

exercise1__vector.R

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```
"name: Han Xiao
assignment1, MA415"

## [1] "name: Han Xiao\nassignment1, MA415"

#3 try R by itself
b <- scan()
length(b)

## [1] 0

sum(b)

## [1] 0

mean(b)

## [1] NaN

c <- scan("read_this_1.txt")
write.table(c, file = "read_this_1.csv", row.names=FALSE, col.names = FALSE)
d <- scan("read_this_1.csv")

#basic R exercise1
#1
a <- 1:20
y <- 20:1
z <- append(a,19:1)
tmp <- c(4,6,3)
tmp1 <- rep(tmp, 10)
tmp2 <- rep(tmp, times = 10, len = 31)
tmp3 <- rep(tmp, c(10,20,30))

#2
x <- seq(3,6,by=.1)
vectorcos <- exp(x)*cos(x)

#3
(.1^seq(3,36,by=3))*(0.2^seq(1,34,by=3))

## [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

(2^seq(1,25))/(1:25)

## [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
```

```
#4
e <- seq(10,100)
sum(e~3+(4*(e~2)))
```

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

```
f <- seq(1,25)
sum(((2^f)/f)+((3^f)/(f^2)))
```

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

```
#5
labs <- paste(c("label "), 1:30, sep="")
```

```
labs2 <- paste(c("fn"), 1:30, sep="")
```

```
#6
set.seed(50)
xVec <- sample(0:999, 250, replace=T)
yVec <- sample(0:999, 250, replace=T)
```

```
 #(a)
yVec[2:250]/xVec[1:249]
```

```
## [1] 1.230226e+00 7.208238e-01 2.585000e+00 8.096480e-01 1.812865e+00
## [6] 9.931818e+00 1.356223e+00 2.430341e-01 1.864286e+01 8.205607e+00
## [11] 1.207692e+00 2.494424e+00 1.421875e-01 5.389610e+00 3.104693e+00
## [16] 4.038462e-01 9.197605e-01 1.596154e+00 5.148649e+00 2.797619e-01
## [21] 5.633117e-01 1.186528e+00 5.633803e-03 3.313539e-01 1.330097e+00
## [26] 1.073846e+00 1.688042e+00 2.155642e+00 8.611111e-01 5.869565e-01
## [31] 2.388268e+00 1.992647e+00 1.775744e+00 3.527508e-01 3.247748e+00
## [36] 8.580542e-01 2.743802e+00 4.422254e-02 1.233244e+00 1.161572e+00
## [41] 2.526171e+00 1.178230e+00 3.417266e-01 7.580645e+00 4.509091e+00
## [46] 3.528571e-01 9.266247e-01 6.921397e-01 1.178121e+00 1.170610e-01
## [51] 2.891566e-01 5.620915e-02 8.998435e-01 2.297659e+00 4.860335e-01
## [56] 5.011765e-01 1.338462e+00 1.819048e+00 1.538160e+00 3.526316e+00
## [61] 7.404844e-01 1.419847e+00 5.126904e-01 5.641026e-01 4.968992e+00
## [66] 1.618421e+01 1.364641e+00 8.196721e+00 2.095588e+00 2.966102e-02
## [71] 1.737673e+00 1.065327e-01 4.977307e-01 5.378378e+00 4.281282e-01
## [76] 3.662162e+00 8.675799e-01 9.215481e-01 1.529141e+00 2.311715e-01
## [81] 8.987109e-01 6.882353e+00 8.820059e-01 1.031983e+00 1.512868e+00
## [86] 2.252632e+01 7.910000e+02 1.955882e-01 9.310987e-02 3.813953e-01
## [91] 1.041968e-01 7.558140e-01 7.765700e-01 1.025000e+00 1.443750e+01
## [96] 2.874150e+00 4.289855e+00 5.464684e-01 1.778135e+00 1.220060e+00
## [101] 1.489109e+00 4.823651e-01 2.848101e-02 9.575000e+01 3.625000e+00
## [106] 7.366589e-01 2.570000e+01 1.617264e+00 4.380952e-01 2.603399e+00
## [111] 1.321185e-01 3.111111e+00 3.554404e+00 4.185841e+00 1.841463e+00
## [116] 1.590062e+00 6.978022e+00 7.769328e-01 1.486486e+00 3.144016e-01
## [121] 6.714744e-01 4.444444e+01 7.970205e-01 1.341155e+00 5.475728e-01
## [126] 2.097826e+00 1.673004e-01 7.857143e+00 2.500000e-01 2.902344e+00
## [131] 1.713092e+00 2.587302e+00 7.620818e-01 4.245077e-01 8.111111e+00
## [136] 3.459854e+00 1.399632e+00 1.864198e+00 1.096591e+00 8.574423e-01
## [141] 1.478743e+00 4.825000e+00 5.115385e-01 1.005747e+00 1.235417e+01
## [146] 4.433735e-01 7.298444e-01 4.592000e-01 1.628302e+00 2.216216e+00
## [151] 9.027778e-01 9.821429e-01 1.744304e+00 3.162743e-01 1.690821e-02
```

```
## [156] 1.911063e+00 6.358108e+00 3.153584e+00 8.984848e-01 1.823684e+01
## [161] 2.043796e+00 3.727679e+00 7.417840e-01 3.028264e-01 5.827233e-01
## [166] 1.600000e+00 2.481586e+00 9.649596e-01 2.159353e-01 4.668142e-01
## [171] 1.048089e+00 1.251302e+00 2.008850e+00 3.896552e+00 1.981172e+00
## [176] 2.387755e+00 4.575000e+01 2.522727e-01 1.483333e+00 6.676707e-01
## [181] 1.030201e+00 2.235294e+00 1.855556e-01 6.981758e-01 4.017991e-01
## [186] 1.100381e+00 5.174897e-01 1.811816e+00 2.017131e+00 1.817901e+00
## [191] 5.614224e-01 2.935780e+00 1.161644e+00 1.317123e-02 8.426573e-01
## [196] 1.778571e+00 4.504425e+00 3.076923e-01 0.000000e+00 1.925926e-01
## [201] 7.746032e+00 1.354267e+00 1.247582e+00 1.526906e+00 1.551595e+00
## [206] 4.368421e-01 4.278997e-01 1.530909e+00 3.202312e-01 2.032184e+00
## [211] 1.337325e-01 1.330344e+00 7.822581e+00 2.857143e+01 1.086957e-02
## [216] 1.522727e+00 3.452381e+00 1.208413e+00 1.434000e+02 6.129780e-01
## [221] 4.953488e-01 1.058333e+00 4.106796e+00 1.228070e-01 3.282759e+01
## [226] 2.378906e+00 1.460177e-01 4.813559e+00 1.657948e+00 3.180851e+00
## [231] 5.472441e+00 2.441860e-01 7.792553e-01 1.900585e+00 3.777209e-01
## [236] 7.758621e-01 7.063636e+00 8.495298e-01 1.954386e+00 2.073298e+00
## [241] 1.705882e+01 1.942928e+00 1.141046e-01 3.101523e+00 4.765363e+00
## [246] 1.354128e+00 2.804878e+00 8.789474e-01 3.323529e+00
```

#(b)

```
sin(yVec[1:249])/cos(xVec[2:250])
```

```
## [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
```

```
##(c)
```

```
xVec[1:248]+(2*xVec[2:249])-xVec[3:250]
```

```
## [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
```

```
##(d)
```

```
sum(exp(-xVec[2:250])/(xVec[1:249]+10))
```

```
## [1] 0.01269872
```

```
##7
```

```
##(a)
```

```
vec1 <- yVec[yVec>600]
```

```
##(b)
```

```
yindex <- match(vec1,yVec)
```

```
##(c)
```

```
xvalue <- xVec[yindex]
```

```
##(d)
```

```
xMean = mean(xVec)
```

```
xVec2 = abs(xVec-xMean)^.5
```

```
#(e)
sortedY <- sort(yVec,decreasing = TRUE)
maxY <- sortedY[1]
lowerVal <- maxY-200
length(xVec[maxY>xVec & xVec>lowerVal])
```

```
## [1] 38
```

```
#(f)
length(xVec[xVec%%2 == 0])
```

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

```
#(g)
sortedYincrease <- sort(yVec,decreasing = FALSE)
yindex2 <- match(sortedYincrease,yVec)
sort(xVec)[yindex2]
```

```
## [1] 710 63 811 700 544 359 458 224 113 171 457 55 862 308 900 789 311
## [18] 311 713 765 364 38 160 124 866 197 256 382 277 277 852 299 299 403
## [35] 20 661 178 515 523 625 501 469 537 627 179 82 82 99 541 274 650
## [52] 390 614 61 309 136 129 368 668 44 44 781 69 69 578 446 870 224
## [69] 530 168 828 920 944 339 278 543 425 8 148 691 928 256 200 200 110
## [86] 995 59 624 373 49 257 257 807 505 72 258 42 435 667 667 699 842
## [103] 193 193 193 18 353 113 358 828 34 399 701 280 275 275 461 702 222
## [120] 676 707 405 525 10 322 688 840 120 109 260 353 76 957 263 174 964
## [137] 48 683 517 517 880 497 865 977 408 206 206 206 14 603 603 365 365
## [154] 203 324 743 415 655 996 38 954 638 638 395 176 543 324 324 894 74
## [171] 127 1 652 836 107 987 444 444 358 480 363 48 511 93 956 324 24
## [188] 24 190 294 294 294 963 660 437 437 477 91 91 357 285 878 760 678
## [205] 585 148 724 339 860 631 986 84 42 533 669 5 618 621 29 238 238
## [222] 238 137 137 803 537 646 121 376 657 554 17 17 193 545 680 640 19
## [239] 19 863 189 188 632 452 807 74 123 216 371 269
```

```
#(h)
indexPos <- seq(1,250,by=3)
yVec[indexPos]
```

```
## [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
```

```
#8
sum(cumprod(seq(2,38,by=2)/seq(3,39,by=2)))+1
```

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