

# A1.R

*kaylaippongi*

*Mon Jan 22 19:41:40 2018*

```
#Assignment 1
#Kayla Ippongi
```

```
#Part 3
```

```
x <-scan(nmax = -1, text = "2 0 9 7 1 5 2 2 3 3 2 2 2 3 2 8 0 1 3 4 6")
length(x)
```

```
## [1] 21
```

```
sum(x)
```

```
## [1] 67
```

```
mean(x)
```

```
## [1] 3.190476
```

```
x <-scan(file = "/Users/kaylaippongi/Desktop/read_this_1.txt")
f = read.delim("/Users/kaylaippongi/Desktop/read_this_1.txt")
write.table(f, file="/Users/kaylaippongi/Desktop/read_this_1.csv",sep=",",col.names=FALSE,row.names=FALSE)
MyData <- read.csv(file="/Users/kaylaippongi/Desktop/read_this_1.csv", sep = "")
```

```
#####
```

```
#Part 4 - Exercises
```

```
#####
```

```
#Problem 1
```

```
a <- seq(1, 20, by=1)
b <- rev(a)
c <- c(1:20, 19:1)
tmp <- c(4,6,3)
e <- rep(tmp, times=10)
f <- rep(tmp, len = 31)
g <- rep(tmp, c(10,20,30))
output<-list(a,b,c,e,f,g)
print(output)
```

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

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

```
##
```

```
## [[2]]
```

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

```
##
```

```
## [[3]]
```

```
## [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
```

```
##
```

```
## [[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 6 3
```

```
##
```

```
## [[5]]
```

```
## [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]]
## [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 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 3 3 3 3 3 3 3
```

#### *#Problem 2*

```
x <- seq(from = 3.0, to = 6.0, length.out = 30)
h <- exp(x)*cos(x)
print(h)
```

```
## [1] -19.884531 -22.258425 -24.649651 -27.005433 -29.261710 -31.342054
## [7] -33.156648 -34.601336 -35.556804 -35.887923 -35.443323 -34.055254
## [13] -31.539802 -27.697537 -22.314685 -15.164898 -6.011744 5.388004
## [19] 19.280158 35.907867 55.505242 78.289718 104.453059 134.150908
## [25] 167.490788 204.518492 245.202804 289.418541 336.927923 387.360340
```

#### *#Problem 3*

##### *#Part a*

```
x <- c(0.1,0.2)
i <- rep(x, times = 12)
j <- c(3,1,6,4,9,7,12,10,15,12,18,16,21,19,
      24,22,27,25,30,28,33,31,36,34)
result <- i^j
print(result)
```

```
## [1] 1.000000e-03 2.000000e-01 1.000000e-06 1.600000e-03 1.000000e-09
## [6] 1.280000e-05 1.000000e-12 1.024000e-07 1.000000e-15 4.096000e-09
## [11] 1.000000e-18 6.553600e-12 1.000000e-21 5.242880e-14 1.000000e-24
## [16] 4.194304e-16 1.000000e-27 3.355443e-18 1.000000e-30 2.684355e-20
## [21] 1.000000e-33 2.147484e-22 1.000000e-36 1.717987e-24
```

##### *#Part b*

```
denominator <- c(1:25)
result <- (((2)^denominator)/denominator)
print(result)
```

```
## [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
```

#### *#Problem 4*

##### *#Part a*

```
i <- c(10:100)
result <- sum(i^3 + 4*(i^2))
print(result)
```

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

##### *#Part b*

```
j <- c(1:25)
result2 <- sum((2^j)/j) + (3^j)/(j^2)
print(result)
```

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

```
#Problem 5
```

```
#Part a
```

```
x <-c(1:30)
```

```
paste("label", sep = " ", x)
```

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

```
#Part b
```

```
paste("fn", sep = "", x)
```

```
## [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"
```

```
#Problem 6
```

```
set.seed(50)
```

```
xVect <- sample(0:999, 250, replace=T)
```

```
yVect <- sample(0:999, 250, replace=T)
```

```
#Part a
```

```
result_a <- yVect - xVect
```

```
print(result_a)
```

```
## [1] 1 434 115 -250 108 886 -262 302 115 676 488 202 31 14
## [15] 138 184 -562 404 507 213 -569 154 -481 -838 -30 -239 121 717
## [29] 230 -89 -142 447 376 158 -4 94 417 -369 -342 2 169 81
## [43] 707 2 650 -452 -707 426 -396 37 -902 -477 -596 276 329 -251
## [57] -502 432 444 520 360 -227 733 -484 201 603 -109 927 364 -659
## [71] -479 -114 -555 255 -569 266 -115 -386 229 41 -322 471 -222 -170
## [85] -60 804 427 111 -404 -595 -445 -616 -308 -117 731 399 776 -511
## [99] 130 -115 310 -212 -167 10 742 -775 625 -357 153 15 41 44
## [113] 31 573 391 -171 421 -154 169 -326 -314 401 263 -126 228 -178
## [127] 702 2 254 -237 384 426 -318 158 95 529 405 436 428 -284
## [141] -132 640 512 -41 127 178 -523 -109 -243 456 686 -29 -175 -288
## [155] -519 -447 733 648 264 555 556 56 -17 -111 -458 -147 519 505
## [169] -508 -265 -600 82 622 478 313 898 97 35 -258 -284 -229 564
## [183] -102 -436 -246 -519 -106 46 361 618 -339 412 -45 -563 -559 202
## [197] 385 -193 -747 -405 15 -133 324 199 148 637 -555 -2 -444 -158
## [211] 383 -602 766 956 -520 -298 385 -233 627 -146 -331 306 -79 447
## [225] 20 696 -69 40 -213 636 471 437 -313 122 -456 -575 565 -180
## [239] 528 175 758 177 152 -125 432 308 615 -415 430 613
```

```
#Part b
```

```
result_b <- sin(yVect)/cos(xVect)
```

```
print(result_b)
```

```
## [1] 2.02224118 0.73968009 1.52945836 1.08735281 1.42036850
## [6] 0.08847263 -71.75899159 -1.75965837 0.19887866 -0.68867562
## [11] -1.10346427 -0.61666901 -1.52167866 -3.42170793 0.35537857
## [16] 0.84243010 0.39758743 1.08970839 1.12635241 10.14928967
## [21] 0.12746796 -4.79219922 0.32996237 -0.75787347 1.30991968
## [26] -0.54757257 1.08425361 0.12947238 -0.96401439 -0.62382798
## [31] 0.70309169 0.50942082 -0.65595693 0.04247691 1.90448080
```

```
## [36] -4.00639404 14.56327813 0.92876667 0.61186365 1.24070688
## [41] -6.03040679 -0.35832744 -32.11768687 2.15248877 43.33854286
## [46] -0.22017777 1.84394289 -1.19716653 -0.29933282 -2.92966766
## [51] 0.24688637 -38.55875997 2.69212918 0.10364309 0.85473844
## [56] 1.47871163 -2.07165736 -0.98805976 0.09360676 -1.10967079
## [61] 0.97397918 30.67068598 -0.14607958 0.57387175 0.13493108
## [66] 0.12024696 -4.99875777 -3.87259442 0.76364893 15.93204208
## [71] -0.75457827 -1.54187008 -2.41949323 4.44066360 1.01515599
## [76] 0.67661739 -1.08593420 -1.69908732 8.19023718 -1.55646283
## [81] -1.00707220 3.15805397 -0.72018468 0.84193590 -0.22103754
## [86] -0.09823146 1.25262125 -4.08478811 -0.88893147 0.46652380
## [91] 0.82608346 -0.25383317 -5.27407661 0.88653353 0.17921727
## [96] 3.72439497 0.08889620 -0.68826374 -0.92361424 -0.19900142
## [101] 1.38794248 1.02746487 -0.05161370 5.16142318 -1.22943275
## [106] -2.28926258 -0.46222186 3.17876321 -0.69141192 -1.00979278
## [111] -13.27270954 -0.24467433 3.93126785 0.90991087 1.03397865
## [116] 15.26050437 -0.07996892 -0.43288100 0.74421774 0.29289038
## [121] -2.21727311 -1.39332814 -0.91450986 1.43510474 1.02488134
## [126] -2.80890859 -0.80841107 -0.04425644 -0.16059274 -3.76663351
## [131] 1.52980298 -0.78042342 0.95756502 6.72751593 -17.63864391
## [136] 1.22093897 0.78392512 0.28676946 0.72901085 -1.12883797
## [141] 0.69986489 -0.91630052 1.01225144 -2.47731549 1.25149056
## [146] 0.72411963 -0.98646483 -0.71357003 1.50029807 4.94640133
## [151] 0.49443189 -0.37565996 0.13253965 0.83721068 4.76667873
## [156] -1.44296451 -1.03780715 1.47839784 0.37645012 0.72209540
## [161] 2.87696138 0.66384767 0.76144921 38.54157545 3.18437146
## [166] -12.54976486 -2.35133916 0.50460855 -0.29910650 -1.07783748
## [171] -0.55051589 8.22889069 -0.33574968 -1.84806391 -0.70931651
## [176] -3.26677853 -1.69009620 -0.76221705 -1.10310314 -0.91533184
## [181] 3.95398337 -1.18003547 0.53525009 -0.48387737 0.04788876
## [186] 26.48066032 2.77855928 -3.33178453 2.15339808 0.50268724
## [191] 2.98975610 0.83754480 -0.51028283 0.13378488 0.43154465
## [196] 1.05521895 1.00309162 -0.42595063 -6.84587078 0.00000000
## [201] 0.52133101 -1.70311929 3.92988906 -0.83154363 1.38401860
## [206] -10.40226625 -1.00116743 2.83651590 -0.05456952 4.65763832
## [211] 11.15798675 0.86648198 8.63571342 4.99641348 0.96268119
## [216] -0.54822504 1.15437050 11.00904435 -1.81212089 -1.11094305
## [221] 1.33916876 -1.16810067 4.34655509 0.79059444 1.27497233
## [226] 2.44458539 -0.54176617 1.29585328 1.17561576 0.89236686
## [231] 3.83037757 -0.70295997 0.30553050 -3.43646161 3.19670009
## [236] 0.31239096 -0.42854781 2.27786529 -0.98357751 -2.76018329
## [241] -0.36919280 1.45298083 0.75537730 -0.41916040 -1.00171748
## [246] 15.06322256 -0.30501941 -0.56373684 1.26567417 1.31370513
```

*#Part c*

```
result_c <- xVect + 2*xVect - xVect
print(result_c)
```

```
## [1] 1416 874 400 1534 1026 88 1398 1292 84 214 780 538 1280 154
## [15] 554 1352 1670 728 148 336 1232 386 1420 1684 618 1300 1154 514
## [29] 648 736 716 816 874 1236 444 1254 242 1402 746 916 726 1672
## [43] 556 186 110 1400 1908 916 1426 1606 1992 1530 1278 598 716 850
## [57] 1430 1050 1022 532 1156 1310 394 1170 258 76 1448 122 272 1888
## [71] 1014 1990 1322 148 1934 296 1314 1912 1304 1912 1086 34 678 938
## [85] 1088 38 2 1360 1074 1290 1382 1376 1656 1520 96 588 138 1614
```

```
## [99] 622 1336 1010 1928 1264 16 48 1724 20 1228 1680 706 1756 144
## [113] 386 226 164 644 182 1578 888 1972 1248 36 1074 1108 1030 920
## [127] 526 84 152 512 718 378 1614 914 198 548 1086 648 352 954
## [141] 1082 320 520 348 96 830 1414 1250 1060 814 432 448 790 1954
## [155] 1656 922 296 586 1320 76 274 448 1704 1486 1366 1090 706 742
## [169] 1732 904 1622 1536 678 406 956 98 40 1760 960 1992 1788 714
## [183] 1800 1206 1334 1574 1944 914 934 648 1856 218 730 1974 1144 560
## [197] 226 1404 1926 810 126 1242 1034 892 1066 380 1276 550 1730 870
## [211] 1002 1338 248 28 1840 616 168 1046 10 1726 1720 240 412 798
## [225] 58 512 1356 118 994 376 254 516 752 342 1562 1740 220 1914
## [239] 570 764 68 806 1262 394 358 1090 246 1520 476 356
```

```
#Part d
sum( (exp(-xVect+1))/(xVect +10))
```

```
## [1] 0.09218706
```

```
print(sum( (exp(-xVect+1))/(xVect +10)))
```

```
## [1] 0.09218706
```

```
#Problem 7
#Part a
result_7a <- xVect[(xVect>600)]
print(result_7a)
```

```
## [1] 708 767 699 646 640 676 835 616 710 842 650 618 627 701 836 700 954
## [18] 713 803 996 765 639 715 655 724 944 995 661 967 657 956 652 956 680
## [35] 645 691 688 828 760 807 668 964 632 862 614 840 878 789 986 624 807
## [52] 707 625 977 828 660 852 743 683 866 811 768 880 996 894 900 603 667
## [69] 787 972 928 987 702 963 621 638 865 669 920 863 860 678 781 870 957
## [86] 631 760
```

```
#Part b
result_7b <- which(yVect>600)
print(result_7b)
```

```
## [1] 1 2 5 6 8 10 11 13 16 18 27 28 32 33 34 36 42
## [18] 43 45 48 50 55 58 59 60 61 63 66 67 68 72 79 80 86
## [35] 88 94 95 96 97 101 102 105 107 109 111 114 118 119 120 123 125
## [52] 127 131 132 134 136 137 138 139 142 143 150 151 154 157 158 159 161
## [69] 163 164 167 168 172 173 174 175 176 178 180 181 182 183 187 189 190
## [86] 203 204 205 206 211 213 214 219 220 224 226 227 230 232 237 238 239
## [103] 241 243 245 246 247 249 250
```

```
#Part c
result_7c <- xVect[which(yVect>600)]
print(result_7c)
```

```
## [1] 708 437 513 44 646 107 390 640 676 364 577 257 408 437 618 627 836
## [18] 278 55 458 803 358 525 511 266 578 197 38 724 61 995 652 956 19
## [35] 680 760 48 294 69 505 964 24 10 840 878 113 789 444 986 537 515
## [52] 263 359 189 457 274 543 324 176 160 260 407 216 977 148 293 660 137
## [69] 852 743 353 371 768 339 203 478 49 880 996 894 357 900 972 467 324
## [86] 517 446 533 190 501 124 14 5 863 399 256 678 188 258 110 957 285
## [103] 34 631 179 545 123 238 178
```

#Part d

```
result_7d <-c(abs(xVect-mean(xVect)))^0.5)
print(result_7d)
```

```
## [1] 16.0044994 3.8543482 15.8699716 17.7522956 7.8194629 20.1954450
## [7] 15.7208142 13.9335566 20.2449006 18.5702989 7.8648585 13.5224258
## [13] 13.7165593 19.3611983 13.2233127 14.9714395 19.5740645 9.3731532
## [19] 19.4385185 16.8480266 12.8118695 16.0890025 16.0668603 19.7520632
## [25] 11.9522383 14.0763632 11.1867779 13.9590831 11.3073427 9.1572922
## [31] 9.6879306 6.6223863 3.8543482 12.8896858 15.1610026 13.2341981
## [37] 18.1894475 15.7842960 8.8800901 2.4787093 9.4263461 19.5995918
## [43] 13.1854465 18.9434949 19.9212449 15.7525871 22.4085698 2.4787093
## [49] 16.1599505 18.7388367 23.3268943 17.6958752 13.6800585 12.3634947
## [55] 9.6879306 5.1822775 16.2217138 8.5524266 7.6905136 13.6329014
## [61] 11.2313846 14.2528594 15.9642100 11.5388041 17.9681941 20.3434510
## [67] 16.4967876 19.7700784 17.7723381 22.1843188 7.4259006 23.3054500
## [73] 14.4618118 19.4385185 22.6967839 17.4314658 14.3228489 22.4531512
## [79] 14.1472259 22.4531512 9.5469367 20.8532012 10.6233705 4.1405314
## [85] 9.5991666 20.8051917 21.2333700 15.1044364 9.2273506 13.8976257
## [91] 15.4642814 15.3669776 19.3944322 17.5540309 20.0961688 12.5640758
## [97] 19.5667064 18.8452647 11.8682770 14.7018366 7.2899931 22.6305988
## [103] 13.4217734 21.0678903 20.6846803 20.2520122 21.0203711 12.7335777
## [109] 19.7013705 9.9426355 20.6432556 19.4898948 16.0890025 18.4080417
## [115] 19.2316406 11.3954377 18.9962101 18.3614814 2.8028557 23.1115556
## [121] 13.1203658 20.8292103 9.2273506 10.1066315 7.9463199 2.8537694
## [127] 13.7424889 20.2449006 19.3870060 13.9948562 9.6361818 16.2128344
## [133] 18.8452647 2.2680388 18.7844617 13.3362663 9.5469367 11.3073427
## [139] 16.6089133 5.0143793 9.4416100 17.0837935 13.8512093 16.6690132
## [145] 20.0961688 6.0709143 15.9732276 13.1584194 8.8399095 6.6974622
## [151] 15.3576040 15.0948998 7.5402918 22.9160206 19.3944322 3.0239048
## [157] 17.4314658 12.6038089 14.4271965 20.3434510 17.7441821 15.0948998
## [163] 20.0035997 17.0629423 15.2034207 9.6511139 9.9426355 8.9919964
## [169] 20.3505282 0.3794733 18.9510950 17.7804387 10.6233705 15.7751704
## [175] 5.1131204 20.0712730 20.7811453 20.6916408 5.3050919 23.3268943
## [181] 21.0272205 9.7394045 21.1694119 12.2940636 14.6677878 18.3069386
## [187] 22.8066657 2.2680388 3.8915293 11.3073427 21.8207241 18.5163711
## [193] 9.3196566 23.1331796 10.9610219 13.1093860 18.4080417 15.8159413
## [199] 22.6084940 6.8451443 19.7194320 13.0055373 8.0711833 2.4199174
## [205] 9.0079964 16.1819653 13.6434600 13.2987217 20.3259440 4.1056059
## [211] 7.0102782 14.7358067 18.1067943 20.9250090 21.6366356 11.9939985
## [217] 19.1795725 8.4346903 21.1389688 20.2766861 20.2025741 18.2169152
## [223] 15.6797959 7.2702132 20.5634627 13.9948562 15.0380850 19.8205953
## [229] 6.7189285 16.2436449 18.0237621 13.9232180 8.7095350 16.7587589
## [235] 18.1423262 20.4485696 18.4893483 22.4754088 12.9172753 8.3579902
## [241] 20.4415264 6.9897067 13.3844686 15.9642100 16.5183534 9.6511139
## [247] 18.1343872 17.5540309 14.6238162 16.5485951
```

#Part e

```
result_7e <-which(yVect<(min(200)))
print(result_7e)
```

```
## [1] 9 14 21 24 39 44 51 53 56 64 71 73 83 89 90 92 104
## [18] 106 112 116 128 130 135 140 144 145 147 152 156 170 177 184 195 200
## [35] 201 207 212 216 223 225 228 233 244
```

```
#Part f
result_7f <- sum(1-xVect%%2)
print(result_7f)
```

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

```
#Part g
result_7g <- sort(order(yVect)[xVect])
print(result_7g)
```

```
## [1] 2 4 8 13 19 25 35 35 37 44 45 50 53 60 71 74 75
## [18] 83 88 90 91 92 98 98 99 101 102 103 116 121 129 131 134 134
## [35] 135 135 136 136 145 145 148 149 153 155 156 157 161 171 185 186 188
## [52] 196 196 198 200 201 206 207 208 211 211 215 217 220 221 234 241 241
## [69] 242 243 244 247
```

```
#Part h
indexes <-seq(from=1, to=250, by = 3)
result_7h <-yVect[indexes]
print(result_7h)
```

```
## [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
```

```
#Problem 8
num <- seq(from = 2, to= 38, by =2)
denom <- seq(from =3, to = 39, by =2)
print(1+sum(cumprod(num/denom)))
```

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