Assignment1.R

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```r
## Assignment sheet 1 question 2 ##
scan(file = "read_this_1.txt")
```

```
##  [1] 2 0 9 7 1 5 2 2 3 3 2 2 2 3 2 8 0 1 3 4 6
```

```r
x <- read.table(file = "read_this_1.txt")

## Basic R exercise 1##
#a
(1:20)
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
```

```r
#b
c(20:1)
```

```
##  [1] 20 19 18 17 16 15 14 13 12 11 10  9  8  7  6  5  4  3  2  1
```

```r
#c
c(1:20,19:1)
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 19 18 17
## [24] 16 15 14 13 12 11 10  9  8  7  6  5  4  3  2  1
```

```r
#d
tmp <- c(4,6,3)
#e
c(rep(tmp, 10))
```

```
##  [1] 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3
```

```r
#f
c(rep(tmp, 10), 4)
```

```
##  [1] 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4 6 3 4
```

```r
#g
c(rep(tmp[1], 10), rep(tmp[2], 20), rep(tmp[3], 30))
```

```
##  [1] 4 4 4 4 4 4 4 4 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 3 3 3 3 3
## [36] 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
```

```r
x <- c(seq(3,6,by = 0.1))
## question 2 ##
c(exp(x)*cos(x))
```

```
##  [1] -19.884531 -22.178753 -24.490697 -26.773182 -28.969238 -31.011186
##  [7] -32.819775 -34.303360 -35.357194 -35.862834 -35.687732 -34.685042
## [13] -32.693695 -29.538816 -25.032529 -18.975233 -11.157417  -1.362099
## [19]  10.632038  25.046705  42.099201  61.996630  84.929067 111.061586
## [25] 140.525075 173.405776 209.733494 249.468441 292.486707 338.564378
## [31] 387.360340
```

```
## question 3 ##
# a
a<-c(seq(3,36,by=3))
b<-c(seq(1,34,by=3))
c((0.1^a)*(0.2^b))
```

```
##  [1] 2.000000e-04 1.600000e-09 1.280000e-14 1.024000e-19 8.192000e-25
##  [6] 6.553600e-30 5.242880e-35 4.194304e-40 3.355443e-45 2.684355e-50
## [11] 2.147484e-55 1.717987e-60
```

```
#b
c<-c(1:25)
c((2^c)/c)
```

```
##  [1] 2.000000e+00 2.000000e+00 2.666667e+00 4.000000e+00 6.400000e+00
##  [6] 1.066667e+01 1.828571e+01 3.200000e+01 5.688889e+01 1.024000e+02
## [11] 1.861818e+02 3.413333e+02 6.301538e+02 1.170286e+03 2.184533e+03
## [16] 4.096000e+03 7.710118e+03 1.456356e+04 2.759411e+04 5.242880e+04
## [21] 9.986438e+04 1.906502e+05 3.647221e+05 6.990507e+05 1.342177e+06
```

```
## question 4 ##
# a
d<-c(10:100)
sum(c(d^3+4*d^2))
```

```
## [1] 26852735
```

```
# b
sum(c(((2^c)/c)+(3^c)/(c^2)))
```

```
## [1] 2129170437
```

```
## question 5 ##
# a
c(paste(rep("label ", 30), 1:30))
```

```
##  [1] "label  1"  "label  2"  "label  3"  "label  4"  "label  5"
##  [6] "label  6"  "label  7"  "label  8"  "label  9"  "label  10"
## [11] "label  11" "label  12" "label  13" "label  14" "label  15"
## [16] "label  16" "label  17" "label  18" "label  19" "label  20"
## [21] "label  21" "label  22" "label  23" "label  24" "label  25"
## [26] "label  26" "label  27" "label  28" "label  29" "label  30"
```

```
# b
c(paste("fn", 1:30, sep = ""))
```

```
##  [1] "fn1"  "fn2"  "fn3"  "fn4"  "fn5"  "fn6"  "fn7"  "fn8"  "fn9"  "fn10"
## [11] "fn11" "fn12" "fn13" "fn14" "fn15" "fn16" "fn17" "fn18" "fn19" "fn20"
## [21] "fn21" "fn22" "fn23" "fn24" "fn25" "fn26" "fn27" "fn28" "fn29" "fn30"
```

```
## question 6
set.seed(50)
xVec <- sample(0:999, 250, replace=T)
yVec <- sample(0:999, 250, replace=T)
xi<-c(1:249)
yi<-c(2:250)
c(yVec[yi]-xVec[xi])
```

```
##   [1]  163 -122  317 -146  417  393  249 -489  741  771   81  402 -549  338
```

```
##  [15]   583 -403  -67  217  307 -121 -269   36 -706 -563  102   48  397  297
##  [29]   -45 -152  497  405  339 -400  499  -89  211 -670   87   74  554  149
##  [43]  -183  612  193 -453  -70 -141  127 -709 -708 -722  -64  388 -184 -212
##  [57]   242  430  275  672 -150  275  -96 -255  512  577  264  439  149 -916
##  [71]   374 -889 -332  324 -553  394  -87  -75  345 -735  -55  100  -40   15
##  [85]   279  409  790 -547 -487 -399 -619 -168 -185   19  645  551  227 -366
##  [99]   242  147  247 -499 -614  758   63 -227  247  379 -472  566 -762  152
## [113]   493  360   69  190  544 -176  216 -676 -205  782 -109  189 -233  505
## [127]  -219  288  -57  487  256  300 -192 -263  704  674  217  280   17  -68
## [141]   259  612 -127    1  545 -231 -191 -338  333  495  -21   -4  294 -668
## [155]  -814  420  793  631  -67  655  143  611 -220 -518 -285  327  523  -13
## [169]  -679 -241   39  193  342  588  469   68  895 -658  232 -331   27  441
## [183]  -733 -182 -399   79 -469  371  475  265 -407  211   59 -974  -90  218
## [197]   396 -486 -963 -327  425  220  128  235  294 -107 -365  146 -588  449
## [211]  -434  221  846  386 -910  161  206  109  712 -334 -434    7  640 -350
## [225]   923  353 -579  225  327  410  568 -195  -83  154 -486 -195  667 -144
## [239]   272  410  546  380 -559  414  674  193  222  -92  553
```

```
c(sin(yVec[xi])/cos(xVec[yi]))
```

```
##   [1]    0.88603405  -1.44184825   0.82807258  -1.61591717  -0.86017343
##   [6]   20.26356465  -0.79930406   1.72414444  -0.08094240  -0.74895634
##  [11]   -2.59866958  -0.37361045  31.11471579   0.12355916  -0.35925226
##  [16]   -0.90743608   0.34374436   5.78205917  -2.57418558  -0.78661325
##  [21]   -0.59855406   0.98936263   0.33042931  -1.75124647  -0.59435547
##  [26]    1.05374692   0.65497397  -0.11596582  -0.97176537   0.57180267
##  [31]    0.75799030  -0.49259143  -0.99433357   0.05377148  -3.77616264
##  [36]   20.54902944   0.77784817   1.28146891  -0.51650728   6.66902699
##  [41]   -0.92970072 -10.93066299  -3.13102962  30.87943423  -1.14281543
##  [46]    0.36757630   1.18479716   0.94594159   0.93339520   0.93632658
##  [51]  -11.05384468   2.76893270   0.97488334  -0.08932225  -1.33616578
##  [56]   -3.30065552   0.62663162  -1.96486337   0.08653876   0.56695489
##  [61]   44.07630714  -1.11764853   0.11230330  -0.46073106  -0.13860882
##  [66]    0.84026052   2.64708780  -1.63174570  -9.63022830  -2.15553419
##  [71]   -0.42770826   3.24955062  -4.23453154   0.93067452  -0.88388390
##  [76]    0.69339350   1.72841015  -8.22082884   1.69276461   1.02074555
##  [81]   -3.21968328  -0.90739226   1.11331935   0.59579467   0.19571363
##  [86]   -0.17975474   4.38929818   0.64431266  -1.54509170  -0.26536991
##  [91]   -0.81679156   1.34164181  -1.03400420  -1.33639979  -0.44444499
##  [96]    0.96777754  -0.09545121  -0.63686070  -2.30844090  -0.11384497
## [101]    1.08800453   1.06851885  -0.30428029  -1.77044888  -1.45269351
## [106]    0.97943716  -2.15021752   1.56128032   0.61018741   5.59692239
## [111]   -1.03020002  -1.14632240  -0.81548097   0.95359082  74.12815803
## [116]   -0.20329495  -0.08875385  -0.76023984  -0.42372635  -0.68385723
## [121]    1.28860542   0.94117702   1.89561343   0.69369539   4.15021756
## [126]   -1.08026240   1.26615554   0.02147428   3.32694398   0.22930300
## [131]    1.14217476   0.73847767   8.72339712 -17.15727240   0.90435970
## [136]    1.07791792   0.75391899  -0.26297571   0.83894657  -1.22542984
## [141]   -0.57277292  -1.22429033   2.10719833  -1.35745285  -0.84117115
## [146]   -0.69663176  -0.99207337  -1.17363312  -5.50814669  -1.12309426
## [151]    0.60767585   0.32903697  -0.08845387  -4.42251048  -1.31360561
## [156]   -1.05268827  -1.45007537  -1.03184453   0.38034305   2.06381128
## [161]   -1.64568068   0.47938401  46.18666528   1.75988821  14.03349520
## [166]    1.99884446  -1.02170635   1.02445028  -0.15250370  -1.11793279
## [171]   -4.12228606   1.02355677   0.89546497   0.74732250  -2.09533197
```

```
## [176]  -2.40630344  -0.73530615   0.90759126  -0.87474163  -4.22536917
## [181]  -2.04450866  -7.41320483   0.03607946  -0.85674969  -0.85648584
## [186]   2.58973778   8.68248704  -0.74202802   1.07347586   1.37638585
## [191]   1.73104746  -0.57596355  -0.49915725   0.11786229  -0.45584137
## [196]  -0.97726281  -6.86428063  -0.60929448  -0.72132361   0.00000000
## [201]   1.00734878   4.20789995  -0.81616263  -1.72455176  10.00784534
## [206]   0.71310632   8.77005056  -0.64297796   0.24086573  -6.12424634
## [211]   0.94848253   9.22132979  -5.85933168  -0.77292827  -0.85749485
## [216]   0.80000340 -10.45187777   2.91489552   0.86914823   0.93956496
## [221]   1.15020196  -4.25009579  -0.97278301   1.05669698  23.96919924
## [226]  -0.11659711   0.58615433  -1.23512544   1.08111948   3.37846777
## [231]   0.96204558  -1.18727215   0.77801767   2.39161655   1.01270315
## [236]   0.30508064  -1.13987140   1.35085069   2.13213714   0.95034702
## [241]   0.48941676  -1.03804260   1.11768517  -0.25446052 -15.07630921
## [246]   1.12429826   0.28067653  -0.75125301  -1.91160477
```

```r
xii<-c(1:248)
yii<-c(2:249)
zii<-c(3:250)
c(xVec[xii]+2*xVec[yii]-xVec[zii])
```

```
##   [1] 1382   70 1221 1749  -98  796 1949  623 -134  618  288 1472  517  -45
##  [15]  794 1982 1489  344 -206 1207  292  771 2085  810 1032 1547  767  537
##  [29]  702  676  737  664 1451  435 1355  168 1150  989  926  348 1757 1299
##  [43]  409 -497  501 2150 1157 1081 1323 2030 1887 1744  879  590  493 1330
##  [57] 1254 1281  465  767 1691  464 1238  805 -519 1425  710 -611 1517  963
##  [71] 1836 2243 -158 1860  606  506 1917 1304 2021 2025  238  226  733 1538
##  [85]  581 -659  824 1109 1136 1339 1239 1584 2300  562  567 -375 1372  761
##  [99] 1142  714 1801 2220  624 -806 1738  268  398 1941  668 2037  829  345
## [113]  337  -45  635 -285 1225  691 1792 2216  123  538 1130 1124 1172  944
## [127]  271  -62  229  785  -70 1346 1622  381  104 1036 1015  199  589 1399
## [141]  601  506  560 -145  171 1204 1427 1278 1128  615  269   37 1521 2172
## [155] 1602  464   74 1575  599   88 -267 1185 1655 1564 1420  880  229 1651
## [169]  959 1306 2008 1243  267 1110  556 -791 1300  844 1578 2427  708 1554
## [183] 1439 1150 1269 2274 1419 1067  187 2071  781 -148 1767 1851 1019 -196
## [197]  554 2223 1710  -90  788 1209  876 1322  275 1191  323 1570 1234  768
## [211] 1715  903 -768 1546 1452  -47 1125 -330  871 2463  894  133  975  201
## [225] -137 1553  299  865  746  184  267  839  -63  863 2411  133 1739 1145
## [239] 1015   47  209 1468  846   10 1146   31 1405 1058
```

```r
sum(c((exp(-xVec[xi+1]))/xVec[xi]+10))
```

```
## [1] 2490.019
```

```r
c(yVec[yVec>600])
```

```
##   [1] 709 871 621 930 948 783 878 671 860 768 698 974 855 813 776 721 917
##  [18] 985 705 884 840 687 957 955 786 938 930 641 615 988 881 881 997 823
##  [35] 791 643 779 693 845 815 752 766 635 993 919 686 635 613 660 800 743
##  [52] 965 743 615 615 803 948 760 604 800 772 863 902 689 881 941 924 693
##  [69] 835 632 872 876 850 961 681 791 947 915 712 665 921 798 866 828 942
##  [86] 841 645 681 827 884 890 970 632 717 846 952 609 824 695 675 777 813
## [103] 792 783 611 853 738 668 791
```

```r
c(match(c(yVec[yVec>600]), yVec))
```

```
##   [1]  1  2  5  6  8 10 11 13 16 18 27 28 32 33 34 36 42
```

4

```
## [18]    43   45   48   50   55   58   59   60   61    6   66   67   68   72   72   80   86
## [35]    88   94   95   96   97  101  102  105  107  109  111  114  107  119  120  123  125
## [52]   127  125   67   67  136    8  138  139  123  143  150  151  154   72  158  159   96
## [69]   163  164  167  168  172  173  174   88  176  178  180  181  182  183  187  189  190
## [86]   203  204  174  206   48  213  214  164  220  224  226  227  230  232  237  238   33
## [103]  241   10  245  246  247  249   88
```

```r
xind<-c(match(c(yVec[yVec>600]), yVec))
xVec[xind]
```

```
##   [1] 708 437 513   44 646 107 390 640 676 364 577 257 408 437 618 627 836
##  [18] 278   55 458 803 358 525 511 266 578   44   38 724   61 995 995 956   19
##  [35] 680 760   48 294   69 505 964   24   10 840 878 113   10 444 986 537 515
##  [52] 263 515 724 724 274 646 324 176 537 260 407 216 977 995 293 660 294
##  [69] 852 743 353 371 768 339 203 680   49 880 996 894 357 900 972 467 324
##  [86] 517 446 203 190 458 124   14 743 863 399 256 678 188 258 110 957 437
## [103]  34 107 179 545 123 238 680
```

```r
xbar=mean(xVec)
func <- function(x) (abs(x-xbar))^(1/2)
lapply(xVec, func)
```

```
## [[1]]
## [1] 16.0045
##
## [[2]]
## [1] 3.854348
##
## [[3]]
## [1] 15.86997
##
## [[4]]
## [1] 17.7523
##
## [[5]]
## [1] 7.819463
##
## [[6]]
## [1] 20.19545
##
## [[7]]
## [1] 15.72081
##
## [[8]]
## [1] 13.93356
##
## [[9]]
## [1] 20.2449
##
## [[10]]
## [1] 18.5703
##
## [[11]]
## [1] 7.864859
##
```

```
## [[12]]
## [1] 13.52243
##
## [[13]]
## [1] 13.71656
##
## [[14]]
## [1] 19.3612
##
## [[15]]
## [1] 13.22331
##
## [[16]]
## [1] 14.97144
##
## [[17]]
## [1] 19.57406
##
## [[18]]
## [1] 9.373153
##
## [[19]]
## [1] 19.43852
##
## [[20]]
## [1] 16.84803
##
## [[21]]
## [1] 12.81187
##
## [[22]]
## [1] 16.089
##
## [[23]]
## [1] 16.06686
##
## [[24]]
## [1] 19.75206
##
## [[25]]
## [1] 11.95224
##
## [[26]]
## [1] 14.07636
##
## [[27]]
## [1] 11.18678
##
## [[28]]
## [1] 13.95908
##
## [[29]]
## [1] 11.30734
##
```

```
## [[30]]
## [1] 9.157292
##
## [[31]]
## [1] 9.687931
##
## [[32]]
## [1] 6.622386
##
## [[33]]
## [1] 3.854348
##
## [[34]]
## [1] 12.88969
##
## [[35]]
## [1] 15.161
##
## [[36]]
## [1] 13.2342
##
## [[37]]
## [1] 18.18945
##
## [[38]]
## [1] 15.7843
##
## [[39]]
## [1] 8.88009
##
## [[40]]
## [1] 2.478709
##
## [[41]]
## [1] 9.426346
##
## [[42]]
## [1] 19.59959
##
## [[43]]
## [1] 13.18545
##
## [[44]]
## [1] 18.94349
##
## [[45]]
## [1] 19.92124
##
## [[46]]
## [1] 15.75259
##
## [[47]]
## [1] 22.40857
##
```

```
## [[48]]
## [1] 2.478709
##
## [[49]]
## [1] 16.15995
##
## [[50]]
## [1] 18.73884
##
## [[51]]
## [1] 23.32689
##
## [[52]]
## [1] 17.69588
##
## [[53]]
## [1] 13.68006
##
## [[54]]
## [1] 12.36349
##
## [[55]]
## [1] 9.687931
##
## [[56]]
## [1] 5.182277
##
## [[57]]
## [1] 16.22171
##
## [[58]]
## [1] 8.552427
##
## [[59]]
## [1] 7.690514
##
## [[60]]
## [1] 13.6329
##
## [[61]]
## [1] 11.23138
##
## [[62]]
## [1] 14.25286
##
## [[63]]
## [1] 15.96421
##
## [[64]]
## [1] 11.5388
##
## [[65]]
## [1] 17.96819
##
```

```
## [[66]]
## [1] 20.34345
##
## [[67]]
## [1] 16.49679
##
## [[68]]
## [1] 19.77008
##
## [[69]]
## [1] 17.77234
##
## [[70]]
## [1] 22.18432
##
## [[71]]
## [1] 7.425901
##
## [[72]]
## [1] 23.30545
##
## [[73]]
## [1] 14.46181
##
## [[74]]
## [1] 19.43852
##
## [[75]]
## [1] 22.69678
##
## [[76]]
## [1] 17.43147
##
## [[77]]
## [1] 14.32285
##
## [[78]]
## [1] 22.45315
##
## [[79]]
## [1] 14.14723
##
## [[80]]
## [1] 22.45315
##
## [[81]]
## [1] 9.546937
##
## [[82]]
## [1] 20.8532
##
## [[83]]
## [1] 10.62337
##
```

```
## [[84]]
## [1] 4.140531
##
## [[85]]
## [1] 9.599167
##
## [[86]]
## [1] 20.80519
##
## [[87]]
## [1] 21.23337
##
## [[88]]
## [1] 15.10444
##
## [[89]]
## [1] 9.227351
##
## [[90]]
## [1] 13.89763
##
## [[91]]
## [1] 15.46428
##
## [[92]]
## [1] 15.36698
##
## [[93]]
## [1] 19.39443
##
## [[94]]
## [1] 17.55403
##
## [[95]]
## [1] 20.09617
##
## [[96]]
## [1] 12.56408
##
## [[97]]
## [1] 19.56671
##
## [[98]]
## [1] 18.84526
##
## [[99]]
## [1] 11.86828
##
## [[100]]
## [1] 14.70184
##
## [[101]]
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##
```

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## [[110]]
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## [[115]]
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## [[116]]
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## [[119]]
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## [[129]]
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## [[132]]
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## [[133]]
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## [[134]]
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## [[135]]
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##
## [[136]]
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##
## [[137]]
## [1] 9.546937
##
```

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## [[139]]
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## [[141]]
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## [[142]]
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## [[143]]
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## [[145]]
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## [[146]]
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## [[147]]
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## [[149]]
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## [[155]]
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## [[161]]
## [1] 17.74418
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## [[162]]
## [1] 15.0949
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## [1] 20.0036
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## [[164]]
## [1] 17.06294
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## [[165]]
## [1] 15.20342
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## [[166]]
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## [[167]]
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## [[173]]
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##
```

```
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## [[175]]
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## [[177]]
## [1] 20.78115
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## [[178]]
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## [1] 5.305092
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## [1] 2.268039
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## [[190]]
## [1] 11.30734
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```

```
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```
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```
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```

```
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## [[247]]
## [1] 18.13439
##
## [[248]]
## [1] 17.55403
##
## [[249]]
## [1] 14.62382
##
## [[250]]
## [1] 16.5486
```

```r
length(yVec[yVec>200])
```

```
## [1] 207
```

```r
length(xVec[xVec%%2==0])
```

```
## [1] 124
```

```r
xVec[match(sort(yVec), yVec)]
```

```
##   [1] 405 842 308 572 461   8 256 507 373 639  42 616  29 645 376 669 688
##  [18] 688  63 638 862  77 996  93  59 585 661  72 339 339 206 537 537 322
##  [35]  42 603 425  48 707 452 477  99 224 811 715 358 358 222 395 543 480
##  [52] 193 683 710 691 954 700 614 787 835 835 435 309 309 224 460 497 944
##  [69] 530 765 523 171 870 807 469 828 624 200 713 365 781  74 129 129 701
##  [86] 760 193 866 353 168 967 967 920 541 650 148 277  18 667 667 987 120
## [103] 655 655 655 699 311 458 632  84 269  82 280 544  17  17 807 113 136
## [120] 457 702  91 625 767 828 109 860 363 121 657 668 324 382 956 299 403
## [137]  74 928 415 415 127 176 678 179 444 724 724 724 513 743 743  10  10
## [154]  38 760 446 986 894 238 640 110 203 203 113 358 977 294 294 258 577
## [171]  55 708 996 863 627 123 515 515 964 324  24 364 260 618 957  48 107
## [188] 107 266 680 680 680  34 900 537 537 274 437 437 505  19 188 190 467
## [205] 852 803 517  69 399 768 545 408 676 407 972 437 353 371 390 995 995
## [222] 995 458 458 124 216 880 836 878 357 660  44  44 578 293 324  49 646
## [239] 646 256 511 525 339 263  14 257 278  61 840 956
```

```r
yind<-seq(1,250,by=3)
c(yVec[yind])
```

```
##  [1] 709 517 437 783 671 860 581 347 279 974 216 776 538 460 985 248 317
## [18] 288 687 957 938 101 615 285 106 414 881 488 484 791 246 643 845 553
## [35] 465  87 993 116 473 635 310 428 965  19 489 803 604 800 175 516 902
## [52] 689 881 593 835 398 358 850 791 915 665 167 866 942 320 482 216 488
## [69] 681 273 884 970 469 717 127 952 284 695 325 777 792  72 738 791
```

```r
1+sum(cumprod((seq(2,38,b=2)/seq(3,39,b=2))))
```

```
## [1] 6.976346
```