

```

> #Pregunta 1
> #-----
> #Abrimos archivo variables.csv y lo nombramos como var_df
> var_df <- read.csv("C:\\Users\\usuario\\Documents\\4. UOC\\1º Álgebra Lineal\\Reto 4\\variables.csv")
>
> #Imprimimos archivo para ver su contenido
> fix(var_df)
> var_df
  id rent inc_sal inc_ret inc_emp inc_non inc_oth gini dist8020 mean_age perc_chil per_ret h
ome_size
1  1 20066  11510  2362  898  590  4707 39.7 3.4 39.5 13.8 11.6
  2.17
2  2 18811  9521  4529  502  550  3709 35.6 3.7 43.0 20.2 23.3
  2.80
3  3 20724 13116  3631  640  574  2763 31.8 2.6 41.5 17.3 17.7
  2.36
4  4 15213  9483  2663  721  595  1753 32.5 3.0 40.5 17.6 15.7
  2.35
5  5 4821  1916  1201  343 1259  44 34.2 2.8 30.7 34.1 6.4
  3.46
6  6 9553  4981  2487  613  883  589 28.5 2.8 40.0 23.4 18.5
  2.79
7  7 30340 15996  4993  574  636  8141 33.3 2.7 44.2 18.7 23.2
  2.41
8  8 25658 15572  3997  656  796  4636 35.1 3.2 41.8 17.4 17.0
  2.30
9  9 25572 12486  5688  562  658  6177 33.4 2.7 44.6 17.4 24.4
  2.40
10 10 24310 12519  5053  613  618  5508 33.7 3.1 44.7 15.9 24.2
  2.35
11 11 26194 14825  5165  643  772  4788 30.0 2.7 43.4 17.2 23.0
  2.26
12 12 22029 11395  5342  564  501  4228 34.0 3.1 43.9 17.0 22.9
  2.38
13 13 25916 14898  4505  590  660  5264 35.5 3.0 41.8 18.0 18.0
  2.56
14 14 25471 13482  4829  641  607  5912 32.9 2.6 43.2 16.6 19.9
  2.47
15 15 19826 12336  4051  707  615  2117 29.3 2.6 42.8 13.5 16.3
  2.50
16 16 19866 13906  3214  677  523  1546 27.2 2.3 40.5 18.7 14.3
  2.40
17 17 17174 12461  2285  763  516  1150 30.4 2.7 37.5 20.7 10.9
  2.51
18 18 24186 12350  6541  549  647  4100 32.1 2.9 46.9 15.1 29.4
  2.38
19 19 22362 10573  5842  665  524  4758 37.0 3.4 43.9 17.4 24.7
  2.33
20 20 15093 9193  2694  738  741  1728 31.4 2.9 40.4 19.1 15.7
  2.67
21 21 28792 18156  4500  606  510  5020 30.3 2.4 41.2 19.0 16.5
  2.78
22 22 34639 17957  8228  375  441  7638 30.5 2.6 45.0 15.4 22.8
  3.01
23 23 24488 15370  3835  689  493  4101 32.1 2.6 41.6 19.9 18.4
  3.04
24 24 22618 15689  3305  702  452  2470 26.4 2.3 40.4 21.6 15.2
  2.56
25 25 22451 16204  2405  648  515  2679 27.3 2.3 37.5 24.1 10.4
  2.66
26 26 31563 16706  4633  548  592  9083 38.8 3.1 41.5 18.0 17.9
  2.84
27 27 20447 12889  4072  615  625  2247 30.9 2.7 41.7 18.8 18.4
  2.49
28 28 15831 12302  1110  685  643  1090 29.6 2.5 33.3 26.5 6.1
  2.63
29 29 22824 11759  4407  733  572  5352 36.9 3.5 41.7 15.8 18.6
  2.22
30 30 26607 13465  5283  731  598  6530 33.9 2.8 43.7 13.9 21.0
  2.15
31 31 22107 13497  3227  660  690  4032 33.4 3.2 40.3 16.8 14.7
  2.36
32 32 25540 15790  4022  539  584  4606 27.5 2.4 42.1 17.7 17.1

```

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      2.51
33 33 26814    16411    4800    520    579    4503 27.7    2.4    41.2    19.8    16.1
      2.53
34 34 18480    10741    4747    550    741    1700 32.2    3.0    42.8    19.0    21.0
      2.62
35 35 12225     7500    2886    625    528     686 33.1    2.9    40.6    18.0    16.9
      2.69
36 36 13462     9315    2204    728    517     697 30.4    2.7    39.0    18.2    12.7
      2.73
37 37  9395     5533    2333    627    568     335 30.5    2.7    38.8    22.1    16.0
      3.13
38 38 13732     9090    2441    701    653     846 31.1    2.7    38.5    20.4    13.4
      2.95
39 39 11387     7136    2352    715    537     647 31.8    2.6    38.1    21.7    14.1
      2.96
40 40 11536     7047    2601    722    524     642 31.5    3.0    38.9    20.8    14.4
      3.11
41 41 10450     5730    2963    633    682     443 28.9    2.7    40.2    20.8    18.6
      3.04
42 42 10219     6626    1970    625    514     484 32.4    3.0    37.1    21.5    12.0
      3.17
43 43 13729     7526    3984    663    550    1007 32.2    3.0    42.0    17.2    21.0
      2.57
44 44 15300     8720    4254    691    549    1086 31.4    2.7    42.8    16.7    20.5
      2.71
45 45 13898     9605    2169    693    567     865 29.0    2.6    39.7    19.6    12.3
      2.69
46 46 12539     8973    1672    759    514     621 29.8    2.9    37.1    22.1    10.0
      2.83
47 47 22855    15290    3271    665    630    2999 29.2    2.4    39.5    19.2    12.8
      2.49
48 48 22607    14163    4685    675    672    2411 30.6    2.7    42.3    16.0    18.5
      2.56
49 49 19766    11983    2052    937    440    4354 37.0    3.4    39.3    14.0    10.4
      2.10
50 50 18049    10907    2633    765    644    3099 39.3    3.4    40.7    17.3    14.2
      2.26
51 51 31114    16551    6118    490    596    7359 31.9    2.5    44.2    17.6    22.6
      2.85
52 52 14229     9066    2829    732    664     937 31.6    2.8    41.9    16.6    17.6
      2.32
53 53 13592     8303    2734    751    613    1190 28.0    2.7    39.9    20.1    14.8
      2.63
54 54 19252    11109    3942    680    563    2957 28.3    2.3    42.7    20.7    20.1
      2.57
55 55 12003     6413    2883    719    804    1185 33.7    3.1    41.4    21.0    19.5
      2.85
56 56 23778    17076    2901    756    499    2547 25.4    2.1    39.8    20.5    11.4
      2.73
57 57 17836    11784    3660    633    657    1102 24.9    2.1    42.0    18.6    15.8
      2.69
58 58 15530    10457    2544    750    736    1044 25.4    2.2    39.8    22.0    15.5
      2.70
59 59 15116     9763    3083    694    590     985 24.1    2.1    41.4    18.4    16.0
      2.75
60 60 16783    10478    3350    663    708    1584 28.1    2.5    41.6    19.0    16.2
      2.75
61 61 13650     7382    3994    709    835     730 26.5    2.3    45.9    12.7    26.7
      2.13
>
> #Comprobamos que var_df es de tipo dataframe
> class(var_df)
[1] "data.frame"
>
> #Eliminamos la primera columna llamada 'id'. Para ello vamos a usar el paquete "dplyr"
> library(dplyr)
> var_df <- select(var_df, -id)
>
> #Comprobamos que realmente se ha eliminado la columna
> fix(var_df)
> var_df
      rent inc_sal inc_ret inc_emp inc_non inc_oth gini dist8020 mean_age perc_chil per_ret home
size
1  20066  11510   2362    898    590    4707 39.7    3.4    39.5    13.8    11.6

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| | | | | | | | | | | | |
|------|-------|-------|------|-----|------|------|------|-----|------|------|------|
| 2.17 | | | | | | | | | | | |
| 2 | 18811 | 9521 | 4529 | 502 | 550 | 3709 | 35.6 | 3.7 | 43.0 | 20.2 | 23.3 |
| 2.80 | | | | | | | | | | | |
| 3 | 20724 | 13116 | 3631 | 640 | 574 | 2763 | 31.8 | 2.6 | 41.5 | 17.3 | 17.7 |
| 2.36 | | | | | | | | | | | |
| 4 | 15213 | 9483 | 2663 | 721 | 595 | 1753 | 32.5 | 3.0 | 40.5 | 17.6 | 15.7 |
| 2.35 | | | | | | | | | | | |
| 5 | 4821 | 1916 | 1201 | 343 | 1259 | 44 | 34.2 | 2.8 | 30.7 | 34.1 | 6.4 |
| 3.46 | | | | | | | | | | | |
| 6 | 9553 | 4981 | 2487 | 613 | 883 | 589 | 28.5 | 2.8 | 40.0 | 23.4 | 18.5 |
| 2.79 | | | | | | | | | | | |
| 7 | 30340 | 15996 | 4993 | 574 | 636 | 8141 | 33.3 | 2.7 | 44.2 | 18.7 | 23.2 |
| 2.41 | | | | | | | | | | | |
| 8 | 25658 | 15572 | 3997 | 656 | 796 | 4636 | 35.1 | 3.2 | 41.8 | 17.4 | 17.0 |
| 2.30 | | | | | | | | | | | |
| 9 | 25572 | 12486 | 5688 | 562 | 658 | 6177 | 33.4 | 2.7 | 44.6 | 17.4 | 24.4 |
| 2.40 | | | | | | | | | | | |
| 10 | 24310 | 12519 | 5053 | 613 | 618 | 5508 | 33.7 | 3.1 | 44.7 | 15.9 | 24.2 |
| 2.35 | | | | | | | | | | | |
| 11 | 26194 | 14825 | 5165 | 643 | 772 | 4788 | 30.0 | 2.7 | 43.4 | 17.2 | 23.0 |
| 2.26 | | | | | | | | | | | |
| 12 | 22029 | 11395 | 5342 | 564 | 501 | 4228 | 34.0 | 3.1 | 43.9 | 17.0 | 22.9 |
| 2.38 | | | | | | | | | | | |
| 13 | 25916 | 14898 | 4505 | 590 | 660 | 5264 | 35.5 | 3.0 | 41.8 | 18.0 | 18.0 |
| 2.56 | | | | | | | | | | | |
| 14 | 25471 | 13482 | 4829 | 641 | 607 | 5912 | 32.9 | 2.6 | 43.2 | 16.6 | 19.9 |
| 2.47 | | | | | | | | | | | |
| 15 | 19826 | 12336 | 4051 | 707 | 615 | 2117 | 29.3 | 2.6 | 42.8 | 13.5 | 16.3 |
| 2.50 | | | | | | | | | | | |
| 16 | 19866 | 13906 | 3214 | 677 | 523 | 1546 | 27.2 | 2.3 | 40.5 | 18.7 | 14.3 |
| 2.40 | | | | | | | | | | | |
| 17 | 17174 | 12461 | 2285 | 763 | 516 | 1150 | 30.4 | 2.7 | 37.5 | 20.7 | 10.9 |
| 2.51 | | | | | | | | | | | |
| 18 | 24186 | 12350 | 6541 | 549 | 647 | 4100 | 32.1 | 2.9 | 46.9 | 15.1 | 29.4 |
| 2.38 | | | | | | | | | | | |
| 19 | 22362 | 10573 | 5842 | 665 | 524 | 4758 | 37.0 | 3.4 | 43.9 | 17.4 | 24.7 |
| 2.33 | | | | | | | | | | | |
| 20 | 15093 | 9193 | 2694 | 738 | 741 | 1728 | 31.4 | 2.9 | 40.4 | 19.1 | 15.7 |
| 2.67 | | | | | | | | | | | |
| 21 | 28792 | 18156 | 4500 | 606 | 510 | 5020 | 30.3 | 2.4 | 41.2 | 19.0 | 16.5 |
| 2.78 | | | | | | | | | | | |
| 22 | 34639 | 17957 | 8228 | 375 | 441 | 7638 | 30.5 | 2.6 | 45.0 | 15.4 | 22.8 |
| 3.01 | | | | | | | | | | | |
| 23 | 24488 | 15370 | 3835 | 689 | 493 | 4101 | 32.1 | 2.6 | 41.6 | 19.9 | 18.4 |
| 3.04 | | | | | | | | | | | |
| 24 | 22618 | 15689 | 3305 | 702 | 452 | 2470 | 26.4 | 2.3 | 40.4 | 21.6 | 15.2 |
| 2.56 | | | | | | | | | | | |
| 25 | 22451 | 16204 | 2405 | 648 | 515 | 2679 | 27.3 | 2.3 | 37.5 | 24.1 | 10.4 |
| 2.66 | | | | | | | | | | | |
| 26 | 31563 | 16706 | 4633 | 548 | 592 | 9083 | 38.8 | 3.1 | 41.5 | 18.0 | 17.9 |
| 2.84 | | | | | | | | | | | |
| 27 | 20447 | 12889 | 4072 | 615 | 625 | 2247 | 30.9 | 2.7 | 41.7 | 18.8 | 18.4 |
| 2.49 | | | | | | | | | | | |
| 28 | 15831 | 12302 | 1110 | 685 | 643 | 1090 | 29.6 | 2.5 | 33.3 | 26.5 | 6.1 |
| 2.63 | | | | | | | | | | | |
| 29 | 22824 | 11759 | 4407 | 733 | 572 | 5352 | 36.9 | 3.5 | 41.7 | 15.8 | 18.6 |
| 2.22 | | | | | | | | | | | |
| 30 | 26607 | 13465 | 5283 | 731 | 598 | 6530 | 33.9 | 2.8 | 43.7 | 13.9 | 21.0 |
| 2.15 | | | | | | | | | | | |
| 31 | 22107 | 13497 | 3227 | 660 | 690 | 4032 | 33.4 | 3.2 | 40.3 | 16.8 | 14.7 |
| 2.36 | | | | | | | | | | | |
| 32 | 25540 | 15790 | 4022 | 539 | 584 | 4606 | 27.5 | 2.4 | 42.1 | 17.7 | 17.1 |
| 2.51 | | | | | | | | | | | |
| 33 | 26814 | 16411 | 4800 | 520 | 579 | 4503 | 27.7 | 2.4 | 41.2 | 19.8 | 16.1 |
| 2.53 | | | | | | | | | | | |
| 34 | 18480 | 10741 | 4747 | 550 | 741 | 1700 | 32.2 | 3.0 | 42.8 | 19.0 | 21.0 |
| 2.62 | | | | | | | | | | | |
| 35 | 12225 | 7500 | 2886 | 625 | 528 | 686 | 33.1 | 2.9 | 40.6 | 18.0 | 16.9 |
| 2.69 | | | | | | | | | | | |
| 36 | 13462 | 9315 | 2204 | 728 | 517 | 697 | 30.4 | 2.7 | 39.0 | 18.2 | 12.7 |
| 2.73 | | | | | | | | | | | |
| 37 | 9395 | 5533 | 2333 | 627 | 568 | 335 | 30.5 | 2.7 | 38.8 | 22.1 | 16.0 |
| 3.13 | | | | | | | | | | | |
| 38 | 13732 | 9090 | 2441 | 701 | 653 | 846 | 31.1 | 2.7 | 38.5 | 20.4 | 13.4 |

```

2.95
39 11387      7136      2352      715      537      647 31.8      2.6      38.1      21.7      14.1
2.96
40 11536      7047      2601      722      524      642 31.5      3.0      38.9      20.8      14.4
3.11
41 10450      5730      2963      633      682      443 28.9      2.7      40.2      20.8      18.6
3.04
42 10219      6626      1970      625      514      484 32.4      3.0      37.1      21.5      12.0
3.17
43 13729      7526      3984      663      550      1007 32.2      3.0      42.0      17.2      21.0
2.57
44 15300      8720      4254      691      549      1086 31.4      2.7      42.8      16.7      20.5
2.71
45 13898      9605      2169      693      567      865 29.0      2.6      39.7      19.6      12.3
2.69
46 12539      8973      1672      759      514      621 29.8      2.9      37.1      22.1      10.0
2.83
47 22855     15290      3271      665      630      2999 29.2      2.4      39.5      19.2      12.8
2.49
48 22607     14163      4685      675      672      2411 30.6      2.7      42.3      16.0      18.5
2.56
49 19766     11983      2052      937      440      4354 37.0      3.4      39.3      14.0      10.4
2.10
50 18049     10907      2633      765      644      3099 39.3      3.4      40.7      17.3      14.2
2.26
51 31114     16551      6118      490      596      7359 31.9      2.5      44.2      17.6      22.6
2.85
52 14229      9066      2829      732      664      937 31.6      2.8      41.9      16.6      17.6
2.32
53 13592      8303      2734      751      613      1190 28.0      2.7      39.9      20.1      14.8
2.63
54 19252     11109      3942      680      563      2957 28.3      2.3      42.7      20.7      20.1
2.57
55 12003      6413      2883      719      804      1185 33.7      3.1      41.4      21.0      19.5
2.85
56 23778     17076      2901      756      499      2547 25.4      2.1      39.8      20.5      11.4
2.73
57 17836     11784      3660      633      657      1102 24.9      2.1      42.0      18.6      15.8
2.69
58 15530     10457      2544      750      736      1044 25.4      2.2      39.8      22.0      15.5
2.70
59 15116      9763      3083      694      590      985 24.1      2.1      41.4      18.4      16.0
2.75
60 16783     10478      3350      663      708      1584 28.1      2.5      41.6      19.0      16.2
2.75
61 13650      7382      3994      709      835      730 26.5      2.3      45.9      12.7      26.7
2.13
>
> #Convertimos el vector var_df en una matriz
> var_matrix <- as.matrix(var_df)
>
> #Comprobamos que ahora el vector var_df es una matriz
> class(var_matrix)
[1] "matrix" "array"
>
> #Buscamos la dimensión que tiene la matriz, y podemos observar que nos devuelve
> # 61, 12, es decir, contamos con 61 observaciones que coinciden con el número de
> #secciones censales, y 12 columnas que coinciden con el número de variables:
> dim(var_matrix)
[1] 61 12
>
> #-----
> #Pregunta 2
> #-----
>
> #En este intento, la variable V es igual a la variable 'mean_age'. Para calcular
> #la razón de 'mean_age' vamos a detectar los valores máximo y mínimo de la variable.
>
> #Asignamos al vector V la columna 'mean_age' de la matriz var_df
> V <- var_matrix[,9]
> #Definimos vector máximo como el valor máximo de V, y definimos el vector mínimo
> #como el valor mínimo de V
> maximo <- max(V)
> minimo <- min(V)

```

```
> fix(maximo)
> maximo
[1] 46.9
> fix(minimo)
> minimo
[1] 30.7
>
> #Calculamos la razón entre el valor Máximo y el valor Mínimo de V (M/m)
> razon <- maximo/minimo
> fix(razon)
> razon
[1] 1.527687
> #Redondeamos resultado a dos decimales
> round(razon, digits=2)
[1] 1.53
>
>
>
>
>
```