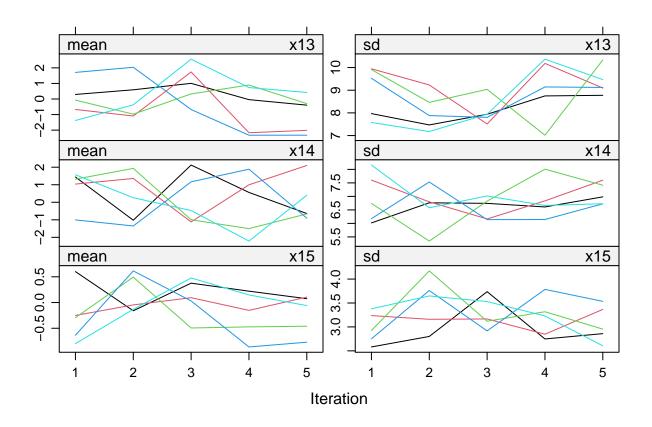
This missing data represents only 1% of the overall data set. However, to ensure as much data as possible is maintained an imputation attempt will be executed on the missing data. The plots below show the results of the imputation and show that there is less missing data in the data set. A couple of variables, x2 and x41, still maintain some missing data. Given the 1% impact, the final step will be to remove the missing data. Further investigation may be needed once a production model is chosen to build out the imputation of these specific variables.

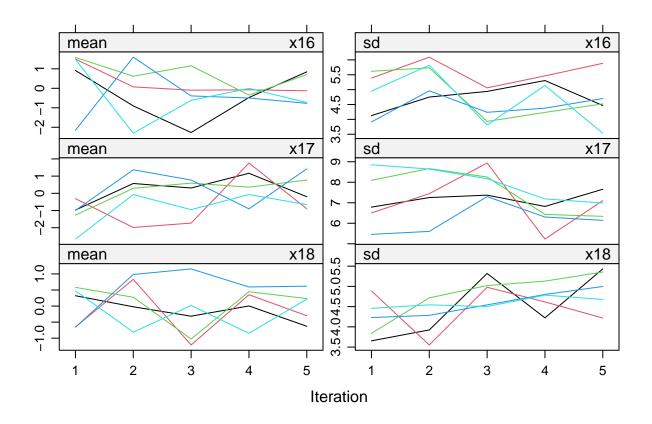


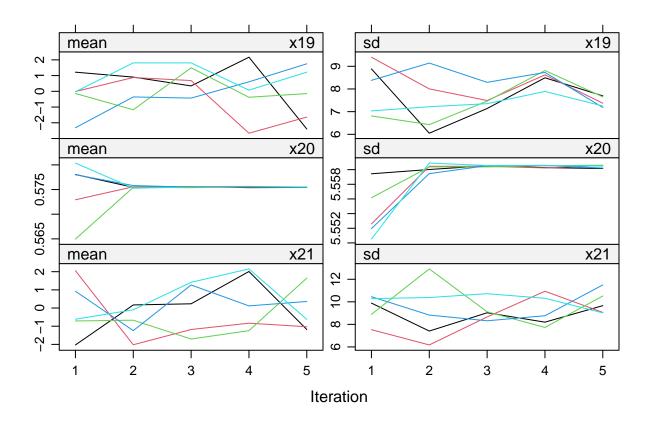


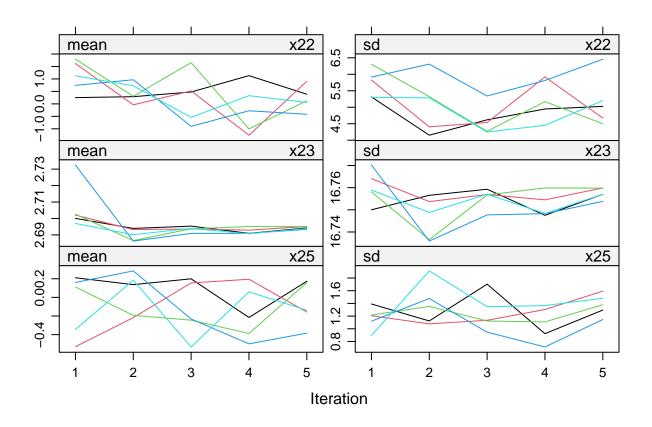


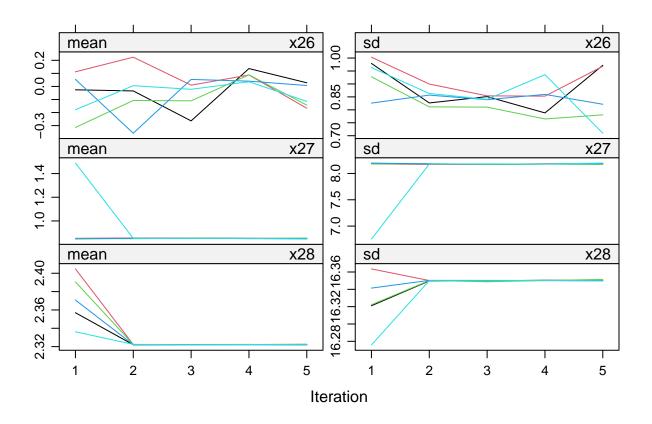


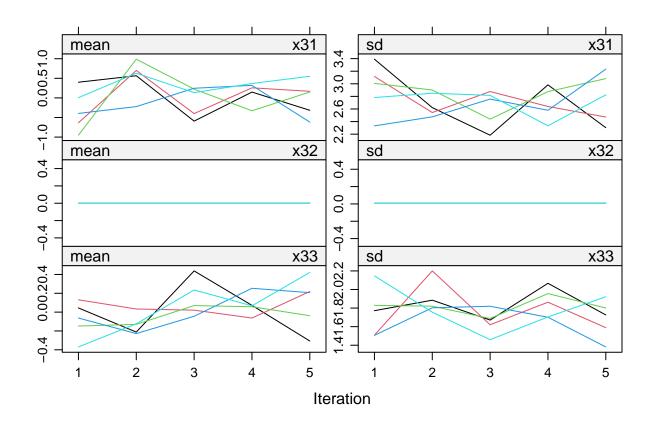


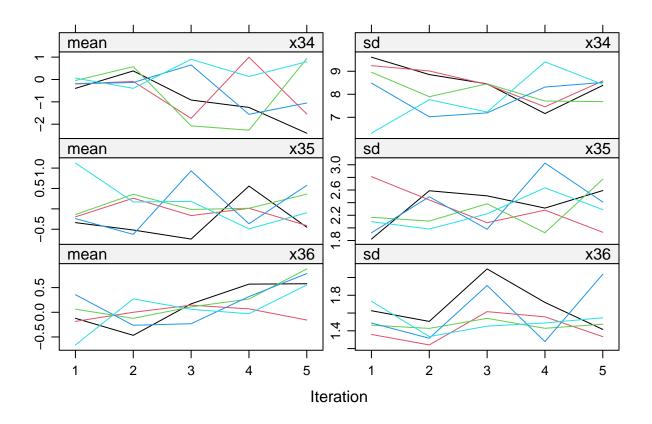


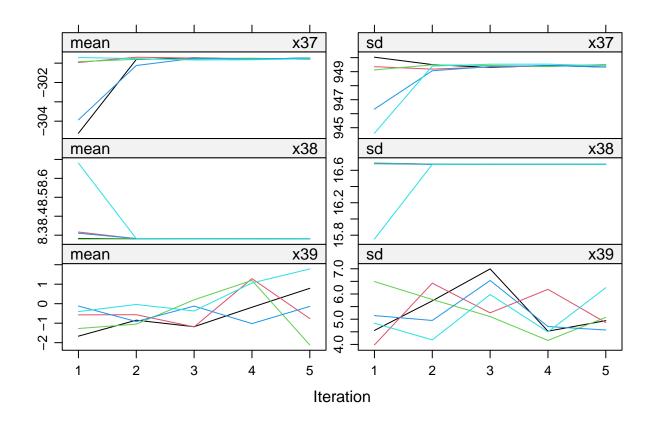


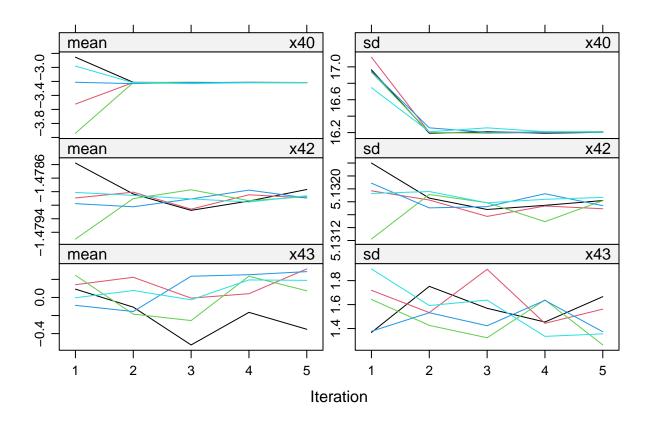


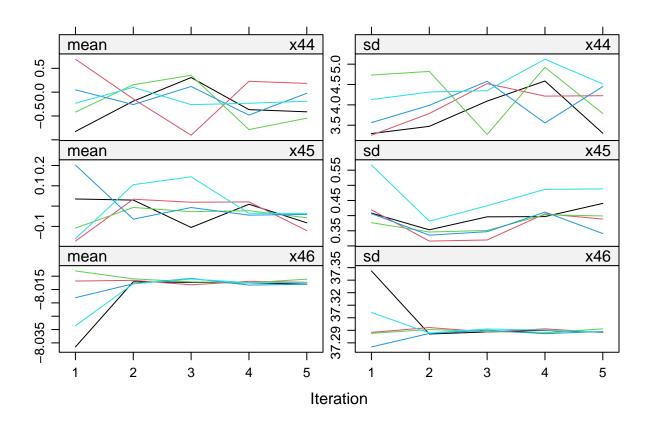


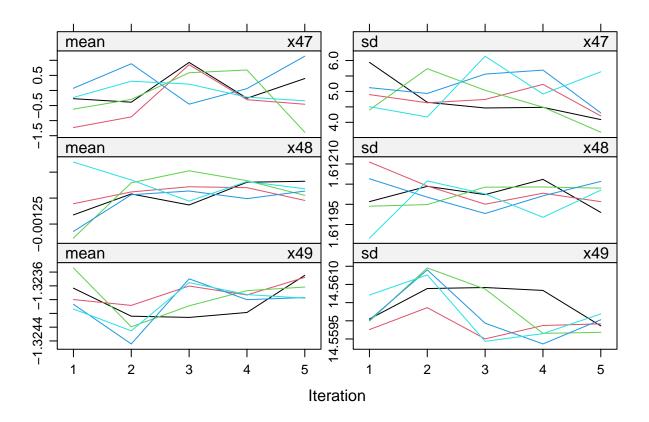






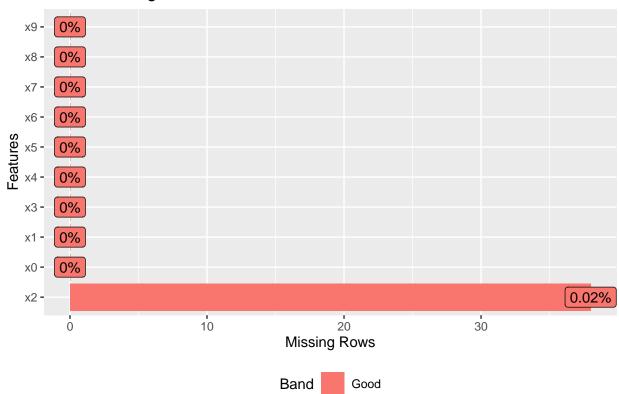




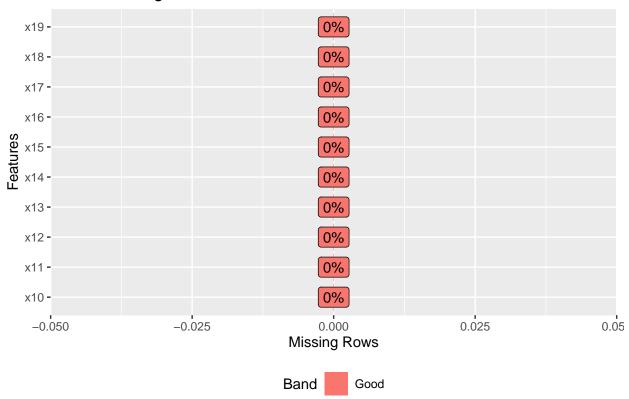


```
##
     x0
                 x2
                       xЗ
                             x4
                                  x5
                                              x7
                                                    x8
                                                          x9
                                                               x10
           x1
                                        x6
                 "" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm"
## "pmm" "pmm"
##
          x14
                    x16
                                             x20
                                                   x21
                                                         x22
                                                               x23
                x15
                            x17
                                x18
                                      x19
                                                                     "" "pmm"
## "pmm" "pmm"
##
          x27
                x28
                      x29
                            x30
                                x31
                                       x32
                                             x33
                                                   x34
                                                         x35
                                                               x36
                      11 11
                            "" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm"
## "pmm" "pmm" "pmm"
##
               x41 x42 x43
   x39 x40
                                x44
                                      x45
                                             x46
                                                   x47
## "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm" "pmm"
```

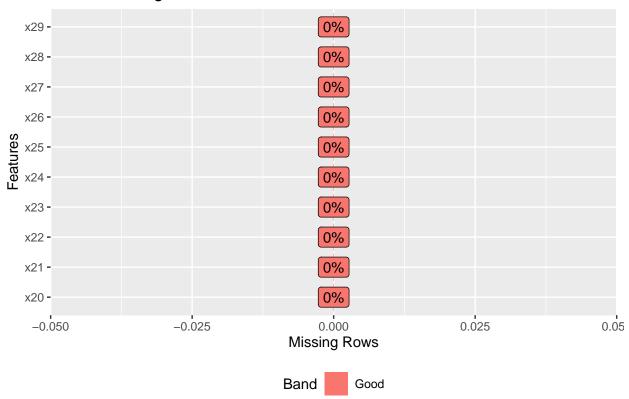
# Plot of Missing Values: 1 – 10



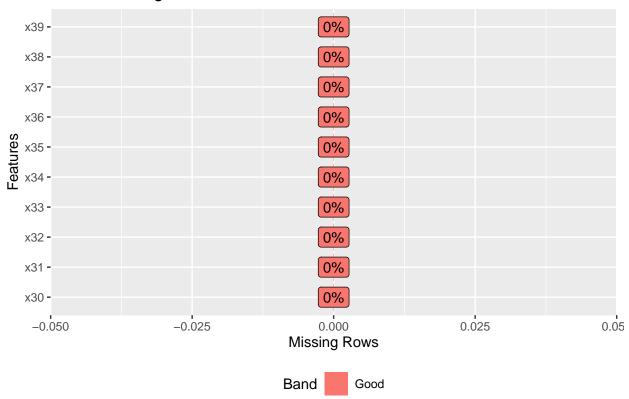
## Plot of Missing Values: 11 – 20



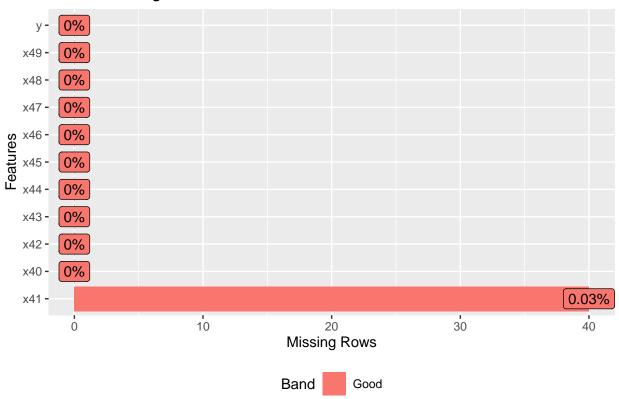
## Plot of Missing Values: 21 – 30



## Plot of Missing Values: 31 – 40







#### **Data Cleanup Verification**

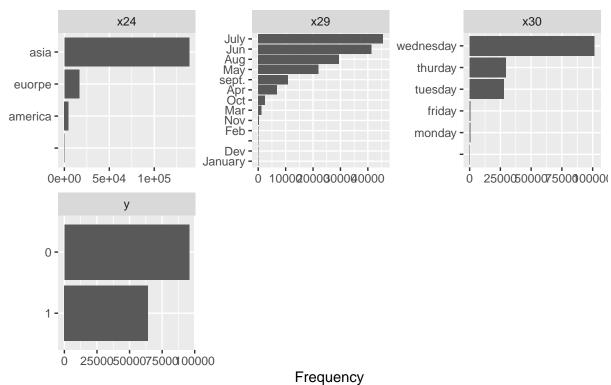
Now that all data has been cleaned and confirmed to be appropriate, the analysis for discrete and continuous variables will be executed to verify that everything is cleaned as it should be. First, the bar plots of the discrete variables will be executed. Finally, the histogram plots for the continuous variables will be executed.

First, re-evaluate the data set at a high level to ensure that the original variables that needed cleaning show as expected.

```
٧2
##
                   variable
## 1:
                               159922
                       rows
##
  2:
                    columns
                                   51
          discrete_columns
                                    3
## 3:
## 4:
        continuous_columns
                                   48
       all_missing_columns
                                    0
## 5:
## 6: total_missing_values
                                    0
## 7:
             complete_rows
                               159922
## 8:
        total observations
                             8156022
## 9:
              memory_usage 64620136
```

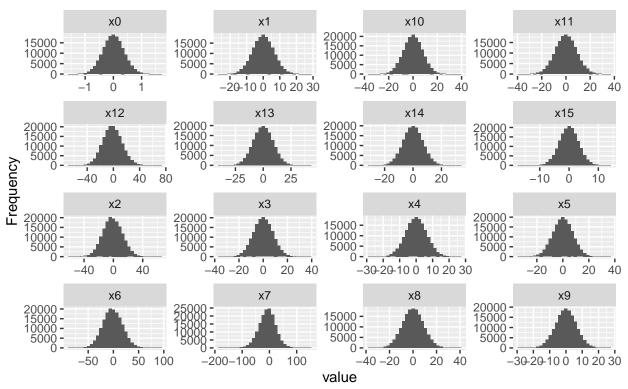
Evaluating the discrete value plots indicates that variable x32 has been categorized as continuous instead of discrete. This gives us 3 discrete variables for evaluation.

#### Bar Plots of Discrete Variables



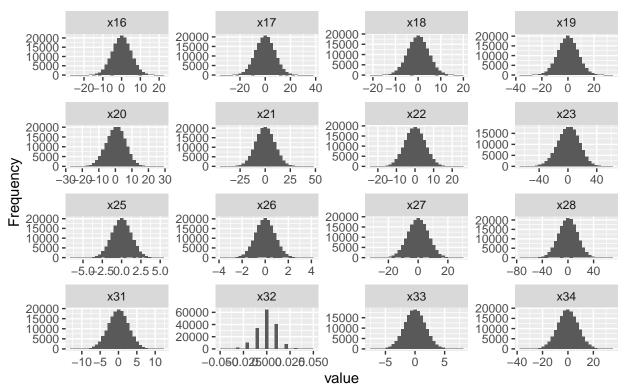
Reviewing the continuous variables, variable x37 is now showing as a continuous variable which indicates that data correction has been completed.

#### Bar Plots of Continuous Variables



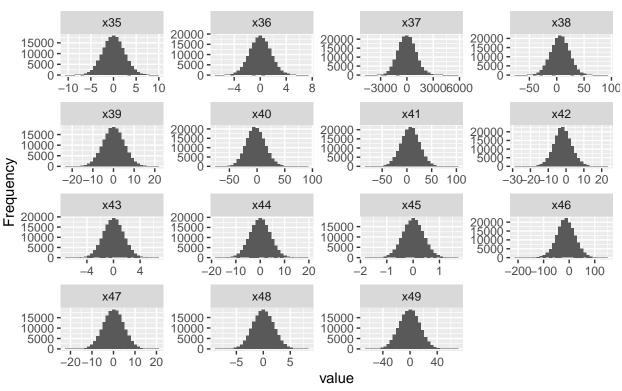
Page 1

# Bar Plots of Continuous Variables



Page 2

## Bar Plots of Continuous Variables

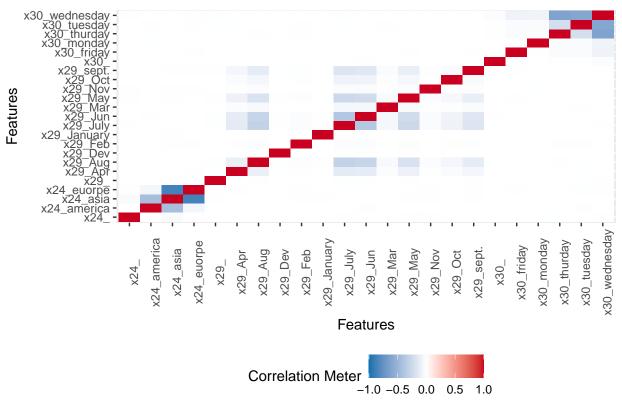


Page 3

The final portion of data understanding to address is to evaluate the correlation between variables. Evaluating correlation allows for understanding if variables are related to one another. This correlation between variables may allow for the removal of highly correlated variables. The same information will be understood if only one of the variables is present thus the model may be simplified by removing a variable.

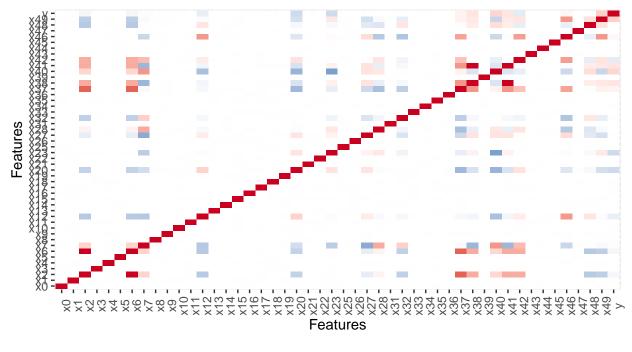
Given the number of variables in the data a full correlation plot will be difficult to read. The correlations plots will be broken down into the discrete and continuous variables. The plot below shows the correlation plot for the discrete variables. From the plot a few items are seen: \* There is a negative correlation between the x24 values of Europe and Asia \* There is a negative correlation between x30 values for Wednesday, Monday and Tuesday \* The remainder of the values have very little correlation





The plot below shows the correlation plot for the continuous variables. From the plot below there is high correlation between variables x2 and x6, as well as between x38 and x41.

## Correlation Plot: Continuous Variables





# Modeling Approach

As part of the modeling approach a training data set and testing data set will need to be created. Creating these individual data sets will allow testing the models against a set of data, the training set, and validating that model with the testing set. This approach will allow for validation that models are performing appropriately and allow for model comparison. In building out the training and test data sets an 80/20 split will be leveraged. This will put 80% of the data in the training data set and 20% in the test data set. With this approach the training set and test set will have the values specified below.

```
## [1] "Training Set Size: 127938"
```

## [1] "Test Set Size: 31984"

Given that the problem provided is a binary classification problem there are multiple approaches that can be taken to model the problem. For this case K-Nearest Neighbor, Logistic Regression and Random Forest models will be executed. Each of these approaches are relatively quick to execute and the outputs are easily explainable.

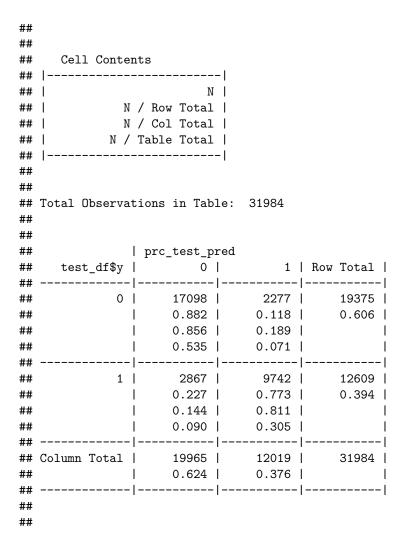
### KNN Modeling

The K-Nearest Neighbor (KNN) modeling method method is an approached used for both classification and regression problems. In this particular case, KNN will be leveraged for the classification problem. In the classification execution, the model attempts to group values based on a weight provided identified as K. The

K value tells the model how many neighbors to attempt to model against the dependent variable. For this implementation K = 15.

The results of our KNN model is shown below. We compare the results from our predicted KNN model against the actual test values for our dependent variable. From it, we can see across a total of 31,984 observations (test set), we have a true positive of of: 17,095 and a true negative of: 9,740 = for a total accuracy of 83.901%. Using KNN is limited for this data set as there were character columns omitted from the model due to limitations. Had those been factored in, we'd likely see a score increase. KNN is likely not the optimal modeling choice here, but is a good first pass to identify that our character columns may have some role to play in improving the accuracy of the model.

The true cost of implementing this model, if selected, would be \$22,800 + \$1,434,500 = \$1,457,300. This further substantiates that KNN is likely not the model of choice if this rate / cost due to false negatives and positives is prohibitive.

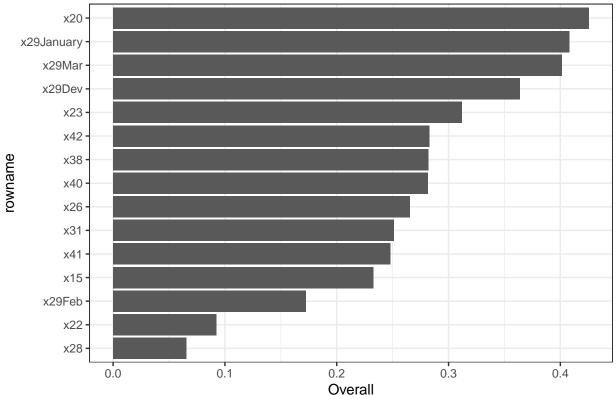


### Logistic Regression

Logistic Regression is another approach to handling a classification problem. Logistic Regression is a statistical model that uses a logistic function to model a binary dependent variable. In comparison to KNN, Logistic Regression is computationally much faster and provides quick insight into a problem.

The plot below shows the variable importance plot. The purpose of this plot is to show which variables have the most impact on the logistic regression analysis. In this case, the top 15 features are shown. As can be seen from the plot, the x29 variable broken out by each month have the highest variable importance.





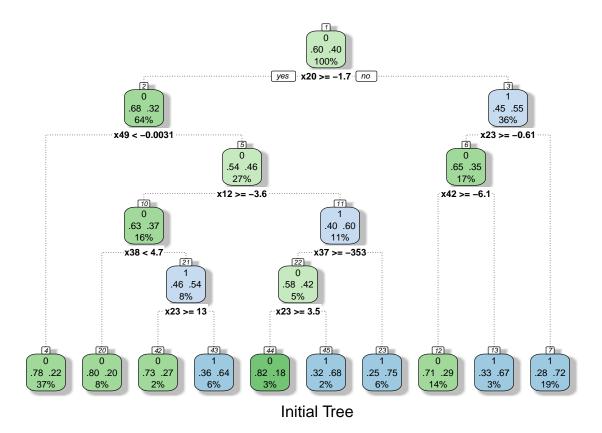
Utilizing the confusion matrix below the accuracy of this model, across 31,984 observations is 70.20% (15,943 + 6,510)/31,984. Applying the Classification Cost penalty specified in the business requirements document, we have a total cost of implementation of: \$34,320 + \$3,049,500 = \$3,083,820. This is higher than the KNN model demonstrated above and if this proves cost-prohibitive, another model may be the better choice.

```
##
##
       FALSE
               TRUE
       15945
##
               3430
##
        6096
               6513
```

#### Basic Tree Model

A Basic Tree Model is another approach that can be leveraged for classification problems. In a basic tree approach a series of "if-then" rules to generate a prediction. Tree Based Models are relatively fast to develop, similar to logistic regression. These types of models are also easily explainable in that the tree structure can be followed to understand the decision making process. Trees can be prone to over fitting if not managed correctly and thus need to be pruned to ensure a best fit model.

The plot below shows the first tree model that has been build off of the data provided. From the model it can be seen that x23 is the first decision point. From there x43 or x28 is evaluated. This process continues until a result has been obtained.

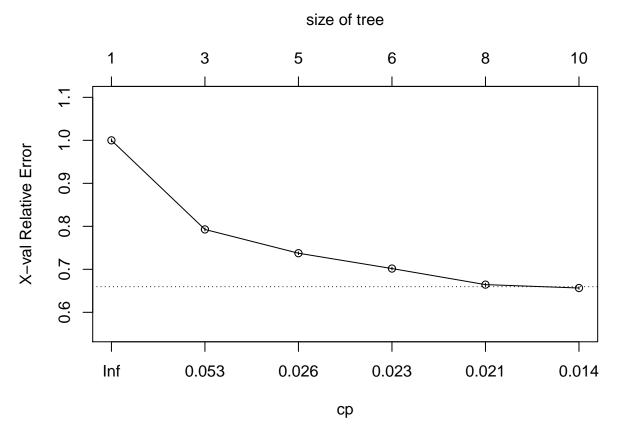


The table below shows that the initial tree has an accuracy of 74.21%, lower than the KNN model but higher than the logistic regression model. Applying the Classification Cost penalty specified in the business requirements document, we have a total cost of implementation of: \$47,140 + \$1,815,140 = \$1,862,280. This is higher than the Logistic Regression model demonstrated above and if this proves cost-prohibitive, another model may be the better choice.

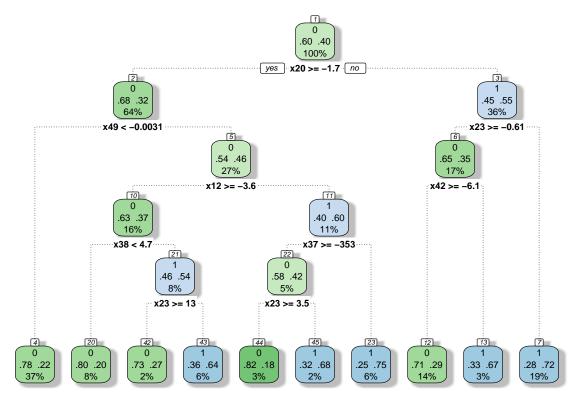
```
##
   Confusion Matrix and Statistics
##
##
             Reference
##
   Prediction
                  0
##
            0 15839
                      4714
##
               3536
                      7895
##
##
                  Accuracy : 0.7421
                     95% CI: (0.7372, 0.7468)
##
##
       No Information Rate: 0.6058
       P-Value [Acc > NIR] : < 2.2e-16
##
##
##
                      Kappa: 0.451
##
    Mcnemar's Test P-Value : < 2.2e-16
##
##
##
               Sensitivity: 0.8175
##
               Specificity: 0.6261
##
            Pos Pred Value: 0.7706
##
            Neg Pred Value: 0.6907
```

```
## Prevalence : 0.6058
## Detection Rate : 0.4952
## Detection Prevalence : 0.6426
## Balanced Accuracy : 0.7218
##
## 'Positive' Class : 0
##
```

To help with any possible over fitting, the tree can be pruned. The method of pruning trees is a process that attempts to get our results to a more optimal tree by removing nodes in the tree and stopping at what the modeler deems is an acceptable stopping criteria. To determine what that stopping criteria could be, investigation of the error in the original tree is helpful. The plot below shows the cross validation error for each split that can be used to prune the tree. From the plot the cp equal to approximately 0.014 would be a good spot to prune the tree.



The pruned tree, below, looks very similar to the initial tree. This result is also confirmed by the confusion matrix results shown below. No change is seen between the initial tree and the pruned tree. This would result in the same cost calculation as the initial tree of \$1,862,280.



**Pruned Tree** 

```
## Confusion Matrix and Statistics
##
##
             Reference
##
  Prediction
                  0
##
            0 15839
                     4714
                     7895
##
            1 3536
##
##
                  Accuracy : 0.7421
##
                    95% CI: (0.7372, 0.7468)
##
       No Information Rate: 0.6058
##
       P-Value [Acc > NIR] : < 2.2e-16
##
##
                     Kappa: 0.451
##
    Mcnemar's Test P-Value : < 2.2e-16
##
##
##
               Sensitivity: 0.8175
               Specificity: 0.6261
##
##
            Pos Pred Value: 0.7706
##
            Neg Pred Value: 0.6907
                Prevalence: 0.6058
##
##
            Detection Rate: 0.4952
##
      Detection Prevalence: 0.6426
##
         Balanced Accuracy: 0.7218
##
          'Positive' Class : 0
##
```

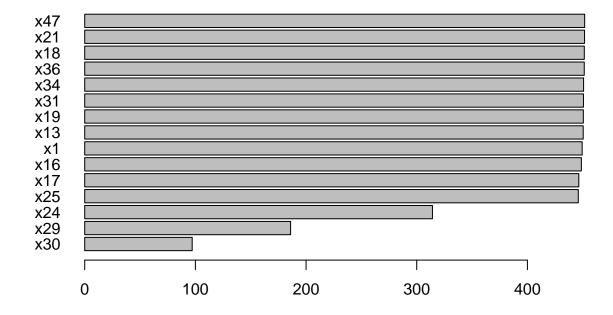
##

#### Random Forest

The final classification approach for this data will be a Random Forest. Random Forests are an ensemble learning method that can be used for classification, regression and other tasks. Random Forests work by building multiple decision trees at a time and then outputting the tree that is the mode (middle) of all of the calculated trees. Given the multiple trees generated Random Forest models are a little more difficult to explain, however many of the same metrics used the the previous classification methods can be obtained. As before the Random Forest will be build off of the training data set and the information will be used to predict values in the test data set to determine the model accuracy. For the first run, the Random Forest will execute on 500 trees. This is the default value for the the model and will provide a good starting point for analysis

Just as with the Logistic Regression model, the Random Forest model will allow for evaluating which features had the greatest impact on the model development. In comparison of the two plots for Linear Regression and Random Forest, features x29 and x43 being having consistent impact across both models. This would indicate that upon further refinement of models these would be key features to ensure remained in any future models.

# **Variable Importance Plot: Random Forest**



The table below shows that the Random Forest model with 500 trees has an accuracy of 92.63% (1 - the OOB Prediction error), the highest of all models so far. Applying the Classification Cost penalty specified in the business requirements document, we have a total cost of implementation of: \$8,230 + \$752,500 = \$760,730. This is lower than other models to this point and seems to indicate this may be a good first model for evaluation.

#### ## Ranger result

```
##
## Call:
##
    ranger(y ~ ., data = train_df, classification = TRUE, importance = "impurity")
##
## Type:
                                       Classification
## Number of trees:
                                       500
                                       127938
## Sample size:
## Number of independent variables:
                                       50
## Mtry:
                                       7
## Target node size:
                                       1
## Variable importance mode:
                                       impurity
## Splitrule:
                                       gini
## 00B prediction error:
                                       7.33 %
##
##
           0
##
     0 18570
                805
##
        1504 11105
```

The table below shows that the Random Forest model with 1,000 trees has an accuracy of 92.69% (1 - the OOB Prediction error), the highest of all models. Applying the Classification Cost penalty specified in the business requirements document, we have a total cost of implementation of: \$8,090 + \$753,500 = \$761,590. This less than a \$1,000 difference from the Random Forest of 500 trees. Due to the number of trees, this model does take much longer (approx. 20 - 30 minutes) to run compared to the 500 tree model (approx. 10 minutes). If speed of processing is a business requirement sacrificing 0.06% accuracy at the same Classification Cost penalty may be acceptable.

```
## Ranger result
##
## Call:
    ranger(y ~ ., data = train_df, classification = TRUE, importance = "impurity",
##
                                                                                            num.trees = 100
##
                                       Classification
## Type:
## Number of trees:
                                       1000
## Sample size:
                                       127938
## Number of independent variables:
                                       50
                                       7
## Target node size:
                                       1
## Variable importance mode:
                                       impurity
## Splitrule:
                                       gini
## 00B prediction error:
                                       7.23 %
##
##
           0
                  1
##
     0 18565
               810
##
       1513 11096
```

## Conclusion

In conclusion, this report has leveraged multiple classification methods to classify an unknown data set. Initially, the data was investigated to evaluate and address missing data and overall data cleanliness. Once the data was ready for processing, four difference classification models were leveraged for comparison on

performance. The models were compared on two metrics: overall model accuracy and model classification cost. A summary of the models and the associated metrics is shown below:

Method	Accuracy	Classification Cost
K-Nearest Neighbor	83.90%	\$1,457,300
Logistic Regression	70.20%	\$3,083,820
Basic Tree	74.21%	\$1,862,280
Random Forest (500 trees)	92.63%	\$760,730
Random Forest (1000 trees)	92.69%	\$761,590

From these current modeling initiatives the Random Forest model seems to be the best model with the lowest Classification Cost penalty - at \$761,590. This is substantially lower cost than the KNN, Logistic Regression, and Basic Tree models performed. If the business is looking to keep costs low and maintain a high-level of accuracy in the model selected, we recommend using Random Forest with 1,000 trees. If explainability of the model is of concern however, this choice provides some good indicators but may be difficult to provide full transparency of the model if that is required. Thus another model with more transparency may be used, but could have a higher Classification Cost.