Assignment One Doc

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Problem 1:

```
print(1:20)
```

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

```
print(20:1)
```

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

```
print(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
```

```
print(c(4, 6, 3))
```

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

```
#e
prob_e <- c(4, 6, 3)
print(rep(prob_e, 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
print(c(rep(prob_e, 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
```

```
#g
four <- rep(4,10)
six <- rep(6,20)
three <- rep(3, 30)
print(c(four, six, three))
```

```
##  [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
```

Problem 2

```
prob_2 <- seq(from = 3, to = 6, by = .1)
ret <- exp(prob_2) * cos(prob_2)
print(ret)
```

```
##  [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
```

```
#Problem 3:
exp_for_one <- seq(from = 3, to = 36, by = 3)
exp_for_two <- seq(from = 1, to = 34, by = 3)
ret <- .1 ^ exp_for_one * .2 ^ exp_for_two
print(ret)
```

```
##  [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
```

```
#3b
exp_and_denom <- 1:25
ret <- (2 ^ exp_and_denom) / exp_and_denom
print(ret)
```

```
##  [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

```
#Problem 4:
i <- 10:100
ret <- (i ^ 3) + (4 * i ^ 2)
print(sum(ret))
```

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

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

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

Problem 5

```
paste('label', 1:30, sep = ' ')
```

```
##  [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"
```

```r
#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"
```

Problem 6

```r
#Problem 6
set.seed(50)
xVec <- sample(0:999, 250, replace = T)
yVec <- sample(0:999, 250, replace = T)
ans6a <- c(yVec[2:250] - xVec[1:249])
#b
ans6b <- c(sin(yVec[1:250]) / cos(xVec[2:249]))
```

```
## Warning in sin(yVec[1:250])/cos(xVec[2:249]): longer object length is not
a
## multiple of shorter object length
```

```r
#c
ans6c <- c(xVec[1:250] + (2 * xVec[2:249]) - xVec[3:248], xVec[2:249] + (2 *
xVec[3:248]) - xVec[4:247])
```

```
## Warning in xVec[1:250] + (2 * xVec[2:249]): longer object length is not a
## multiple of shorter object length

## Warning in xVec[1:250] + (2 * xVec[2:249]) - xVec[3:248]: longer object
## length is not a multiple of shorter object length

## Warning in xVec[2:249] + (2 * xVec[3:248]): longer object length is not a
## multiple of shorter object length

## Warning in xVec[2:249] + (2 * xVec[3:248]) - xVec[4:247]: longer object
## length is not a multiple of shorter object length
```

```r
#d
i <- 1: 249
exp(-xVec[i + 1]) / (xVec[i] + 10)
```

```
##   [1] 2.276077e-193  3.095965e-90  0.000000e+00 2.072573e-226  1.487788e-2
2
##   [6] 4.963218e-306 3.936574e-284  8.764516e-22  6.523597e-49 3.605506e-17
2
##  [11] 3.738732e-120 4.035779e-281  5.577140e-37 5.766460e-123 9.100146e-29
7
##  [16]  0.000000e+00 9.771289e-162  1.946869e-35  1.300912e-75 1.675634e-27
0
##  [21]  2.424324e-87 2.205067e-311  0.000000e+00 7.457023e-138 1.602493e-28
5
##  [26] 3.913272e-254 4.146485e-115 7.279082e-144 4.527768e-163 8.812186e-15
9
```

```
##  [31] 1.745836e-180 3.909625e-193 9.030310e-272 6.147031e-100 2.147197e-27
5
##  [36]  4.428210e-56 2.768834e-307 1.433140e-165 3.235404e-202 4.795758e-16
1
##  [41]  0.000000e+00 2.181542e-124  1.416513e-43  1.261730e-26 1.516873e-30
6
##  [46]  0.000000e+00 1.285435e-202 4.761991e-313  0.000000e+00  0.000000e+0
0
##  [51]  0.000000e+00 3.949339e-281 2.156280e-133 1.077996e-158 7.227654e-18
8
##  [56] 6.933558e-314 1.364769e-231 2.224160e-225 5.765409e-119 3.442551e-25
4
##  [61] 5.857834e-288  4.179895e-89 4.185600e-257  1.590358e-59  2.258369e-1
9
##  [66] 7.754501e-317  4.388747e-30  1.215324e-61  0.000000e+00 6.810034e-22
4
##  [71]  0.000000e+00 8.495352e-291  1.085140e-35  0.000000e+00  5.426529e-6
8
##  [76] 2.950314e-288  0.000000e+00 7.161775e-287  0.000000e+00 1.559981e-23
9
##  [81]  7.486325e-11 2.201947e-149 5.930107e-207 1.157354e-239  1.011335e-1
1
##  [86]  1.268550e-02 4.348702e-297 8.810775e-237 1.386985e-283 1.219752e-30
3
##  [91] 2.289172e-302  0.000000e+00  0.000000e+00  1.850862e-24 3.580918e-13
0
##  [96]  3.554734e-33  0.000000e+00 1.052432e-138 2.425387e-293 7.080386e-22
3
## [101]  0.000000e+00 3.446105e-278  5.225275e-07  2.097297e-12  0.000000e+0
0
## [106]  5.206414e-08 1.101940e-268  0.000000e+00 5.816061e-157  0.000000e+0
0
## [111]  6.058768e-35  1.850764e-86  4.142166e-52  1.985854e-38 1.560950e-14
2
## [116]  9.079545e-43  0.000000e+00 1.865105e-196  0.000000e+00 1.004579e-27
4
## [121]  2.402205e-11 2.171227e-235 4.601185e-244 3.864228e-227 3.194324e-20
3
## [126] 1.283670e-117  2.106052e-21  1.895030e-35 7.693327e-114 4.606800e-15
9
## [131]  2.245518e-85  0.000000e+00 4.122871e-202  2.165357e-46 9.244543e-12
2
## [136] 5.306131e-239 3.514493e-144  1.097551e-79 3.732666e-210 2.286422e-23
8
## [141]  5.911957e-73 7.128297e-116  1.003220e-78  7.745457e-24 1.010095e-18
2
## [146] 2.115497e-310 5.133690e-275 1.049907e-233 3.234090e-180  3.734701e-9
7
## [151] 2.311679e-100 1.214685e-174  0.000000e+00  0.000000e+00 7.362068e-20
4
```

```
## [156]  1.125630e-67 3.573220e-130 7.659481e-290  4.685273e-20  6.613247e-6
2
## [161] 3.554011e-100  0.000000e+00  0.000000e+00 3.162816e-300 2.942891e-24
0
## [166] 8.907481e-157 2.074152e-164  0.000000e+00 5.706766e-200  0.000000e+0
0
## [171]  0.000000e+00 7.641719e-151  1.974216e-91 1.199107e-210  1.074362e-2
4
## [176]  3.493481e-11  0.000000e+00 3.883816e-212  0.000000e+00  0.000000e+0
0
## [181] 1.001617e-158  0.000000e+00 1.450060e-265 3.452392e-293  0.000000e+0
0
## [186]  0.000000e+00 3.430128e-202 3.274614e-206 4.074455e-144  0.000000e+0
0
## [191]  4.894391e-51 2.552508e-161  0.000000e+00 3.844689e-252 4.291628e-12
5
## [196]  2.899516e-52 1.084847e-307  0.000000e+00 1.326240e-179  1.050508e-3
0
## [201] 2.752985e-272 4.674374e-228 3.826929e-197 7.279077e-235  5.613692e-8
6
## [206] 4.159973e-280 5.720612e-123  0.000000e+00 1.380042e-192 5.889854e-22
1
## [211] 5.604937e-294  2.068304e-57  6.205438e-09  0.000000e+00 1.857020e-13
7
## [216]  1.039528e-39 7.777824e-230  1.264155e-05  0.000000e+00  0.000000e+0
0
## [221]  8.813389e-56  2.638720e-92 2.410172e-176  6.219231e-16 1.696477e-11
3
## [226] 1.328800e-297  3.459690e-29 2.073927e-218  4.442521e-85  3.531308e-5
8
## [231] 6.535865e-115 1.892954e-166  1.409471e-77  0.000000e+00  0.000000e+0
0
## [236]  1.919218e-51  0.000000e+00 1.740388e-127 4.262711e-169  4.372215e-1
8
## [241] 2.167061e-177 2.209184e-277  4.336397e-89  8.816930e-81 1.079060e-23
9
## [246]  6.878373e-57  0.000000e+00 5.641864e-107  2.000463e-80
```

Problem 7

```
#Problem 7
pr7a <- yVec[yVec > 600]
#b
pr7b <- which(yVec > 600)
#c
x_vals_over_600 <- which(xVec > 600)
intersect(x_vals_over_600, pr7b)
```

```
##  [1]   1   8  13  16  34  36  42  50  67  72  79  80  88  94 102 109 111
## [18] 118 120 154 159 163 164 172 178 180 181 183 187 220 227 238 243
```

```r
#d
x_bar <- mean(xVec)
ret <- c(sqrt(abs(xVec[1:250] - x_bar)))
#e
yVec[yVec < max(yVec) + 200 & yVec > max(yVec - 200)]
```

```
##  [1] 871 930 948 878 860 974 855 813 917 985 884 840 957 955 938 930 988
## [18] 881 881 997 823 845 815 993 919 800 965 803 948 800 863 902 881 941
## [35] 924 835 872 876 850 961 947 915 921 798 866 828 942 841 827 884 890
## [52] 970 846 952 824 813 853
```

```r
#f
yVec[yVec %% 2 == 0]
```

```
##   [1] 930 948 878 860 768   4 698 974 554 216 776 218 538 332 460 532 248
##  [18] 884 840  94 288 174 786 938 428 930 330 988 500  28 106 398 414 542
##  [35] 570 488 484 428  50 246  72 520 296 752  18 766 368 116 224 686 512
##  [52] 660 310 800 428 282  44 330 194 948 760 604 800 772 184 516 902 220
##  [69]  14 924 280 632 398 872 876 358 850 222 712 798 268 866 828 942 320
##  [86] 424 482 498 216   0  78 488 884 890 970 400  10 290 632 426 846 952
## [103] 284 824 598 792 580  72 738 668
```

```r
#g, not so sure what the question is asking
sort(xVec)
```

```
##   [1]   1   5   8  10  14  17  18  19  20  24  29  34  38  38  42  42  44
##  [18]  48  48  49  55  59  61  63  69  72  74  74  76  77  82  84  91  93
##  [35]  99 107 109 110 113 113 120 121 123 124 127 129 136 137 148 148 160
##  [52] 168 171 174 176 178 179 188 189 190 193 193 197 197 200 203 206 216
##  [69] 222 224 224 238 256 256 257 258 260 263 266 269 274 275 277 278 280
##  [86] 285 293 294 299 308 309 311 322 324 324 324 339 339 353 353 357 358
## [103] 358 359 363 364 365 368 371 373 376 382 390 395 399 403 405 407 408
## [120] 415 425 435 437 437 444 446 452 457 457 458 458 460 461 467 469 477
## [137] 478 480 497 501 505 507 511 513 515 517 523 525 530 533 537 537 541
## [154] 543 543 544 545 545 554 572 577 578 585 603 614 616 618 621 624 625
## [171] 627 631 632 638 639 640 645 646 650 652 655 657 660 661 667 668 669
## [188] 676 678 680 683 688 691 699 700 701 702 707 708 710 713 715 724 743
## [205] 760 760 765 767 768 781 787 789 803 807 807 811 828 828 835 836 840
## [222] 842 852 860 862 863 865 866 870 878 880 894 900 920 928 944 954 956
## [239] 956 957 963 964 967 972 977 986 987 995 996 996
```

```r
#h
ans7h <- c(yVec[1], yVec[4], yVec[7], yVec[10], yVec[13])
```

```r
#Problem 8
x <- seq(2, 38, by=2)
y <- seq(3, 39, by=2)
1 + sum(cumprod(x / y))
```

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