PTest

Jeremiah Theisen

2024-09-24

```
quakes
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```
##         lat   long depth mag stations
## 1    -20.42 181.62   562 4.8       41
## 2    -20.62 181.03   650 4.2       15
## 3    -26.00 184.10    42 5.4       43
## 4    -17.97 181.66   626 4.1       19
## 5    -20.42 181.96   649 4.0       11
## 6    -19.68 184.31   195 4.0       12
## 7    -11.70 166.10    82 4.8       43
## 8    -28.11 181.93   194 4.4       15
## 9    -28.74 181.74   211 4.7       35
## 10   -17.47 179.59   622 4.3       19
## 11   -21.44 180.69   583 4.4       13
## 12   -12.26 167.00   249 4.6       16
## 13   -18.54 182.11   554 4.4       19
## 14   -21.00 181.66   600 4.4       10
## 15   -20.70 169.92   139 6.1       94
## 16   -15.94 184.95   306 4.3       11
## 17   -13.64 165.96    50 6.0       83
## 18   -17.83 181.50   590 4.5       21
## 19   -23.50 179.78   570 4.4       13
## 20   -22.63 180.31   598 4.4       18
## 21   -20.84 181.16   576 4.5       17
## 22   -10.98 166.32   211 4.2       12
## 23   -23.30 180.16   512 4.4       18
## 24   -30.20 182.00   125 4.7       22
## 25   -19.66 180.28   431 5.4       57
## 26   -17.94 181.49   537 4.0       15
## 27   -14.72 167.51   155 4.6       18
## 28   -16.46 180.79   498 5.2       79
## 29   -20.97 181.47   582 4.5       25
## 30   -19.84 182.37   328 4.4       17
## 31   -22.58 179.24   553 4.6       21
## 32   -16.32 166.74    50 4.7       30
## 33   -15.55 185.05   292 4.8       42
## 34   -23.55 180.80   349 4.0       10
## 35   -16.30 186.00    48 4.5       10
## 36   -25.82 179.33   600 4.3       13
## 37   -18.73 169.23   206 4.5       17
## 38   -17.64 181.28   574 4.6       17
## 39   -17.66 181.40   585 4.1       17
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## 40   -18.82 169.33   230 4.4       11
## 41   -37.37 176.78   263 4.7       34
## 42   -15.31 186.10    96 4.6       32
## 43   -24.97 179.82   511 4.4       23
## 44   -15.49 186.04    94 4.3       26
## 45   -19.23 169.41   246 4.6       27
## 46   -30.10 182.30    56 4.9       34
## 47   -26.40 181.70   329 4.5       24
## 48   -11.77 166.32    70 4.4       18
## 49   -24.12 180.08   493 4.3       21
## 50   -18.97 185.25   129 5.1       73
## 51   -18.75 182.35   554 4.2       13
## 52   -19.26 184.42   223 4.0       15
## 53   -22.75 173.20    46 4.6       26
## 54   -21.37 180.67   593 4.3       13
## 55   -20.10 182.16   489 4.2       16
## 56   -19.85 182.13   562 4.4       31
## 57   -22.70 181.00   445 4.5       17
## 58   -22.06 180.60   584 4.0       11
## 59   -17.80 181.35   535 4.4       23
## 60   -24.20 179.20   530 4.3       12
## 61   -20.69 181.55   582 4.7       35
## 62   -21.16 182.40   260 4.1       12
## 63   -13.82 172.38   613 5.0       61
## 64   -11.49 166.22    84 4.6       32
## 65   -20.68 181.41   593 4.9       40
## 66   -17.10 184.93   286 4.7       25
## 67   -20.14 181.60   587 4.1       13
## 68   -21.96 179.62   627 5.0       45
## 69   -20.42 181.86   530 4.5       27
## 70   -15.46 187.81    40 5.5       91
## 71   -15.31 185.80   152 4.0       11
## 72   -19.86 184.35   201 4.5       30
## 73   -11.55 166.20    96 4.3       14
## 74   -23.74 179.99   506 5.2       75
## 75   -17.70 181.23   546 4.4       35
## 76   -23.54 180.04   564 4.3       15
## 77   -19.21 184.70   197 4.1       11
## 78   -12.11 167.06   265 4.5       23
## 79   -21.81 181.71   323 4.2       15
## 80   -28.98 181.11   304 5.3       60
## 81   -34.02 180.21    75 5.2       65
## 82   -23.84 180.99   367 4.5       27
## 83   -19.57 182.38   579 4.6       38
## 84   -20.12 183.40   284 4.3       15
## 85   -17.70 181.70   450 4.0       11
## 86   -19.66 184.31   170 4.3       15
## 87   -21.50 170.50   117 4.7       32
## 88   -23.64 179.96   538 4.5       26
## 89   -15.43 186.30   123 4.2       16
## 90   -15.41 186.44    69 4.3       42
## 91   -15.48 167.53   128 5.1       61
## 92   -13.36 167.06   236 4.7       22
## 93   -20.64 182.02   497 5.2       64
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## 94   -19.72 169.71   271 4.2       14
## 95   -15.44 185.26   224 4.2       21
## 96   -19.73 182.40   375 4.0       18
## 97   -27.24 181.11   365 4.5       21
## 98   -18.16 183.41   306 5.2       54
## 99   -13.66 166.54    50 5.1       45
## 100  -24.57 179.92   484 4.7       33
## 101  -16.98 185.61   108 4.1       12
## 102  -26.20 178.41   583 4.6       25
## 103  -21.88 180.39   608 4.7       30
## 104  -33.00 181.60    72 4.7       22
## 105  -21.33 180.69   636 4.6       29
## 106  -19.44 183.50   293 4.2       15
## 107  -34.89 180.60    42 4.4       25
## 108  -20.24 169.49   100 4.6       22
## 109  -22.55 185.90    42 5.7       76
## 110  -36.95 177.81   146 5.0       35
## 111  -15.75 185.23   280 4.5       28
## 112  -16.85 182.31   388 4.2       14
## 113  -19.06 182.45   477 4.0       16
## 114  -26.11 178.30   617 4.8       39
## 115  -26.20 178.35   606 4.4       21
## 116  -26.13 178.31   609 4.2       25
## 117  -13.66 172.23    46 5.3       67
## 118  -13.47 172.29    64 4.7       14
## 119  -14.60 167.40   178 4.8       52
## 120  -18.96 169.48   248 4.2       13
## 121  -14.65 166.97    82 4.8       28
## 122  -19.90 178.90    81 4.3       11
## 123  -22.05 180.40   606 4.7       27
## 124  -19.22 182.43   571 4.5       23
## 125  -31.24 180.60   328 4.4       18
## 126  -17.93 167.89    49 5.1       43
## 127  -19.30 183.84   517 4.2       21
## 128  -26.53 178.57   600 5.0       69
## 129  -27.72 181.70    94 4.8       59
## 130  -19.19 183.51   307 4.3       19
## 131  -17.43 185.43   189 4.5       22
## 132  -17.05 181.22   527 4.2       24
## 133  -19.52 168.98    63 4.5       21
## 134  -23.71 180.30   510 4.6       30
## 135  -21.30 180.82   624 4.3       14
## 136  -16.24 168.02    53 4.7       12
## 137  -16.14 187.32    42 5.1       68
## 138  -23.95 182.80   199 4.6       14
## 139  -25.20 182.60   149 4.9       31
## 140  -18.84 184.16   210 4.2       17
## 141  -12.66 169.46   658 4.6       43
## 142  -20.65 181.40   582 4.0       14
## 143  -13.23 167.10   220 5.0       46
## 144  -29.91 181.43   205 4.4       34
## 145  -14.31 173.50   614 4.2       23
## 146  -20.10 184.40   186 4.2       10
## 147  -17.80 185.17    97 4.4       22
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## 148  -21.27 173.49    48 4.9       42
## 149  -23.58 180.17   462 5.3       63
## 150  -17.90 181.50   573 4.0       19
## 151  -23.34 184.50    56 5.7      106
## 152  -15.56 167.62   127 6.4      122
## 153  -23.83 182.56   229 4.3       24
## 154  -11.80 165.80   112 4.2       20
## 155  -15.54 167.68   140 4.7       16
## 156  -20.65 181.32   597 4.7       39
## 157  -11.75 166.07    69 4.2       14
## 158  -24.81 180.00   452 4.3       19
## 159  -20.90 169.84    93 4.9       31
## 160  -11.34 166.24   103 4.6       30
## 161  -17.98 180.50   626 4.1       19
## 162  -24.34 179.52   504 4.8       34
## 163  -13.86 167.16   202 4.6       30
## 164  -35.56 180.20    42 4.6       32
## 165  -35.48 179.90    59 4.8       35
## 166  -34.20 179.43    40 5.0       37
## 167  -26.00 182.12   205 5.6       98
## 168  -19.89 183.84   244 5.3       73
## 169  -23.43 180.00   553 4.7       41
## 170  -18.89 169.42   239 4.5       27
## 171  -17.82 181.83   640 4.3       24
## 172  -25.68 180.34   434 4.6       41
## 173  -20.20 180.90   627 4.1       11
## 174  -15.20 184.68    99 4.1       14
## 175  -15.03 182.29   399 4.1       10
## 176  -32.22 180.20   216 5.7       90
## 177  -22.64 180.64   544 5.0       50
## 178  -17.42 185.16   206 4.5       22
## 179  -17.84 181.48   542 4.1       20
## 180  -15.02 184.24   339 4.6       27
## 181  -18.04 181.75   640 4.5       47
## 182  -24.60 183.50    67 4.3       25
## 183  -19.88 184.30   161 4.4       17
## 184  -20.30 183.00   375 4.2       15
## 185  -20.45 181.85   534 4.1       14
## 186  -17.67 187.09    45 4.9       62
## 187  -22.30 181.90   309 4.3       11
## 188  -19.85 181.85   576 4.9       54
## 189  -24.27 179.88   523 4.6       24
## 190  -15.85 185.13   290 4.6       29
## 191  -20.02 184.09   234 5.3       71
## 192  -18.56 169.31   223 4.7       35
## 193  -17.87 182.00   569 4.6       12
## 194  -24.08 179.50   605 4.1       21
## 195  -32.20 179.61   422 4.6       41
## 196  -20.36 181.19   637 4.2       23
## 197  -23.85 182.53   204 4.6       27
## 198  -24.00 182.75   175 4.5       14
## 199  -20.41 181.74   538 4.3       31
## 200  -17.72 180.30   595 5.2       74
## 201  -19.67 182.18   360 4.3       23
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## 202  -17.70 182.20   445 4.0       12
## 203  -16.23 183.59   367 4.7       35
## 204  -26.72 183.35   190 4.5       36
## 205  -12.95 169.09   629 4.5       19
## 206  -21.97 182.32   261 4.3       13
## 207  -21.96 180.54   603 5.2       66
## 208  -20.32 181.69   508 4.5       14
## 209  -30.28 180.62   350 4.7       32
## 210  -20.20 182.30   533 4.2       11
## 211  -30.66 180.13   411 4.7       42
## 212  -16.17 184.10   338 4.3       13
## 213  -28.25 181.71   226 4.1       19
## 214  -20.47 185.68    93 5.4       85
## 215  -23.55 180.27   535 4.3       22
## 216  -20.94 181.58   573 4.3       21
## 217  -26.67 182.40   186 4.2       17
## 218  -18.13 181.52   618 4.6       41
## 219  -20.21 183.83   242 4.4       29
## 220  -18.31 182.39   342 4.2       14
## 221  -16.52 185.70    90 4.7       30
## 222  -22.36 171.65   130 4.6       39
## 223  -22.43 184.48    65 4.9       48
## 224  -20.37 182.10   397 4.2       22
## 225  -23.77 180.16   505 4.5       26
## 226  -13.65 166.66    71 4.9       52
## 227  -21.55 182.90   207 4.2       18
## 228  -16.24 185.75   154 4.5       22
## 229  -23.73 182.53   232 5.0       55
## 230  -22.34 171.52   106 5.0       43
## 231  -19.40 180.94   664 4.7       34
## 232  -24.64 180.81   397 4.3       24
## 233  -16.00 182.82   431 4.4       16
## 234  -19.62 185.35    57 4.9       31
## 235  -23.84 180.13   525 4.5       15
## 236  -23.54 179.93   574 4.0       12
## 237  -28.23 182.68    74 4.4       20
## 238  -21.68 180.63   617 5.0       63
## 239  -13.44 166.53    44 4.7       27
## 240  -24.96 180.22   470 4.8       41
## 241  -20.08 182.74   298 4.5       33
## 242  -24.36 182.84   148 4.1       16
## 243  -14.70 166.00    48 5.3       16
## 244  -18.20 183.68   107 4.8       52
## 245  -16.65 185.51   218 5.0       52
## 246  -18.11 181.67   597 4.6       28
## 247  -17.95 181.65   619 4.3       26
## 248  -15.50 186.90    46 4.7       18
## 249  -23.36 180.01   553 5.3       61
## 250  -19.15 169.50   150 4.2       12
## 251  -10.97 166.26   180 4.7       26
## 252  -14.85 167.24    97 4.5       26
## 253  -17.80 181.38   587 5.1       47
## 254  -22.50 170.40   106 4.9       38
## 255  -29.10 182.10   179 4.4       19
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## 256  -20.32 180.88   680 4.2       22
## 257  -16.09 184.89   304 4.6       34
## 258  -19.18 169.33   254 4.7       35
## 259  -23.81 179.36   521 4.2       23
## 260  -23.79 179.89   526 4.9       43
## 261  -19.02 184.23   270 5.1       72
## 262  -20.90 181.51   548 4.7       32
## 263  -19.06 169.01   158 4.4       10
## 264  -17.88 181.47   562 4.4       27
## 265  -19.41 183.05   300 4.2       16
## 266  -26.17 184.20    65 4.9       37
## 267  -14.95 167.24   130 4.6       16
## 268  -18.73 168.80    82 4.4       14
## 269  -20.21 182.37   482 4.6       37
## 270  -21.29 180.85   607 4.5       23
## 271  -19.76 181.41   105 4.4       15
## 272  -22.09 180.38   590 4.9       35
## 273  -23.80 179.90   498 4.1       12
## 274  -20.16 181.99   504 4.2       11
## 275  -22.13 180.38   577 5.7      104
## 276  -17.44 181.40   529 4.6       25
## 277  -23.33 180.18   528 5.0       59
## 278  -24.78 179.22   492 4.3       16
## 279  -22.00 180.52   561 4.5       19
## 280  -19.13 182.51   579 5.2       56
## 281  -30.72 180.10   413 4.4       22
## 282  -22.32 180.54   565 4.2       12
## 283  -16.45 177.77   138 4.6       17
## 284  -17.70 185.00   383 4.0       10
## 285  -17.95 184.68   260 4.4       21
## 286  -24.40 179.85   522 4.7       29
## 287  -19.30 180.60   671 4.2       16
## 288  -21.13 185.32   123 4.7       36
## 289  -18.07 181.57   572 4.5       26
## 290  -20.60 182.28   529 5.0       50
## 291  -18.48 181.49   641 5.0       49
## 292  -13.34 166.20    67 4.8       18
## 293  -20.92 181.50   546 4.6       31
## 294  -25.31 179.69   507 4.6       35
## 295  -15.24 186.21   158 5.0       57
## 296  -16.40 185.86   148 5.0       47
## 297  -24.57 178.40   562 5.6       80
## 298  -17.94 181.51   601 4.0       16
## 299  -30.64 181.20   175 4.0       16
## 300  -18.64 169.32   260 4.6       23
## 301  -13.09 169.28   654 4.4       22
## 302  -19.68 184.14   242 4.8       40
## 303  -16.44 185.74   126 4.7       30
## 304  -21.09 181.38   555 4.6       15
## 305  -14.99 171.39   637 4.3       21
## 306  -23.30 179.70   500 4.7       29
## 307  -17.68 181.36   515 4.1       19
## 308  -22.00 180.53   583 4.9       20
## 309  -21.38 181.39   501 4.6       36
```

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## 310  -32.62 181.50    55 4.8       26
## 311  -13.05 169.58   644 4.9       68
## 312  -12.93 169.63   641 5.1       57
## 313  -18.60 181.91   442 5.4       82
## 314  -21.34 181.41   464 4.5       21
## 315  -21.48 183.78   200 4.9       54
## 316  -17.40 181.02   479 4.4       14
## 317  -17.32 181.03   497 4.1       13
## 318  -18.77 169.24   218 5.3       53
## 319  -26.16 179.50   492 4.5       25
## 320  -12.59 167.10   325 4.9       26
## 321  -14.82 167.32   123 4.8       28
## 322  -21.79 183.48   210 5.2       69
## 323  -19.83 182.04   575 4.4       23
## 324  -29.50 182.31   129 4.4       14
## 325  -12.49 166.36    74 4.9       55
## 326  -26.10 182.30    49 4.4       11
## 327  -21.04 181.20   483 4.2       10
## 328  -10.78 165.77    93 4.6       20
## 329  -20.76 185.77   118 4.6       15
## 330  -11.41 166.24    83 5.3       55
## 331  -19.10 183.87    61 5.3       42
## 332  -23.91 180.00   534 4.5       11
## 333  -27.33 182.60    42 4.4       11
## 334  -12.25 166.60   219 5.0       28
## 335  -23.49 179.07   544 5.1       58
## 336  -27.18 182.18    56 4.5       14
## 337  -25.80 182.10    68 4.5       26
## 338  -27.19 182.18    69 5.4       68
## 339  -27.27 182.38    45 4.5       16
## 340  -27.10 182.18    43 4.7       17
## 341  -27.22 182.28    65 4.2       14
## 342  -27.38 181.70    80 4.8       13
## 343  -27.27 182.50    51 4.5       13
## 344  -27.54 182.50    68 4.3       12
## 345  -27.20 182.39    69 4.3       14
## 346  -27.71 182.47   103 4.3       11
## 347  -27.60 182.40    61 4.6       11
## 348  -27.38 182.39    69 4.5       12
## 349  -21.54 185.48    51 5.0       29
## 350  -27.21 182.43    55 4.6       10
## 351  -28.96 182.61    54 4.6       15
## 352  -12.01 166.29    59 4.9       27
## 353  -17.46 181.32   573 4.1       17
## 354  -30.17 182.02    56 5.5       68
## 355  -27.27 182.36    65 4.7       21
## 356  -17.79 181.32   587 5.0       49
## 357  -22.19 171.40   150 5.1       49
## 358  -17.10 182.68   403 5.5       82
## 359  -27.18 182.53    60 4.6       21
## 360  -11.64 166.47   130 4.7       19
## 361  -17.98 181.58   590 4.2       14
## 362  -16.90 185.72   135 4.0       22
## 363  -21.98 179.60   583 5.4       67
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## 364  -32.14 179.90   406 4.3       19
## 365  -18.80 169.21   221 4.4       16
## 366  -26.78 183.61    40 4.6       22
## 367  -20.43 182.37   502 5.1       48
## 368  -18.30 183.20   103 4.5       14
## 369  -15.83 182.51   423 4.2       21
## 370  -23.44 182.93   158 4.1       20
## 371  -23.73 179.99   527 5.1       49
## 372  -19.89 184.08   219 5.4      105
## 373  -17.59 181.09   536 5.1       61
## 374  -19.77 181.40   630 5.1       54
## 375  -20.31 184.06   249 4.4       21
## 376  -15.33 186.75    48 5.7      123
## 377  -18.20 181.60   553 4.4       14
## 378  -15.36 186.66   112 5.1       57
## 379  -15.29 186.42   153 4.6       31
## 380  -15.36 186.71   130 5.5       95
## 381  -16.24 167.95   188 5.1       68
## 382  -13.47 167.14   226 4.4       26
## 383  -25.50 182.82   124 5.0       25
## 384  -14.32 167.33   204 5.0       49
## 385  -20.04 182.01   605 5.1       49
## 386  -28.83 181.66   221 5.1       63
## 387  -17.82 181.49   573 4.2       14
## 388  -27.23 180.98   401 4.5       39
## 389  -10.72 165.99   195 4.0       14
## 390  -27.00 183.88    56 4.9       36
## 391  -20.36 186.16   102 4.3       21
## 392  -27.17 183.68    44 4.8       27
## 393  -20.94 181.26   556 4.4       21
## 394  -17.46 181.90   417 4.2       14
## 395  -21.04 181.20   591 4.9       45
## 396  -23.70 179.60   646 4.2       21
## 397  -17.72 181.42   565 5.3       89
## 398  -15.87 188.13    52 5.0       30
## 399  -17.84 181.30   535 5.7      112
## 400  -13.45 170.30   641 5.3       93
## 401  -30.80 182.16    41 4.7       24
## 402  -11.63 166.14   109 4.6       36
## 403  -30.40 181.40    40 4.3       17
## 404  -26.18 178.59   548 5.4       65
## 405  -15.70 184.50   118 4.4       30
## 406  -17.95 181.50   593 4.3       16
## 407  -20.51 182.30   492 4.3       23
## 408  -15.36 167.51   123 4.7       28
## 409  -23.61 180.23   475 4.4       26
## 410  -33.20 181.60   153 4.2       21
## 411  -17.68 186.80   112 4.5       35
## 412  -22.24 184.56    99 4.8       57
## 413  -20.07 169.14    66 4.8       37
## 414  -25.04 180.10   481 4.3       15
## 415  -21.50 185.20   139 4.4       15
## 416  -14.28 167.26   211 5.1       51
## 417  -14.43 167.26   151 4.4       17
```

```
## 418  -32.70 181.70   211 4.4       40
## 419  -34.10 181.80   246 4.3       23
## 420  -19.70 186.20    47 4.8       19
## 421  -24.19 180.38   484 4.3       27
## 422  -26.60 182.77   119 4.5       29
## 423  -17.04 186.80    70 4.1       22
## 424  -22.10 179.71   579 5.1       58
## 425  -32.60 180.90    57 4.7       44
## 426  -33.00 182.40   176 4.6       28
## 427  -20.58 181.24   602 4.7       44
## 428  -20.61 182.60   488 4.6       12
## 429  -19.47 169.15   149 4.4       15
## 430  -17.47 180.96   546 4.2       23
## 431  -18.40 183.40   343 4.1       10
## 432  -23.33 180.26   530 4.7       22
## 433  -18.55 182.23   563 4.0       17
## 434  -26.16 178.47   537 4.8       33
## 435  -21.80 183.20   325 4.4       19
## 436  -27.63 182.93    80 4.3       14
## 437  -18.89 169.48   259 4.4       21
## 438  -20.30 182.30   476 4.5       10
## 439  -20.56 182.04   499 4.5       29
## 440  -16.10 185.32   257 4.7       30
## 441  -12.66 166.37   165 4.3       18
## 442  -21.05 184.68   136 4.7       29
## 443  -17.97 168.52   146 4.8       33
## 444  -19.83 182.54   524 4.6       14
## 445  -22.55 183.81    82 5.1       68
## 446  -22.28 183.52    90 4.7       19
## 447  -15.72 185.64   138 4.3       21
## 448  -20.85 181.59   499 5.1       91
## 449  -21.11 181.50   538 5.5      104
## 450  -25.31 180.15   467 4.5       25
## 451  -26.46 182.50   184 4.3       11
## 452  -24.09 179.68   538 4.3       21
## 453  -16.96 167.70    45 4.7       23
## 454  -23.19 182.80   237 4.3       18
## 455  -20.81 184.70   162 4.3       20
## 456  -15.03 167.32   136 4.6       20
## 457  -18.06 181.59   604 4.5       23
## 458  -19.00 185.60   107 4.5       15
## 459  -23.53 179.99   538 5.4       87
## 460  -18.18 180.63   639 4.6       39
## 461  -15.66 186.80    45 4.4       11
## 462  -18.00 180.62   636 5.0      100
## 463  -18.08 180.70   628 5.2       72
## 464  -18.05 180.86   632 4.4       15
## 465  -29.90 181.16   215 5.1       51
## 466  -20.90 181.90   556 4.4       17
## 467  -15.61 167.50   135 4.4       21
## 468  -16.03 185.43   297 4.8       25
## 469  -17.68 181.11   568 4.4       22
## 470  -31.94 180.57   168 4.7       39
## 471  -19.14 184.36   269 4.7       31
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## 472  -18.00 185.48   143 4.4       29
## 473  -16.95 185.94    95 4.3       12
## 474  -10.79 166.06   142 5.0       40
## 475  -20.83 185.90   104 4.5       19
## 476  -32.90 181.60   169 4.6       27
## 477  -37.93 177.47    65 5.4       65
## 478  -29.09 183.20    54 4.6       23
## 479  -23.56 180.23   474 4.5       13
## 480  -19.60 185.20   125 4.4       13
## 481  -21.39 180.68   617 4.5       18
## 482  -14.85 184.87   294 4.1       10
## 483  -22.70 183.30   180 4.0       13
## 484  -32.42 181.21    47 4.9       39
## 485  -17.90 181.30   593 4.1       13
## 486  -23.58 183.40    94 5.2       79
## 487  -34.40 180.50   201 4.4       41
## 488  -17.61 181.20   537 4.1       11
## 489  -21.07 181.13   594 4.9       43
## 490  -13.84 170.62   638 4.6       20
## 491  -30.24 181.63    80 4.5       17
## 492  -18.49 169.04   211 4.8       30
## 493  -23.45 180.23   520 4.2       19
## 494  -16.04 183.54   384 4.2       23
## 495  -17.14 185.31   223 4.1       15
## 496  -22.54 172.91    54 5.5       71
## 497  -15.90 185.30    57 4.4       19
## 498  -30.04 181.20    49 4.8       20
## 499  -24.03 180.22   508 4.2       23
## 500  -18.89 184.46   242 4.8       36
## 501  -16.51 187.10    62 4.9       46
## 502  -20.10 186.30    63 4.6       19
## 503  -21.06 183.81   203 4.5       34
## 504  -13.07 166.87   132 4.4       24
## 505  -23.46 180.09   543 4.6       28
## 506  -19.41 182.30   589 4.2       19
## 507  -11.81 165.98    51 4.7       28
## 508  -11.76 165.96    45 4.4       51
## 509  -12.08 165.76    63 4.5       51
## 510  -25.59 180.02   485 4.9       48
## 511  -26.54 183.63    66 4.7       34
## 512  -20.90 184.28    58 5.5       92
## 513  -16.99 187.00    70 4.7       30
## 514  -23.46 180.17   541 4.6       32
## 515  -17.81 181.82   598 4.1       14
## 516  -15.17 187.20    50 4.7       28
## 517  -11.67 166.02   102 4.6       21
## 518  -20.75 184.52   144 4.3       25
## 519  -19.50 186.90    58 4.4       20
## 520  -26.18 179.79   460 4.7       44
## 521  -20.66 185.77    69 4.3       25
## 522  -19.22 182.54   570 4.1       22
## 523  -24.68 183.33    70 4.7       30
## 524  -15.43 167.38   137 4.5       16
## 525  -32.45 181.15    41 5.5       81
```

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## 526  -21.31 180.84   586 4.5       17
## 527  -15.44 167.18   140 4.6       44
## 528  -13.26 167.01   213 5.1       70
## 529  -15.26 183.13   393 4.4       28
## 530  -33.57 180.80    51 4.7       35
## 531  -15.77 167.01    64 5.5       73
## 532  -15.79 166.83    45 4.6       39
## 533  -21.00 183.20   296 4.0       16
## 534  -16.28 166.94    50 4.6       24
## 535  -23.28 184.60    44 4.8       34
## 536  -16.10 167.25    68 4.7       36
## 537  -17.70 181.31   549 4.7       33
## 538  -15.96 166.69   150 4.2       20
## 539  -15.95 167.34    47 5.4       87
## 540  -17.56 181.59   543 4.6       34
## 541  -15.90 167.42    40 5.5       86
## 542  -15.29 166.90   100 4.2       15
## 543  -15.86 166.85    85 4.5       22
## 544  -16.20 166.80    98 4.5       21
## 545  -15.71 166.91    58 4.8       20
## 546  -16.45 167.54   125 4.6       18
## 547  -11.54 166.18    89 5.4       80
## 548  -19.61 181.91   590 4.6       34
## 549  -15.61 187.15    49 5.0       30
## 550  -21.16 181.41   543 4.3       17
## 551  -20.65 182.22   506 4.3       24
## 552  -20.33 168.71    40 4.8       38
## 553  -15.08 166.62    42 4.7       23
## 554  -23.28 184.61    76 4.7       36
## 555  -23.44 184.60    63 4.8       27
## 556  -23.12 184.42   104 4.2       17
## 557  -23.65 184.46    93 4.2       16
## 558  -22.91 183.95    64 5.9      118
## 559  -22.06 180.47   587 4.6       28
## 560  -13.56 166.49    83 4.5       25
## 561  -17.99 181.57   579 4.9       49
## 562  -23.92 184.47    40 4.7       17
## 563  -30.69 182.10    62 4.9       25
## 564  -21.92 182.80   273 5.3       78
## 565  -25.04 180.97   393 4.2       21
## 566  -19.92 183.91   264 4.2       23
## 567  -27.75 182.26   174 4.5       18
## 568  -17.71 181.18   574 5.2       67
## 569  -19.60 183.84   309 4.5       23
## 570  -34.68 179.82    75 5.6       79
## 571  -14.46 167.26   195 5.2       87
## 572  -18.85 187.55    44 4.8       35
## 573  -17.02 182.41   420 4.5       29
## 574  -20.41 186.51    63 5.0       28
## 575  -18.18 182.04   609 4.4       26
## 576  -16.49 187.80    40 4.5       18
## 577  -17.74 181.31   575 4.6       42
## 578  -20.49 181.69   559 4.5       24
## 579  -18.51 182.64   405 5.2       74
```

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## 580  -27.28 183.40    70 5.1       54
## 581  -15.90 167.16    41 4.8       42
## 582  -20.57 181.33   605 4.3       18
## 583  -11.25 166.36   130 5.1       55
## 584  -20.04 181.87   577 4.7       19
## 585  -20.89 181.25   599 4.6       20
## 586  -16.62 186.74    82 4.8       51
## 587  -20.09 168.75    50 4.6       23
## 588  -24.96 179.87   480 4.4       25
## 589  -20.95 181.42   559 4.6       27
## 590  -23.31 179.27   566 5.1       49
## 591  -20.95 181.06   611 4.3       20
## 592  -21.58 181.90   409 4.4       19
## 593  -13.62 167.15   209 4.7       30
## 594  -12.72 166.28    70 4.8       47
## 595  -21.79 185.00    74 4.1       15
## 596  -20.48 169.76   134 4.6       33
## 597  -12.84 166.78   150 4.9       35
## 598  -17.02 182.93   406 4.0       17
## 599  -23.89 182.39   243 4.7       32
## 600  -23.07 184.03    89 4.7       32
## 601  -27.98 181.96    53 5.2       89
## 602  -28.10 182.25    68 4.6       18
## 603  -21.24 180.81   605 4.6       34
## 604  -21.24 180.86   615 4.9       23
## 605  -19.89 174.46   546 5.7       99
## 606  -32.82 179.80   176 4.7       26
## 607  -22.00 185.50    52 4.4       18
## 608  -21.57 185.62    66 4.9       38
## 609  -24.50 180.92   377 4.8       43
## 610  -33.03 180.20   186 4.6       27
## 611  -30.09 182.40    51 4.4       18
## 612  -22.75 170.99    67 4.8       35
## 613  -17.99 168.98   234 4.7       28
## 614  -19.60 181.87   597 4.2       18
## 615  -15.65 186.26    64 5.1       54
## 616  -17.78 181.53   511 4.8       56
## 617  -22.04 184.91    47 4.9       47
## 618  -20.06 168.69    49 5.1       49
## 619  -18.07 181.54   546 4.3       28
## 620  -12.85 165.67    75 4.4       30
## 621  -33.29 181.30    60 4.7       33
## 622  -34.63 179.10   278 4.7       24
## 623  -24.18 179.02   550 5.3       86
## 624  -23.78 180.31   518 5.1       71
## 625  -22.37 171.50   116 4.9       38
## 626  -23.97 179.91   518 4.5       23
## 627  -34.12 181.75    75 4.7       41
## 628  -25.25 179.86   491 4.2       23
## 629  -22.87 172.65    56 5.1       50
## 630  -18.48 182.37   376 4.8       57
## 631  -21.46 181.02   584 4.2       18
## 632  -28.56 183.47    48 4.8       56
## 633  -28.56 183.59    53 4.4       20
```

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## 634  -21.30 180.92   617 4.5       26
## 635  -20.08 183.22   294 4.3       18
## 636  -18.82 182.21   417 5.6      129
## 637  -19.51 183.97   280 4.0       16
## 638  -12.05 167.39   332 5.0       36
## 639  -17.40 186.54    85 4.2       28
## 640  -23.93 180.18   525 4.6       31
## 641  -21.23 181.09   613 4.6       18
## 642  -16.23 167.91   182 4.5       28
## 643  -28.15 183.40    57 5.0       32
## 644  -20.81 185.01    79 4.7       42
## 645  -20.72 181.41   595 4.6       36
## 646  -23.29 184.00   164 4.8       50
## 647  -38.46 176.03   148 4.6       44
## 648  -15.48 186.73    82 4.4       17
## 649  -37.03 177.52   153 5.6       87
## 650  -20.48 181.38   556 4.2       13
## 651  -18.12 181.88   649 5.4       88
## 652  -18.17 181.98   651 4.8       43
## 653  -11.40 166.07    93 5.6       94
## 654  -23.10 180.12   533 4.4       27
## 655  -14.28 170.34   642 4.7       29
## 656  -22.87 171.72    47 4.6       27
## 657  -17.59 180.98   548 5.1       79
## 658  -27.60 182.10   154 4.6       22
## 659  -17.94 180.60   627 4.5       29
## 660  -17.88 180.58   622 4.2       23
## 661  -30.01 180.80   286 4.8       43
## 662  -19.19 182.30   390 4.9       48
## 663  -18.14 180.87   624 5.5      105
## 664  -23.46 180.11   539 5.0       41
## 665  -18.44 181.04   624 4.2       21
## 666  -18.21 180.87   631 5.2       69
## 667  -18.26 180.98   631 4.8       36
## 668  -15.85 184.83   299 4.4       30
## 669  -23.82 180.09   498 4.8       40
## 670  -18.60 184.28   255 4.4       31
## 671  -17.80 181.32   539 4.1       12
## 672  -10.78 166.10   195 4.9       45
## 673  -18.12 181.71   594 4.6       24
## 674  -19.34 182.62   573 4.5       32
## 675  -15.34 167.10   128 5.3       18
## 676  -24.97 182.85   137 4.8       40
## 677  -15.97 186.08   143 4.6       41
## 678  -23.47 180.24   511 4.8       37
## 679  -23.11 179.15   564 4.7       17
## 680  -20.54 181.66   559 4.9       50
## 681  -18.92 169.37   248 5.3       60
## 682  -20.16 184.27   210 4.4       27
## 683  -25.48 180.94   390 4.6       33
## 684  -18.19 181.74   616 4.3       17
## 685  -15.35 186.40    98 4.4       17
## 686  -18.69 169.10   218 4.2       27
## 687  -18.89 181.24   655 4.1       14
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## 688  -17.61 183.32   356 4.2       15
## 689  -20.93 181.54   564 5.0       64
## 690  -17.60 181.50   548 4.1       10
## 691  -17.96 181.40   655 4.3       20
## 692  -18.80 182.41   385 5.2       67
## 693  -20.61 182.44   518 4.2       10
## 694  -20.74 181.53   598 4.5       36
## 695  -25.23 179.86   476 4.4       29
## 696  -23.90 179.90   579 4.4       16
## 697  -18.07 181.58   603 5.0       65
## 698  -15.43 185.19   249 4.0       11
## 699  -14.30 167.32   208 4.8       25
## 700  -18.04 181.57   587 5.0       51
## 701  -13.90 167.18   221 4.2       21
## 702  -17.64 177.01   545 5.2       91
## 703  -17.98 181.51   586 5.2       68
## 704  -25.00 180.00   488 4.5       10
## 705  -19.45 184.48   246 4.3       15
## 706  -16.11 187.48    61 4.5       19
## 707  -23.73 179.98   524 4.6       11
## 708  -17.74 186.78   104 5.1       71
## 709  -21.56 183.23   271 4.4       36
## 710  -20.97 181.72   487 4.3       16
## 711  -15.45 186.73    83 4.7       37
## 712  -15.93 167.91   183 5.6      109
## 713  -21.47 185.86    55 4.9       46
## 714  -21.44 170.45   166 5.1       22
## 715  -22.16 180.49   586 4.6       13
## 716  -13.36 172.76   618 4.4       18
## 717  -21.22 181.51   524 4.8       49
## 718  -26.10 182.50   133 4.2       17
## 719  -18.35 185.27   201 4.7       57
## 720  -17.20 182.90   383 4.1       11
## 721  -22.42 171.40    86 4.7       33
## 722  -17.91 181.48   555 4.0       17
## 723  -26.53 178.30   605 4.9       43
## 724  -26.50 178.29   609 5.0       50
## 725  -16.31 168.08   204 4.5       16
## 726  -18.76 169.71   287 4.4       23
## 727  -17.10 182.80   390 4.0       14
## 728  -19.28 182.78   348 4.5       30
## 729  -23.50 180.00   550 4.7       23
## 730  -21.26 181.69   487 4.4       20
## 731  -17.97 181.48   578 4.7       43
## 732  -26.02 181.20   361 4.7       32
## 733  -30.30 180.80   275 4.0       14
## 734  -24.89 179.67   498 4.2       14
## 735  -14.57 167.24   162 4.5       18
## 736  -15.40 186.87    78 4.7       44
## 737  -22.06 183.95   134 4.5       17
## 738  -25.14 178.42   554 4.1       15
## 739  -20.30 181.40   608 4.6       13
## 740  -25.28 181.17   367 4.3       25
## 741  -20.63 181.61   599 4.6       30
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## 742  -19.02 186.83    45 5.2       65
## 743  -22.10 185.30    50 4.6       22
## 744  -38.59 175.70   162 4.7       36
## 745  -19.30 183.00   302 5.0       65
## 746  -31.03 181.59    57 5.2       49
## 747  -30.51 181.30   203 4.4       20
## 748  -22.55 183.34    66 4.6       18
## 749  -22.14 180.64   591 4.5       18
## 750  -25.60 180.30   440 4.0       12
## 751  -18.04 181.84   611 4.2       20
## 752  -21.29 185.77    57 5.3       69
## 753  -21.08 180.85   627 5.9      119
## 754  -20.64 169.66    89 4.9       42
## 755  -24.41 180.03   500 4.5       34
## 756  -12.16 167.03   264 4.4       14
## 757  -17.10 185.90   127 5.4       75
## 758  -21.13 185.60    85 5.3       86
## 759  -12.34 167.43    50 5.1       47
## 760  -16.43 186.73    75 4.1       20
## 761  -20.70 184.30   182 4.3       17
## 762  -21.18 180.92   619 4.5       18
## 763  -17.78 185.33   223 4.1       10
## 764  -21.57 183.86   156 5.1       70
## 765  -13.70 166.75    46 5.3       71
## 766  -12.27 167.41    50 4.5       29
## 767  -19.10 184.52   230 4.1       16
## 768  -19.85 184.51   184 4.4       26
## 769  -11.37 166.55   188 4.7       24
## 770  -20.70 186.30    80 4.0       10
## 771  -20.24 185.10    86 5.1       61
## 772  -16.40 182.73   391 4.0       16
## 773  -19.60 184.53   199 4.3       21
## 774  -21.63 180.77   592 4.3       21
## 775  -21.60 180.50   595 4.0       22
## 776  -21.77 181.00   618 4.1       10
## 777  -21.80 183.60   213 4.4       17
## 778  -21.05 180.90   616 4.3       10
## 779  -10.80 165.80   175 4.2       12
## 780  -17.90 181.50   589 4.0       12
## 781  -22.26 171.44    83 4.5       25
## 782  -22.33 171.46   119 4.7       32
## 783  -24.04 184.85    70 5.0       48
## 784  -20.40 186.10    74 4.3       22
## 785  -15.00 184.62    40 5.1       54
## 786  -27.87 183.40    87 4.7       34
## 787  -14.12 166.64    63 5.3       69
## 788  -23.61 180.27   537 5.0       63
## 789  -21.56 185.50    47 4.5       29
## 790  -21.19 181.58   490 5.0       77
## 791  -18.07 181.65   593 4.1       16
## 792  -26.00 178.43   644 4.9       27
## 793  -20.21 181.90   576 4.1       16
## 794  -28.00 182.00   199 4.0       16
## 795  -20.74 180.70   589 4.4       27
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## 796  -31.80 180.60   178 4.5       19
## 797  -18.91 169.46   248 4.4       33
## 798  -20.45 182.10   500 4.5       37
## 799  -22.90 183.80    71 4.3       19
## 800  -18.11 181.63   568 4.3       36
## 801  -23.80 184.70    42 5.0       36
## 802  -23.42 180.21   510 4.5       37
## 803  -23.20 184.80    97 4.5       13
## 804  -12.93 169.52   663 4.4       30
## 805  -21.14 181.06   625 4.5       35
## 806  -19.13 184.97   210 4.1       22
## 807  -21.08 181.30   557 4.9       78
## 808  -20.07 181.75   582 4.7       27
## 809  -20.90 182.02   402 4.3       18
## 810  -25.04 179.84   474 4.6       32
## 811  -21.85 180.89   577 4.6       43
## 812  -19.34 186.59    56 5.2       49
## 813  -15.83 167.10    43 4.5       19
## 814  -23.73 183.00   118 4.3       11
## 815  -18.10 181.72   544 4.6       52
## 816  -22.12 180.49   532 4.0       14
## 817  -15.39 185.10   237 4.5       39
## 818  -16.21 186.52   111 4.8       30
## 819  -21.75 180.67   595 4.6       30
## 820  -22.10 180.40   603 4.1       11
## 821  -24.97 179.54   505 4.9       50
## 822  -19.36 186.36   100 4.7       40
## 823  -22.14 179.62   587 4.1       23
## 824  -21.48 182.44   364 4.3       20
## 825  -18.54 168.93   100 4.4       17
## 826  -21.62 182.40   350 4.0       12
## 827  -13.40 166.90   228 4.8       15
## 828  -15.50 185.30    93 4.4       25
## 829  -15.67 185.23    66 4.4       34
## 830  -21.78 183.11   225 4.6       21
## 831  -30.63 180.90   334 4.2       28
## 832  -15.70 185.10    70 4.1       15
## 833  -19.20 184.37   220 4.2       18
## 834  -19.70 182.44   397 4.0       12
## 835  -19.40 182.29   326 4.1       15
## 836  -15.85 185.90   121 4.1       17
## 837  -17.38 168.63   209 4.7       29
## 838  -24.33 179.97   510 4.8       44
## 839  -20.89 185.26    54 5.1       44
## 840  -18.97 169.44   242 5.0       41
## 841  -17.99 181.62   574 4.8       38
## 842  -15.80 185.25    82 4.4       39
## 843  -25.42 182.65   102 5.0       36
## 844  -21.60 169.90    43 5.2       56
## 845  -26.06 180.05   432 4.2       19
## 846  -17.56 181.23   580 4.1       16
## 847  -25.63 180.26   464 4.8       60
## 848  -25.46 179.98   479 4.5       27
## 849  -22.23 180.48   581 5.0       54
```

```
## 850  -21.55 181.39   513 5.1       81
## 851  -15.18 185.93    77 4.1       16
## 852  -13.79 166.56    68 4.7       41
## 853  -15.18 167.23    71 5.2       59
## 854  -18.78 186.72    68 4.8       48
## 855  -17.90 181.41   586 4.5       33
## 856  -18.50 185.40   243 4.0       11
## 857  -14.82 171.17   658 4.7       49
## 858  -15.65 185.17   315 4.1       15
## 859  -30.01 181.15   210 4.3       17
## 860  -13.16 167.24   278 4.3       17
## 861  -21.03 180.78   638 4.0       14
## 862  -21.40 180.78   615 4.7       51
## 863  -17.93 181.89   567 4.1       27
## 864  -20.87 181.70   560 4.2       13
## 865  -12.01 166.66    99 4.8       36
## 866  -19.10 169.63   266 4.8       31
## 867  -22.85 181.37   397 4.2       15
## 868  -17.08 185.96   180 4.2       29
## 869  -21.14 174.21    40 5.7       78
## 870  -12.23 167.02   242 6.0      132
## 871  -20.91 181.57   530 4.2       20
## 872  -11.38 167.05   133 4.5       32
## 873  -11.02 167.01    62 4.9       36
## 874  -22.09 180.58   580 4.4       22
## 875  -17.80 181.20   530 4.0       15
## 876  -18.94 182.43   566 4.3       20
## 877  -18.85 182.20   501 4.2       23
## 878  -21.91 181.28   548 4.5       30
## 879  -22.03 179.77   587 4.8       31
## 880  -18.10 181.63   592 4.4       28
## 881  -18.40 184.84   221 4.2       18
## 882  -21.20 181.40   560 4.2       12
## 883  -12.00 166.20    94 5.0       31
## 884  -11.70 166.30   139 4.2       15
## 885  -26.72 182.69   162 5.2       64
## 886  -24.39 178.98   562 4.5       30
## 887  -19.64 169.50   204 4.6       35
## 888  -21.35 170.04    56 5.0       22
## 889  -22.82 184.52    49 5.0       52
## 890  -38.28 177.10   100 5.4       71
## 891  -12.57 167.11   231 4.8       28
## 892  -22.24 180.28   601 4.2       21
## 893  -13.80 166.53    42 5.5       70
## 894  -21.07 183.78   180 4.3       25
## 895  -17.74 181.25   559 4.1       16
## 896  -23.87 180.15   524 4.4       22
## 897  -21.29 185.80    69 4.9       74
## 898  -22.20 180.58   594 4.5       45
## 899  -15.24 185.11   262 4.9       56
## 900  -17.82 181.27   538 4.0       33
## 901  -32.14 180.00   331 4.5       27
## 902  -19.30 185.86    48 5.0       40
## 903  -33.09 180.94    47 4.9       47
```

```
## 904  -20.18 181.62   558 4.5       31
## 905  -17.46 181.42   524 4.2       16
## 906  -17.44 181.33   545 4.2       37
## 907  -24.71 179.85   477 4.2       34
## 908  -21.53 170.52   129 5.2       30
## 909  -19.17 169.53   268 4.3       21
## 910  -28.05 182.39   117 5.1       43
## 911  -23.39 179.97   541 4.6       50
## 912  -22.33 171.51   112 4.6       14
## 913  -15.28 185.98   162 4.4       36
## 914  -20.27 181.51   609 4.4       32
## 915  -10.96 165.97    76 4.9       64
## 916  -21.52 169.75    61 5.1       40
## 917  -19.57 184.47   202 4.2       28
## 918  -23.08 183.45    90 4.7       30
## 919  -25.06 182.80   133 4.0       14
## 920  -17.85 181.44   589 5.6      115
## 921  -15.99 167.95   190 5.3       81
## 922  -20.56 184.41   138 5.0       82
## 923  -17.98 181.61   598 4.3       27
## 924  -18.40 181.77   600 4.1       11
## 925  -27.64 182.22   162 5.1       67
## 926  -20.99 181.02   626 4.5       36
## 927  -14.86 167.32   137 4.9       22
## 928  -29.33 182.72    57 5.4       61
## 929  -25.81 182.54   201 4.7       40
## 930  -14.10 166.01    69 4.8       29
## 931  -17.63 185.13   219 4.5       28
## 932  -23.47 180.21   553 4.2       23
## 933  -23.92 180.21   524 4.6       50
## 934  -20.88 185.18    51 4.6       28
## 935  -20.25 184.75   107 5.6      121
## 936  -19.33 186.16    44 5.4      110
## 937  -18.14 181.71   574 4.0       20
## 938  -22.41 183.99   128 5.2       72
## 939  -20.77 181.16   568 4.2       12
## 940  -17.95 181.73   583 4.7       57
## 941  -20.83 181.01   622 4.3       15
## 942  -27.84 182.10   193 4.8       27
## 943  -19.94 182.39   544 4.6       30
## 944  -23.60 183.99   118 5.4       88
## 945  -23.70 184.13    51 4.8       27
## 946  -30.39 182.40    63 4.6       22
## 947  -18.98 182.32   442 4.2       22
## 948  -27.89 182.92    87 5.5       67
## 949  -23.50 184.90    61 4.7       16
## 950  -23.73 184.49    60 4.7       35
## 951  -17.93 181.62   561 4.5       32
## 952  -35.94 178.52   138 5.5       78
## 953  -18.68 184.50   174 4.5       34
## 954  -23.47 179.95   543 4.1       21
## 955  -23.49 180.06   530 4.0       23
## 956  -23.85 180.26   497 4.3       32
## 957  -27.08 183.44    63 4.7       27
```

```
## 958  -20.88 184.95    82 4.9       50
## 959  -20.97 181.20   605 4.5       31
## 960  -21.71 183.58   234 4.7       55
## 961  -23.90 184.60    41 4.5       22
## 962  -15.78 167.44    40 4.8       42
## 963  -12.57 166.72   137 4.3       20
## 964  -19.69 184.23   223 4.1       23
## 965  -22.04 183.95   109 5.4       61
## 966  -17.99 181.59   595 4.1       26
## 967  -23.50 180.13   512 4.8       40
## 968  -21.40 180.74   613 4.2       20
## 969  -15.86 166.98    60 4.8       25
## 970  -23.95 184.64    43 5.4       45
## 971  -25.79 182.38   172 4.4       14
## 972  -23.75 184.50    54 5.2       74
## 973  -24.10 184.50    68 4.7       23
## 974  -18.56 169.05   217 4.9       35
## 975  -23.30 184.68   102 4.9       27
## 976  -17.03 185.74   178 4.2       32
## 977  -20.77 183.71   251 4.4       47
## 978  -28.10 183.50    42 4.4       17
## 979  -18.83 182.26   575 4.3       11
## 980  -23.00 170.70    43 4.9       20
## 981  -20.82 181.67   577 5.0       67
## 982  -22.95 170.56    42 4.7       21
## 983  -28.22 183.60    75 4.9       49
## 984  -27.99 183.50    71 4.3       22
## 985  -15.54 187.15    60 4.5       17
## 986  -12.37 166.93   291 4.2       16
## 987  -22.33 171.66   125 5.2       51
## 988  -22.70 170.30    69 4.8       27
## 989  -17.86 181.30   614 4.0       12
## 990  -16.00 184.53   108 4.7       33
## 991  -20.73 181.42   575 4.3       18
## 992  -15.45 181.42   409 4.3       27
## 993  -20.05 183.86   243 4.9       65
## 994  -17.95 181.37   642 4.0       17
## 995  -17.70 188.10    45 4.2       10
## 996  -25.93 179.54   470 4.4       22
## 997  -12.28 167.06   248 4.7       35
## 998  -20.13 184.20   244 4.5       34
## 999  -17.40 187.80    40 4.5       14
## 1000 -21.59 170.56   165 6.0      119
```

```
names(quakes)
```

```
## [1] "lat"      "long"     "depth"    "mag"      "stations"
```

P1

1.

a.

```
length(which(quakes$mag==4.1))
```

```
## [1] 55
```

```
length(which(quakes$mag==4.2))
```

```
## [1] 90
```

b. P(4.1) = 55/800 = 0.06875 P(4.2) = 90/800 = 0.1125

c.

```
index = sample(1:nrow(quakes), 100)

samp=quakes[index,]


table(samp$mag)
```

```
##
##   4 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9   5 5.1 5.2 5.3 5.5 5.6 5.9 6.1
##   7   7   8   7   7  13  11   7   7   3   5   5   6   3   1   1   1   1
```

d. P(4.1|S) = 3/100 = 0.03 P(4.2|S) = 6/100 = 0.06 The sample probabilities for 4.1 and 4.2 are both lower than for the entire population.

P2

2.

a. P(C) = 13/52 => 1/4 => 0.25
b. P(F10) = 16/52 => 4/13 => 0.3077
c. P(C and F10) => 4/52 => 1/13 => 0.0769
d. Independent because P(F10|C) = 0.0769/0.25 = 0.3077 = P(F10) P(C and F10) = 0.0769 = (0.25)(0.3077) = P(C)P(B)

e. If you drew a card, and the first card was a club, the chance of drawing a club would be 12/51. This is dependent on the first event, since if the first card drawn was not a club, the chance of the second card being a club would be 13/51 which is not the same as 12/51.

P3

3. P(B) = 2.75? (I know this is impossible, but I ran the algebra multiple times and this is what I got)

P4

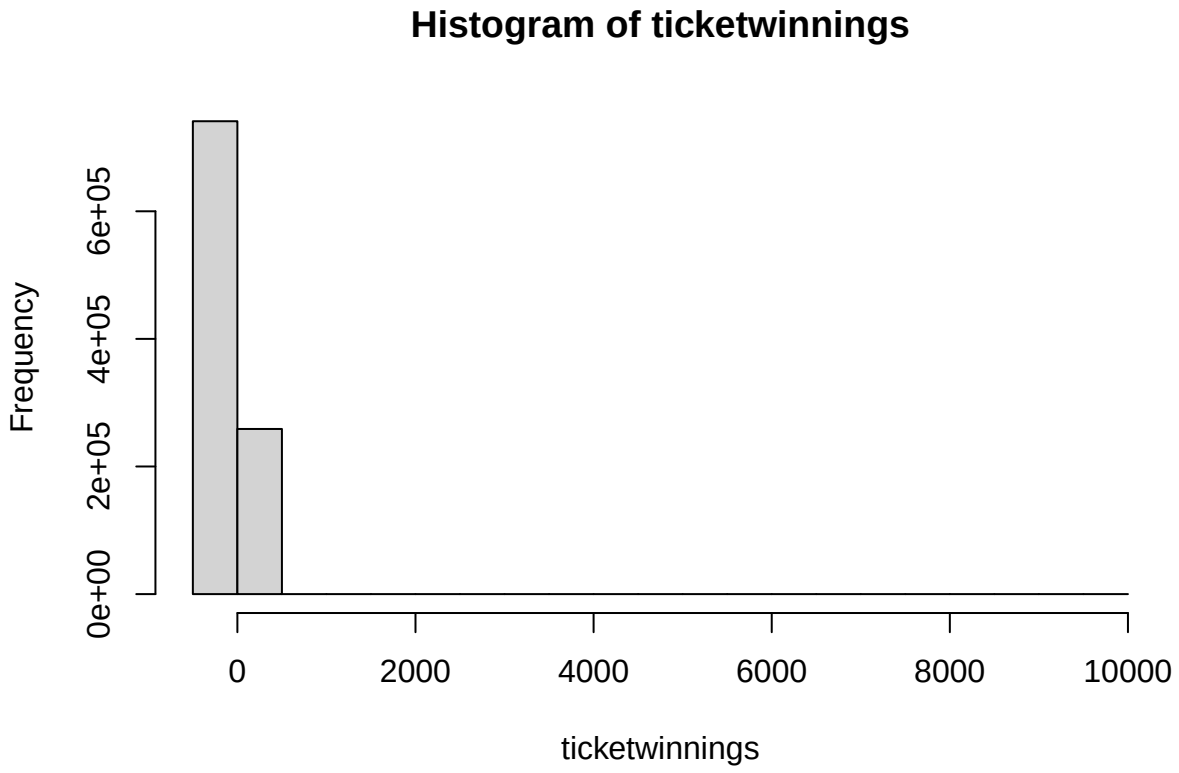
4.

a. -5, 3, 45, 9995

b. E(X) = -1.14
c.

```
ticketwinnings = sample(c(-5, 3, 45, 9995), 1000000, replace = TRUE, prob = c(0.73999, 0.22, 0.04, 0.000

hist(ticketwinnings)
```



d.

```
mean(ticketwinnings)
```

```
## [1] -1.153412
```

This is off from my calculation by 0.071, which is not a lot.

P5

5. E(Z) = 1.51