HW4

# 1 Create the vectors

# a) (1,2,3,...,19,20)

# b) (20,19,...,2,1)

# c) (1,2,3,...,19,20,19,18,...,2,1)

# d) (4, 6, 3) and assign it to the name tmp.

# For parts (e), (f) and (g) look at the help for the function rep.

# e) (4,6,3, 4,6,3,...,4,6,3) where there are 10 occurrences of 4.

# f) (4,6,3, 4,6,3,...,4,6,3,4) where there are 11 occurrences of 4, 10 occurrences of 6 and 10 occurrences of 3.

# g) (4,4,...,4, 6,6,...,6, 3,3,...,3) where there are 10 occurrences of 4, 20

# occurrences of 6 and 30 occurrences of 3.

#a  
(1:20)

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

#b  
(20:1)

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

#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

#d  
tmp <- c(4,6,3)

# using repitition functions

#e  
rep(c(4,6,3), 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

#f  
rep(c(4,6,3), len=31)

## [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

#g  
rep(c(4,6,3), c(10,20,30))

## [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

# 2 Create a vector of the values of (e^x)cos(x) at x = 3,3.1,3.2,...,5.9,6.

#using in-buit sequence function  
x <- seq(3,6,0.1)  
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

# 3

#a  
(0.1^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

#b  
c <- (1:25)  
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

# 4

#a  
i <- (10:100)  
y <- i^3+4i^2  
sum(y)

## [1] 25499019+0i

#b  
i <- (1:25)  
y <- 2^i/i+3^i/i^2  
sum(y)

## [1] 2129170437

# 5 Use the function paste to create the following character vectors of length 30:

# a) ("label 1", "label 2", ....., "label 30"). Note that there is a single space between label and the number following.

# b) ("fn1", "fn2", ..., "fn30"). In this case, there is no space between fn and the number following.

#a  
paste("label",1:30)

## [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"

#b  
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"

# 6 Execute the following lines which create two vectors of random integers which are chosen with replacement from the integers 0, 1, . . . , 999. Both vectors have length 250.

xVec <- sample(0:999, 250, replace=T)  
yVec <- sample(0:999, 250, replace=T)  
#(a)   
yVec[-1] - xVec[-length(xVec)]

## [1] 142 -637 4 591 230 -353 -170 -283 -799 -14 -418 966 770 267  
## [15] -472 84 316 582 464 -282 15 789 662 957 197 -672 -891 484  
## [29] 451 4 623 565 169 -426 30 -457 -73 -503 -720 87 110 424  
## [43] 304 -899 -55 434 -34 -76 -369 -8 154 77 443 -36 681 197  
## [57] 52 352 17 -93 -114 419 567 -228 38 666 -12 145 -374 7  
## [71] -910 25 584 -319 -550 111 -33 100 11 -704 135 -313 238 15  
## [85] -60 282 -219 -143 755 -252 -94 360 82 415 -360 613 615 245  
## [99] 94 -308 398 -324 592 -770 -258 0 -138 -523 559 -174 -159 -566  
## [113] -575 328 -430 511 289 -590 -265 -235 269 83 200 -171 -520 385  
## [127] -466 95 -183 658 -254 16 700 -201 137 -749 -578 -326 30 694  
## [141] 152 556 -21 249 -317 610 209 -269 696 159 308 288 50 359  
## [155] 27 304 -331 330 -37 -90 -67 598 -466 45 503 53 -340 -494  
## [169] -896 -239 338 -5 -177 458 -608 128 -511 -236 78 190 204 -512  
## [183] 182 -200 439 22 -322 -777 493 77 165 85 -281 -264 425 -136  
## [197] 6 -67 561 -178 -548 -29 -649 -580 -98 332 687 292 -714 873  
## [211] -89 296 -609 -516 407 -83 -264 487 40 423 166 124 -361 551  
## [225] 79 20 -158 103 -72 -614 287 631 254 601 -640 194 -111 -18  
## [239] 48 661 -17 176 182 846 -758 -539 268 -546 -307

#(b)   
sin(yVec[-length(yVec)]) / cos(xVec[-1])

## [1] 1.267592e+00 1.715745e+00 -2.603134e-02 2.381399e+00 4.305574e-01  
## [6] 5.390712e+00 -2.709880e+00 1.480185e+00 3.889594e+00 9.981496e-01  
## [11] 1.047121e-01 -7.635689e-01 1.395678e+00 -1.786564e+00 -1.678032e+00  
## [16] -2.170839e+00 1.362643e+00 1.751668e+00 2.804415e-02 3.678309e+00  
## [21] 1.611613e-01 9.692080e-01 -1.556511e-01 -1.882265e+00 8.603896e-01  
## [26] -1.355025e+00 4.893861e-01 -1.025682e+00 -6.189929e-01 -1.308630e+00  
## [31] 1.106946e+00 1.446428e+00 1.121932e+00 -2.220144e-01 9.417543e-01  
## [36] 1.066796e+00 -1.946779e+00 1.549078e+00 1.000811e+00 -1.893648e+00  
## [41] -1.935798e+00 2.302993e+00 1.297574e+00 6.091119e-01 1.171504e+01  
## [46] -7.949709e-01 2.999771e+01 -9.851681e+00 -1.476940e+00 8.870388e-02  
## [51] 5.845988e-01 1.690806e+00 -2.518884e+01 -1.012002e+00 9.926058e-02  
## [56] -3.911904e+00 -1.543584e+00 1.002652e-01 -1.919817e+00 4.916883e+00  
## [61] -6.746334e-02 4.642496e+00 7.283999e-01 -1.205891e-01 8.937386e-01  
## [66] -7.342890e-01 -7.780079e-01 -6.997668e-01 -1.248014e+00 2.459659e+00  
## [71] -1.007071e+00 1.176521e+00 -3.576860e+00 -2.527220e+00 -2.717456e-01  
## [76] 2.369684e+00 5.996528e-01 -3.779447e-01 3.917312e-01 1.020103e+00  
## [81] 2.664369e+00 -4.442311e-01 -1.702968e+00 5.462871e-01 4.229887e-01  
## [86] 2.411060e+00 -8.273074e-01 -3.512576e-01 1.261767e+00 -4.334166e-01  
## [91] -1.132542e+00 -7.466096e-01 -2.000589e+00 1.031957e+00 -1.543751e+02  
## [96] 7.576695e-01 -1.392038e+01 -1.563621e+00 1.484499e+00 1.006408e+00  
## [101] 2.947052e+01 8.511036e-01 -1.283640e+00 6.493663e-01 -1.724416e+00  
## [106] 1.019246e+01 -1.106296e+00 1.153174e+00 -2.522622e+00 -1.422209e+00  
## [111] -9.010496e-03 -1.763842e-01 -6.714928e-01 -5.410549e-02 -1.172809e+00  
## [116] -8.452764e-01 -2.245232e+00 -8.694113e-01 2.024929e+01 5.164376e+00  
## [121] 1.395445e+00 2.503858e-01 -3.388668e-01 -1.256298e+00 7.213890e+00  
## [126] -7.863490e-01 7.055974e-01 9.858480e-01 -8.810266e-01 -3.240553e-02  
## [131] 5.807428e-01 -2.035809e-01 -3.544071e-01 -1.177119e+00 6.437936e-01  
## [136] 7.924080e-01 -1.264684e+00 1.415595e+00 -1.546929e+00 -1.109892e+00  
## [141] 1.091917e+00 -2.634159e+01 -6.185331e-01 -6.251502e-01 8.761434e-01  
## [146] -3.650514e-01 -1.165295e+00 8.260910e-01 -3.978371e-01 -1.704939e+00  
## [151] -1.278154e+00 -8.901621e-01 -4.115160e+00 3.310713e-01 7.217265e-01  
## [156] 1.199159e+00 -1.725692e-01 -4.759632e-01 -4.427457e-01 -1.092329e+00  
## [161] -1.043534e+00 -1.008605e+00 -1.670703e+00 -2.063576e+00 -1.149759e-01  
## [166] -2.966659e+00 -3.327719e+00 6.829927e-01 -4.152443e+00 -1.892882e-01  
## [171] 1.312351e+00 5.458260e-01 6.351405e-01 -7.367850e-01 -1.325936e-01  
## [176] -6.583608e-01 5.209544e-02 -1.204010e+00 1.099849e+00 9.731242e-01  
## [181] -8.148152e-01 1.530496e-01 9.280055e-01 2.369497e+00 6.810587e-01  
## [186] -5.823701e+00 7.477350e+00 2.541531e-01 -9.052547e-01 -3.402821e+00  
## [191] -5.132872e-01 -3.607168e-01 -1.144253e-01 1.484077e+01 8.999345e-01  
## [196] -6.963612e-01 1.013279e+00 -8.899071e-02 2.744185e-01 -3.310165e+00  
## [201] 1.690248e+00 -9.888586e-02 -2.622871e-01 -2.284260e+02 1.509206e+00  
## [206] 1.822864e+00 -2.293460e-01 -1.541080e+00 1.032392e+00 1.489717e+00  
## [211] -1.044758e+00 -2.073263e+00 -1.030661e+00 -7.857082e-01 9.457695e-01  
## [216] 1.448484e+00 9.939402e-01 -1.487460e+00 -2.046833e-01 4.400348e-01  
## [221] 1.118575e+00 9.121730e-01 8.512781e-01 -3.732941e-01 -2.271034e+00  
## [226] 9.228932e-02 -7.718890e-01 -4.448547e-01 1.162942e+00 -7.490694e-01  
## [231] 1.196938e+00 1.360342e+00 -1.063454e+00 -1.408575e+00 -1.943117e+00  
## [236] 1.217465e-01 -1.287804e+01 5.400971e-01 1.676606e+00 -2.379292e+01  
## [241] -1.658799e+00 3.311590e-01 -9.637146e-01 -3.720958e-01 -2.059291e+00  
## [246] 7.800461e-01 4.379041e-02 -6.507798e-02 9.267759e-03

#(c)   
xVec[-c(249,250)] + 2\*xVec[-c(1,250)]-xVec[-c(1,2)]

## [1] 853 2379 696 -164 1920 1139 740 2216 420 1770 610 -196 603 1930  
## [15] 1975 1001 334 82 1459 666 174 669 -24 -367 1225 2498 1506 664  
## [29] 151 163 489 79 1846 862 1707 1731 903 1942 1869 669 911 573  
## [43] 1838 2167 627 362 687 1347 140 1142 77 713 878 406 114 993  
## [57] -196 1365 1649 1495 172 -94 1452 2611 947 316 -643 986 1751 2325  
## [71] 1822 -201 791 1918 2034 1231 -534 775 1867 1390 1654 1903 1330 97  
## [85] -25 2014 1546 138 8 1123 1210 1193 150 1583 339 606 488 -39  
## [99] 1147 735 1355 414 1572 1302 1007 1567 2282 594 1071 1900 1852 1998  
## [113] 1248 1799 379 502 1685 2114 1978 1372 1489 1635 1018 1951 791 1502  
## [127] 1169 546 -144 1800 1681 112 516 1291 1563 1323 1790 1673 767 502  
## [141] 648 1028 549 787 444 -418 1160 367 213 639 345 662 -125 1244  
## [155] 534 1475 1996 471 244 1262 712 864 1054 -129 1047 1974 1154 1503  
## [169] 2255 1939 -105 1853 229 1654 1028 577 1947 1098 -178 -66 2147 572  
## [183] 798 1538 262 608 2170 1695 150 -105 1095 1907 1768 1513 278 1426  
## [197] 1868 377 -104 1375 248 962 1866 2224 705 -373 539 2001 281 1329  
## [211] 152 1158 1758 862 682 1321 406 124 556 511 1169 2371 1254 187  
## [225] -272 2104 892 -174 2041 722 90 691 54 1445 1894 429 1054 822  
## [239] 154 637 517 792 -299 1007 2292 1606 1317 1005

#or, for an answer which works whatever the length of xVec,  
xVecLen <- length(xVec)  
xVec[-c(xVecLen-1,xVecLen)] + 2\*xVec[-c(1,xVecLen)] - xVec[-c(1,2)]

## [1] 853 2379 696 -164 1920 1139 740 2216 420 1770 610 -196 603 1930  
## [15] 1975 1001 334 82 1459 666 174 669 -24 -367 1225 2498 1506 664  
## [29] 151 163 489 79 1846 862 1707 1731 903 1942 1869 669 911 573  
## [43] 1838 2167 627 362 687 1347 140 1142 77 713 878 406 114 993  
## [57] -196 1365 1649 1495 172 -94 1452 2611 947 316 -643 986 1751 2325  
## [71] 1822 -201 791 1918 2034 1231 -534 775 1867 1390 1654 1903 1330 97  
## [85] -25 2014 1546 138 8 1123 1210 1193 150 1583 339 606 488 -39  
## [99] 1147 735 1355 414 1572 1302 1007 1567 2282 594 1071 1900 1852 1998  
## [113] 1248 1799 379 502 1685 2114 1978 1372 1489 1635 1018 1951 791 1502  
## [127] 1169 546 -144 1800 1681 112 516 1291 1563 1323 1790 1673 767 502  
## [141] 648 1028 549 787 444 -418 1160 367 213 639 345 662 -125 1244  
## [155] 534 1475 1996 471 244 1262 712 864 1054 -129 1047 1974 1154 1503  
## [169] 2255 1939 -105 1853 229 1654 1028 577 1947 1098 -178 -66 2147 572  
## [183] 798 1538 262 608 2170 1695 150 -105 1095 1907 1768 1513 278 1426  
## [197] 1868 377 -104 1375 248 962 1866 2224 705 -373 539 2001 281 1329  
## [211] 152 1158 1758 862 682 1321 406 124 556 511 1169 2371 1254 187  
## [225] -272 2104 892 -174 2041 722 90 691 54 1445 1894 429 1054 822  
## [239] 154 637 517 792 -299 1007 2292 1606 1317 1005

#(d)   
sum(exp(-xVec[-1])/(xVec[-length(xVec)]+10))

## [1] 2.881549e-05

# 7

xVec <- sample(0:999, 250, replace=T)  
yVec <- sample(0:999, 250, replace=T)  
#(a)   
yVec[yVec>600]

## [1] 762 885 772 950 650 815 836 684 615 942 624 847 697 976 722 864 705  
## [18] 701 704 754 862 814 791 978 652 925 844 727 965 674 871 603 809 790  
## [35] 681 868 871 819 730 993 705 800 964 892 834 630 883 707 750 702 715  
## [52] 892 930 720 995 733 602 624 811 937 912 961 763 799 972 607 886 981  
## [69] 957 942 819 938 961 829 694 782 765 729 737 927 972 665 807 951 976  
## [86] 951 683 750 653 931 871 871 971 607 683 689 716 848

#(b)   
(1:length(yVec))[yVec>600] #or which

## [1] 1 2 4 7 12 14 16 18 20 22 24 26 30 32 37 39 43  
## [18] 47 50 55 56 58 60 64 65 67 70 73 76 77 78 79 80 81  
## [35] 82 87 94 95 97 98 101 102 103 104 108 110 111 119 121 123 125  
## [52] 128 132 134 135 136 137 138 143 145 146 152 153 154 156 157 158 160  
## [69] 161 165 168 169 170 171 173 174 175 184 186 187 189 199 201 206 208  
## [86] 214 219 220 221 223 227 228 230 231 235 239 243 244

(yVec>600)

## [1] TRUE TRUE FALSE TRUE FALSE FALSE TRUE FALSE FALSE FALSE FALSE  
## [12] TRUE FALSE TRUE FALSE TRUE FALSE TRUE FALSE TRUE FALSE TRUE  
## [23] FALSE TRUE FALSE TRUE FALSE FALSE FALSE TRUE FALSE TRUE FALSE  
## [34] FALSE FALSE FALSE TRUE FALSE TRUE FALSE FALSE FALSE TRUE FALSE  
## [45] FALSE FALSE TRUE FALSE FALSE TRUE FALSE FALSE FALSE FALSE TRUE  
## [56] TRUE FALSE TRUE FALSE TRUE FALSE FALSE FALSE TRUE TRUE FALSE  
## [67] TRUE FALSE FALSE TRUE FALSE FALSE TRUE FALSE FALSE TRUE TRUE  
## [78] TRUE TRUE TRUE TRUE TRUE FALSE FALSE FALSE FALSE TRUE FALSE  
## [89] FALSE FALSE FALSE FALSE FALSE TRUE TRUE FALSE TRUE TRUE FALSE  
## [100] FALSE TRUE TRUE TRUE TRUE FALSE FALSE FALSE TRUE FALSE TRUE  
## [111] TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE TRUE  
## [122] FALSE TRUE FALSE TRUE FALSE FALSE TRUE FALSE FALSE FALSE TRUE  
## [133] FALSE TRUE TRUE TRUE TRUE TRUE FALSE FALSE FALSE FALSE TRUE  
## [144] FALSE TRUE TRUE FALSE FALSE FALSE FALSE FALSE TRUE TRUE TRUE  
## [155] FALSE TRUE TRUE TRUE FALSE TRUE TRUE FALSE FALSE FALSE TRUE  
## [166] FALSE FALSE TRUE TRUE TRUE TRUE FALSE TRUE TRUE TRUE FALSE  
## [177] FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE TRUE TRUE  
## [188] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  
## [199] TRUE FALSE TRUE FALSE FALSE FALSE FALSE TRUE FALSE TRUE FALSE  
## [210] FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE TRUE TRUE  
## [221] TRUE FALSE TRUE FALSE FALSE FALSE TRUE TRUE FALSE TRUE TRUE  
## [232] FALSE FALSE FALSE TRUE FALSE FALSE FALSE TRUE FALSE FALSE FALSE  
## [243] TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE

#(c)   
xVec[yVec>600]

## [1] 18 822 339 905 550 797 213 940 892 297 378 783 933 948 584 751 759  
## [18] 137 220 730 227 573 453 895 861 662 767 959 69 972 755 966 804 657  
## [35] 396 108 681 889 20 787 570 295 301 508 524 518 322 521 310 699 989  
## [52] 56 764 684 228 737 295 584 437 463 791 880 504 92 461 753 737 584  
## [69] 894 948 679 820 656 886 36 817 664 499 453 720 339 994 301 870 442  
## [86] 961 364 595 592 12 540 788 514 182 88 39 972 850

#(d)   
sqrt(abs(xVec-mean(xVec)))

## [1] 22.1459703 17.7075125 21.9418322 13.0170657 15.7937963 19.1195188  
## [7] 19.9137139 18.2086792 7.1724473 14.7459825 12.1837597 6.4463943  
## [13] 16.2344079 16.9869362 7.0316428 17.1884845 21.7357770 20.7739260  
## [19] 7.1802507 19.5845858 18.3998913 14.5411141 21.5303507 11.4212083  
## [25] 21.2707311 16.5697314 13.6177825 20.3360763 14.7459825 20.6047567  
## [31] 16.2924522 20.9655909 14.9145566 11.1604659 15.3767357 17.9288594  
## [37] 8.6922954 13.9483332 15.5742095 19.1456522 20.7471444 15.3115643  
## [43] 15.8289608 19.4279181 4.8534524 12.3062586 19.2728825 17.1626338  
## [49] 14.7120359 16.9836392 6.9682135 21.8301626 4.1899881 17.7638960  
## [55] 14.8847573 16.7762928 10.2252628 8.0346749 17.3909172 7.4460728  
## [61] 7.9651742 20.0360675 22.2135994 19.6610274 18.7764746 14.3023075  
## [67] 12.3917715 19.9888969 11.8977309 16.0796766 12.4677183 19.3505555  
## [73] 21.2263044 15.1143640 16.5965057 20.9629196 21.5303507 15.7021018  
## [79] 21.3905587 17.1917422 12.1883551 10.6039615 13.8724187 21.8275972  
## [85] 12.5077576 21.6666564 20.0110969 12.7453521 20.3114746 20.3333224  
## [91] 10.6978503 20.7471444 19.5305914 13.1360572 19.5078446 19.6100994  
## [97] 22.1007692 16.6899970 11.6380411 19.2988083 7.8457632 14.6097228  
## [103] 14.4029164 0.6663332 20.7471444 3.3828982 13.0213671 3.9441095  
## [109] 20.4803320 3.0912781 13.6544498 21.7613419 15.6062808 13.7274907  
## [115] 10.4615486 18.0431705 14.5105479 14.1617795 3.5434447 18.9590084  
## [121] 14.0870153 17.6760855 13.8042023 18.5622197 21.9215875 19.8130260  
## [127] 19.0146259 21.2707311 14.1970419 17.7075125 18.4240061 15.9861190  
## [133] 6.5996970 13.2497547 16.7464623 15.1180687 14.6097228 8.6922954  
## [139] 9.1893417 15.4452582 8.6858506 16.9836392 8.4524553 7.7817736  
## [145] 6.7412165 16.8094021 19.5561755 17.0130538 10.8883424 15.8569858  
## [151] 12.7497451 19.2757879 2.1080797 20.4069596 12.4320553 6.8879605  
## [157] 15.6382864 15.1180687 13.2874377 8.6922954 19.6355800 20.8912422  
## [163] 17.9040777 18.4812337 20.9655909 19.7089827 12.8279383 13.0597090  
## [169] 17.6509490 12.1472631 19.4308003 17.5340811 21.7357770 17.5657622  
## [175] 12.4722091 12.1837597 20.4097036 17.5055420 10.6562658 16.0450615  
## [181] 22.2810233 18.2635155 19.9137139 3.0731092 15.9826156 7.4460728  
## [187] 14.5449648 17.5055420 13.0170657 19.7371730 19.7877740 16.4755577  
## [193] 13.5851389 9.1408971 16.8687877 15.3767357 4.2946478 15.5742095  
## [199] 22.0353353 16.0138690 14.4029164 18.2908720 12.2293091 21.7817355  
## [205] 19.4050509 19.0146259 22.4375578 8.1513189 2.3571169 20.2347226  
## [211] 22.5265177 21.5277495 8.8065884 21.2733636 6.5996970 3.8005263  
## [217] 18.7468397 19.0379621 12.0184858 9.3035477 9.1408971 8.7496286  
## [223] 22.2810233 17.7043497 14.0198431 20.2594176 5.6174727 16.7199282  
## [229] 14.3023075 2.3571169 18.0677613 5.3332917 2.7488179 9.3511497  
## [235] 20.5047312 20.6020387 16.6866414 14.1970419 21.6666564 11.2051774  
## [241] 3.6818474 16.3231124 21.5303507 18.4812337 18.6398498 14.4375898  
## [247] 21.3671711 16.7796305 21.7153402 12.1014049

#(e)   
sum( yVec>max(yVec)-200 )

## [1] 53

#(f)   
sum(xVec%%2==0)

## [1] 131

#(g)   
xVec[order(yVec)]

## [1] 693 713 259 905 34 790 853 107 586 134 15 650 980 146 292 362 78  
## [18] 522 161 316 710 685 219 12 633 850 357 300 127 893 552 136 32 251  
## [35] 233 663 56 713 921 424 678 613 751 793 323 5 291 120 842 497 206  
## [52] 901 157 98 360 27 843 399 627 552 195 824 272 433 220 480 352 514  
## [69] 822 99 532 634 149 45 870 569 560 353 898 291 985 803 922 39 252  
## [86] 346 592 874 242 126 272 1 274 847 202 972 253 89 908 196 900 78  
## [103] 834 201 965 72 421 187 202 131 490 230 494 516 747 709 840 373 237  
## [120] 673 705 280 457 671 95 710 459 772 84 585 703 829 286 752 360 658  
## [137] 243 885 875 257 394 982 925 719 320 169 526 445 622 36 78 557 295  
## [154] 966 753 182 892 378 584 518 550 861 592 994 972 396 364 88 940 39  
## [171] 36 933 137 699 220 759 570 521 989 972 684 584 959 499 20 737 453  
## [188] 310 595 730 18 504 664 339 817 657 453 92 295 301 804 437 573 797  
## [205] 889 679 886 524 213 767 783 850 227 751 108 755 681 540 788 322 822  
## [222] 737 508 56 791 662 720 764 12 463 820 297 948 905 870 961 894 880  
## [239] 656 301 69 514 461 339 948 442 895 584 787 228

#(h)   
yVec[c(T,F,F)]

## [1] 762 772 950 337 519 836 327 942 166 340 559 107 722 564 705 117 67  
## [18] 337 754 814 589 978 925 844 727 965 603 681 296 347 570 871 730 148  
## [35] 964 231 399 575 261 447 750 28 324 310 265 733 187 290 937 99 492  
## [52] 799 607 981 540 229 938 411 765 390 103 729 927 335 7 286 665 258  
## [69] 560 976 373 951 240 750 931 252 166 291 683 503 81 848 414 71

# 8

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

## [1] 6.976346