1. Create the vectors
   1. (2, 3, … , 29, 30) and assign it to the name dev.

**Ans:**

> dev=seq(2,30,1)

> dev

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

[28] 29 30

* 1. (30, 29, … , 2) and assign it to the name dev.

**Ans:**

> dev=seq(30,2,-1)

> dev

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

[28] 3 2

* 1. (1, 2, 3, …. , 29, 30, 29, 28, , 2, 1) and assign it to the name dev.

**Ans:**

> dev= c(1:30, seq(29,2-1))

> dev

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

[28] 28 29 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6

[55] 5 4 3 2 1

* 1. (4, 6, 3) and assign it to the name dev.

**Ans:**

> dev=c(4,6,3)

> dev

[1] 4 6 3

For parts (e), (f) and (g)

* 1. (5, 6, 7, 5, 6, 7, , 5, 6, 7) where there are 10 occurrences of 5.

**Ans:**

> a=5:7

> a1=c(rep(a,10))

> a1

[1] 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7

* 1. (5, 6, 7, 5, 6, 7, , 5, 6, 7, 5) where there are 11 occurrences of 5, 10 occurrences of 6 and 10 occurrences of 7.

**Ans:**

> a=5:7

> a1=c(rep(a,10),5)

> a1

[1] 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5 6 7 5

* 1. (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.

**Ans:**

> b=c(rep(4,10),rep(6,20),rep(3,30))

> b

[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 3 3 3 3 3

[41] 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3

1. Create a vector of the values of ex sin(x) at x = 3, 3.1, 3.2, , 6.

**Ans:**

> x=seq(3,6,0.1)

> x

[1] 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9

[21] 5.0 5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 6.0

> y=exp(x)\*sin(x)

> y

[1] 2.8344711 0.9230055 -1.4320654 -4.2769020 -7.6570591 -11.6163451

[7] -16.1954669 -21.4304437 -27.3507725 -33.9773327 -41.3200162 -49.3750762

[13] -58.1221905 -67.5212405 -77.5088155 -87.9944570 -98.8566695 -109.9387348

[19] -121.0443775 -131.9333449 -142.3169809 -151.8538900 -160.1458060 -166.7338044

[25] -171.0950158 -172.6400256 -170.7111690 -164.5819569 -153.4578954 -136.4789910

[31] -112.7242573

1. 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.

set.seed(100)

x <- Sample (0:999, 250, replace=T)

y <- Sample (0:999, 250, replace=T)

> x=sample(0:999,250,replace=TRUE)

> x

[1] 804 774 211 377 311 897 416 835 321 137 617 675 272 186 330 121 235 932 782 451

[21] 110 888 813 196 600 39 473 776 579 321 993 496 681 737 907 441 748 754 445 366

[41] 79 205 885 916 617 366 675 410 669 910 414 152 377 465 244 118 8 650 56 130

[61] 960 259 9 992 652 724 714 825 148 675 846 992 304 145 519 832 918 348 332 838

[81] 446 694 902 29 471 408 336 663 873 86 334 933 918 686 383 8 719 480 3 572

[101] 80 379 999 97 804 84 877 982 609 684 494 275 3 664 548 596 308 897 916 971

[121] 342 928 918 691 769 602 769 97 231 706 28 631 672 452 675 9 63 279 467 776

[141] 366 900 521 289 244 589 380 705 116 598 846 350 316 780 254 840 751 308 458 414

[161] 325 135 910 150 837 544 115 44 282 881 836 57 48 316 131 35 120 567 127 758

[181] 99 229 443 515 924 44 149 848 152 824 863 654 22 997 147 82 797 344 728 341

[201] 860 407 568 901 935 847 414 347 456 903 360 579 628 713 22 496 440 557 175 563

[221] 609 639 792 346 333 987 716 411 570 104 867 477 278 463 41 874 743 72 425 515

[241] 738 268 487 962 841 268 260 913 599 63

> y=sample(0:999,250,replace=TRUE)

> y

[1] 717 742 262 530 804 727 865 46 8 939 241 899 511 696 957 54 129 768 861 727

[21] 904 741 161 482 410 465 443 26 653 390 26 291 0 645 826 754 514 619 397 430

[41] 634 479 559 509 826 560 13 475 36 244 954 269 47 961 41 568 489 815 526 836

[61] 71 745 337 620 717 949 271 971 472 797 908 990 221 192 709 845 43 728 299 257

[81] 980 865 664 868 843 966 913 283 457 868 516 265 868 690 594 923 149 806 311 920

[101] 649 178 441 754 257 998 522 998 402 584 891 853 429 278 891 987 139 540 310 852

[121] 43 372 515 767 287 816 5 22 242 831 74 111 623 671 365 183 26 490 595 956

[141] 358 179 992 30 723 44 282 57 657 900 481 718 670 369 987 357 278 295 725 523

[161] 898 554 180 987 84 280 386 667 532 230 632 538 714 777 175 783 957 881 943 169

[181] 149 151 644 667 669 210 189 477 776 773 525 979 989 526 96 568 140 590 931 199

[201] 408 369 746 112 122 719 860 240 664 318 781 659 234 245 694 243 561 796 621 470

[221] 624 999 760 120 321 772 955 398 194 983 146 807 702 799 530 460 152 998 557 492

[241] 412 257 164 871 631 963 943 955 897 421

* 1. Identify out the values in y which are > 500.

**Ans**

> y[y>500]

[1] 717 742 530 804 727 865 939 899 511 696 957 768 861 727 904 741 653 645 826 754

[21] 514 619 634 559 509 826 560 954 961 568 815 526 836 745 620 717 949 971 797 908

[41] 990 709 845 728 980 865 664 868 843 966 913 868 516 868 690 594 923 806 920 649

[61] 754 998 522 998 584 891 853 891 987 540 852 515 767 816 831 623 671 595 956 992

[81] 723 657 900 718 670 987 725 523 898 554 987 667 532 632 538 714 777 783 957 881

[101] 943 644 667 669 776 773 525 979 989 526 568 590 931 746 719 860 664 781 659 694

[121] 561 796 621 624 999 760 772 955 983 807 702 799 530 998 557 871 631 963 943 955

[141] 897

* 1. Identify the index positions in y of the values which are > 700?

**Ans**

> which(y>700)

[1] 1 2 5 6 7 10 12 15 18 19 20 21 22 35 36 45 51 54 58 60

[21] 62 65 66 68 70 71 72 75 76 78 81 82 84 85 86 87 90 93 96 98

[41] 100 104 106 108 111 112 115 116 120 124 126 130 140 143 145 150 152 155 159 161

[61] 164 173 174 176 177 178 179 189 190 192 193 199 203 206 207 211 218 222 223 226

[81] 227 230 232 233 234 238 244 246 247 248 249

* 1. What are the values in x which are in Same index position to the values in y which are > 400?

**Ans**

> a=x[x>400]

> b=which(y>400)

> c=c(a,b)

> subset(c,x>400 & y>400)

[1] 804 774 617 675 813 496 681 737 441 445 916 675 465 650 960 992 652 846 992 519

[21] 838 902 663 686 877 982 609 494 548 596 897 928 918 706 631 672 675 467 521 846

[41] 780 414 837 836 515 924 848 824 863 728 860 568 935 456 903 628 557 639 792 867

[61] 477 743 913 599 12 13 27 40 45 46 48 56 58 59 60 64 70 72 76 82

[81] 83 85 89 95 96 100 101 103 104 108 109 115 118 123 130 133 134 140 143 150

[101] 151 153 155 162 164 173 183 184 185 189 192 194 198 207 209 211 212 215 221 222

[121] 223 230 234 238 244 250

* 1. How many values in y are within 200?

**Ans 51**

> y[y<200]

[1] 51 70 119 17 137 121 41 94 53 181 3 94 153 14 39 24 54 81 117 191

[21] 158 173 128 97 186 33 87 147 29 176 187 150 119 152 163 138 182 185 125 106

[41] 22 56 155 184 175 174 46 106 71 26 164

* 1. How many numbers in x are divisible by 2?

**Ans 104**

> x[x/2]

[1] 79 461 NA 324 376 NA NA NA 585 989 NA 145 90 785 899 NA NA 167 NA NA

[21] 817 NA NA NA 150 NA 304 197 NA NA NA 972 NA NA NA NA NA NA 813 693

[41] NA NA NA NA NA NA NA 339 62 253 NA NA 87 829 NA 716 NA NA 597 513

[61] NA NA NA 133 NA NA NA NA NA NA NA NA NA NA 689 NA NA 522 NA NA

[81] NA 253 324 867 769 NA 16 NA 549 839 NA NA NA 369 NA NA 909 230 689 NA

[101] NA NA 197 NA 258 NA 279 NA NA NA 435 NA 228 775 80 87 NA NA 735 NA

[121] NA NA 982 NA 461 NA 513 NA 560 822 950 857 212 793 NA 931 263 69 936 766

[141] 904 NA 981 339 NA 936 NA 230 28 NA NA NA NA 302 NA 376 786 366 NA NA

[161] 570 340 NA 95 9 NA 409 NA NA 62 929 966 333 535 NA NA 525 NA NA 966

[181] NA 167 NA 981 NA 775 229 197 NA 627 NA NA NA 560 NA NA 167 183 822 385

[201] 609 NA 638 NA NA NA NA 390 NA 16 NA 652 817 100 NA NA NA NA NA NA

[221] 501 NA NA NA 934 NA NA 865 NA 390 167 390 NA 668 NA 581 477 NA NA 593

[241] NA 366 239 229 689 441 396 NA 682 936

* 1. Sort the numbers in the vector x in the order of increasing values in y.

> sort(x)

[1] 6 7 9 16 16 17 27 28 29 30 42 43 45 50 56 62 66 69 77 79

[21] 80 81 84 86 87 90 95 100 108 118 120 131 133 138 145 147 148 150 154 158

[41] 167 167 173 174 176 183 184 195 197 197 202 206 212 224 228 229 229 230 239 241

[61] 243 253 258 263 270 272 273 277 279 280 284 294 298 302 302 304 308 324 324 333

[81] 333 335 339 340 344 345 354 362 364 366 367 369 370 374 375 376 376 377 384 385

[101] 386 390 392 396 404 408 409 416 420 435 441 452 457 460 461 462 470 475 477 491

[121] 501 506 513 515 522 525 531 535 537 549 560 562 570 572 574 581 583 585 592 593

[141] 593 597 597 602 602 605 608 609 615 625 626 627 638 648 652 653 662 668 672 681

[161] 682 684 689 689 693 696 709 715 716 716 719 725 730 731 733 735 745 747 748 749

[181] 766 769 770 774 775 775 779 785 786 786 787 793 795 798 799 813 813 817 820 821

[201] 822 829 832 836 837 838 839 852 857 860 862 865 867 869 871 885 886 890 890 891

[221] 894 894 899 902 902 903 904 909 909 916 929 930 931 934 936 942 946 950 966 969

[241] 972 972 977 977 981 981 982 986 989 991

> sort(y)

[1] 3 14 17 22 24 26 29 33 39 41 46 51 53 54 56 70 71 81 87 94

[21] 94 97 106 106 117 119 119 121 125 128 137 138 147 150 152 153 155 158 163 164

[41] 173 174 175 176 181 182 184 185 186 187 191 200 203 209 209 211 216 228 235 240

[61] 244 246 246 247 248 253 254 255 258 262 263 264 266 267 270 271 279 283 287 294

[81] 296 298 307 309 320 320 323 325 330 337 341 341 356 364 367 373 379 382 384 386

[101] 387 391 394 399 399 403 403 412 414 415 419 422 423 423 423 424 437 441 454 457

[121] 464 467 468 474 478 479 479 483 485 490 496 498 506 514 519 526 540 541 546 551

[141] 551 557 557 558 565 565 570 571 578 590 596 596 602 603 604 607 618 621 640 658

[161] 659 660 666 671 673 674 678 680 681 682 686 689 691 712 720 724 728 736 744 752

[181] 755 757 758 761 762 770 785 791 798 808 810 814 818 822 825 826 829 831 834 836

[201] 838 838 840 841 843 846 847 852 865 869 870 875 879 880 885 888 891 894 894 900

[221] 900 900 907 908 912 915 920 930 936 938 939 943 944 949 949 950 952 955 961 964

[241] 964 966 966 969 971 977 987 987 990 999

* 1. Create the vector (x1 + 2x2 - x3; x2+ 2x3-x4,, xn-2+ 2xn-1 - xn.)

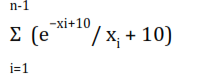
**Ans**

> m=c("x1 + 2x2 - x3", "x2+ 2x3-x4", "xn-2+ 2xn-1 - xn")

> m

[1] "x1 + 2x2 - x3" "x2+ 2x3-x4" "xn-2+ 2xn-1 - xn"

* 1. Calculate



**Ans**

> splsum=function(x){exp(x+10/x+10)}

> splsum(1:10)

[1] 1318815734 24154953 12401566 14650719 24154953 47047424 100792190

[8] 229175811 542181357 1318815734