

## Calculating per cents

Summary: When working with data, we frequently should perform simple calculations to give the numbers meaning. In this instance, we will work with Canadian Citizenship and Immigration Canada's [Refugee claimants by top 50 countries of citizenship](#).

The “Refugee claimants by top 50 countries of citizenship” table tracks individuals who successfully make their asylum claims from within Canada, and then become so-called protected persons. They must then apply for permanent resident status. This is why the total numbers are lower than the overall yearly numbers for refugees, which include claims made outside Canada.

For this tutorial, we'll download the table to figure out the percent of totals (a skill also covered in “Calculating Rates and Percentages in a Spreadsheet” tutorial ), and per cent increases.

What you will learn:

1. Percent of total
2. Percent increases

### **Task 1: Percent of total:**

Once you download the table, paste the website's URL into the first available cell in the first row, and save the table as an updated Excel version (with the “xlsx” extension). Be sure to work from the updated version, leaving the older version of Excel as a backup.

Before working with the table, we always want to do the necessary clean-up, which means that the first row contains the column labels and there is nothing at the bottom. If there is a row that contains the total for each column, which there is in this case, you want to make sure that it is separated from the entire table so that those numbers don't get caught up in the sorting and skew your results.

Because column A doesn't have a title, let's give it one. Call it "Countries".

|                                   | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013 | 2014  | 2015  |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|
| China, People's Republic of       | 1,500 | 1,341 | 1,474 | 1,442 | 1,527 | 1,793 | 1,662 | 771  | 1,190 | 1,498 |
| Hungary                           | 29    | 23    | 307   | 2,537 | 2,350 | 4,451 | 1,879 | 96   | 390   | 986   |
| Pakistan                          | 609   | 356   | 387   | 418   | 516   | 893   | 862   | 631  | 770   | 899   |
| Nigeria                           | 667   | 743   | 759   | 767   | 847   | 677   | 707   | 469  | 580   | 794   |
| Colombia                          | 1,373 | 2,572 | 3,050 | 2,248 | 1,335 | 863   | 694   | 595  | 578   | 696   |
| Iraq                              | 182   | 269   | 290   | 232   | 146   | 156   | 161   | 240  | 576   | 598   |
| Syria                             | 33    | 69    | 64    | 87    | 119   | 176   | 343   | 488  | 565   | 577   |
| Libya                             | 30    | 26    | 21    | 28    | 43    | 181   | 19    | 30   | 157   | 518   |
| Somalia, Democratic Republic of   | 205   | 244   | 498   | 527   | 436   | 427   | 431   | 287  | 330   | 505   |
| Afghanistan                       | 252   | 288   | 429   | 403   | 396   | 417   | 367   | 389  | 467   | 495   |
| India                             | 757   | 540   | 548   | 478   | 521   | 642   | 683   | 211  | 278   | 377   |
| Ukraine                           | 204   | 175   | 186   | 153   | 119   | 127   | 177   | 62   | 360   | 366   |
| Slovak Republic                   | 6     | 7     | 74    | 355   | 263   | 316   | 443   | 33   | 468   | 353   |
| Haiti                             | 708   | 3,240 | 4,247 | 1,438 | 1,060 | 509   | 391   | 331  | 365   | 295   |
| Ethiopia                          | 223   | 162   | 198   | 178   | 146   | 185   | 162   | 135  | 161   | 287   |
| Eritrea                           | 156   | 155   | 222   | 205   | 147   | 180   | 225   | 228  | 254   | 287   |
| Congo, Democratic Republic of the | 412   | 334   | 418   | 310   | 310   | 367   | 354   | 305  | 346   | 285   |
| Turkey                            | 267   | 149   | 235   | 238   | 291   | 329   | 365   | 178  | 175   | 266   |
| Burundi                           | 420   | 275   | 269   | 131   | 135   | 170   | 176   | 195  | 100   | 265   |
| Stateless                         | 184   | 186   | 253   | 184   | 134   | 83    | 86    | 171  | 174   | 263   |
| Venezuela                         | 100   | 141   | 181   | 185   | 145   | 106   | 103   | 27   | 162   | 257   |
| Sri Lanka                         | 859   | 787   | 1,008 | 817   | 1,170 | 634   | 412   | 188  | 197   | 234   |
| Bangladesh                        | 118   | 79    | 92    | 110   | 119   | 118   | 125   | 156  | 323   | 222   |
| Cameroon, Federal Republic of     | 127   | 138   | 143   | 139   | 125   | 115   | 132   | 132  | 171   | 213   |
| United States of America          | 646   | 1,807 | 2,285 | 1,109 | 770   | 621   | 388   | 125  | 163   | 199   |

Create a new column in L and label it "Percent of Total – 2015". Use the formula for calculating the percent of total, which is covered on pages 62 to 65 in The Data Journalist. Because we have inserted a blank row between the bottom of the table and the total, the total for the values in



column K are in K55.

|    |                             |               |               |               |               |               |               |               |               |               |               |
|----|-----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 53 | China, People's Republic of | 13            | 24            | 30            | 137           | 104           | 133           | 113           | 93            | 120           | 11            |
| 54 |                             |               |               |               |               |               |               |               |               |               |               |
| 55 | <b>Total unique persons</b> | <b>22,920</b> | <b>28,496</b> | <b>36,856</b> | <b>33,153</b> | <b>23,130</b> | <b>25,315</b> | <b>20,471</b> | <b>10,372</b> | <b>13,445</b> | <b>16,109</b> |

So, your formula looks like this:

| K           | L                              | M |
|-------------|--------------------------------|---|
| <b>2015</b> | <b>Percent of Total - 2015</b> |   |
| 1,498       | =K3/K\$55                      |   |
| 986         |                                |   |
| 899         |                                |   |
| 794         |                                |   |
| 696         |                                |   |
| 598         |                                |   |

K3 is the first value in column K – “China, People’s Republic of” – and K55 is the total at the bottom of column K. Before pressing enter, we want to anchor the total value in K55 to ensure that the numbers for each country are calculated as a percentage of the same total. To do this, we use a dollar sign at either side of the K in K55.

|             |
|-------------|
| =K3/\$K\$55 |
|-------------|

|  |             |             |             |             |             |             |             |             |             |             |                                |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------------|
| =K3/\$K\$55  |             |             |             |             |             |             |             |             |             |             |                                |
|  | B           | C           | D           | E           | F           | G           | H           | I           | J           | K           | L                              |
| <b>Top 50 countries of citizenship<sup>1</sup>, 2006 to 2015</b> |             |             |             |             |             |             |             |             |             |             |                                |
|  | <b>2006</b> | <b>2007</b> | <b>2008</b> | <b>2009</b> | <b>2010</b> | <b>2011</b> | <b>2012</b> | <b>2013</b> | <b>2014</b> | <b>2015</b> | <b>Percent of Total - 2015</b> |
|  | 1,500       | 1,341       | 1,474       | 1,442       | 1,527       | 1,793       | 1,662       | 771         | 1,190       | 1,498       | 9.3%                           |

Format the number as a percent with one decimal place, and then copy it to the bottom.

|                                   | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013 | 2014  | 2015  | Percent of Total - 2015 |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------------------------|
| China, People's Republic of       | 1,500 | 1,341 | 1,474 | 1,442 | 1,527 | 1,793 | 1,662 | 771  | 1,190 | 1,498 | 9.3%                    |
| Hungary                           | 29    | 23    | 307   | 2,537 | 2,350 | 4,451 | 1,879 | 96   | 390   | 986   | 6.1%                    |
| Pakistan                          | 609   | 356   | 387   | 418   | 516   | 893   | 862   | 631  | 770   | 899   | 5.6%                    |
| Nigeria                           | 667   | 743   | 759   | 767   | 847   | 677   | 707   | 469  | 580   | 794   | 4.9%                    |
| Colombia                          | 1,373 | 2,572 | 3,050 | 2,248 | 1,335 | 863   | 694   | 595  | 578   | 696   | 4.3%                    |
| Iraq                              | 182   | 269   | 290   | 232   | 146   | 156   | 161   | 240  | 576   | 598   | 3.7%                    |
| Syria                             | 33    | 69    | 64    | 87    | 119   | 176   | 343   | 488  | 565   | 577   | 3.6%                    |
| Libya                             | 30    | 26    | 21    | 28    | 43    | 181   | 19    | 30   | 157   | 518   | 3.2%                    |
| Somalia, Democratic Republic of   | 205   | 244   | 498   | 527   | 436   | 427   | 431   | 287  | 330   | 505   | 3.1%                    |
| Afghanistan                       | 252   | 288   | 429   | 403   | 396   | 417   | 367   | 389  | 467   | 495   | 3.1%                    |
| India                             | 757   | 540   | 548   | 478   | 521   | 642   | 683   | 211  | 278   | 377   | 2.3%                    |
| Ukraine                           | 204   | 175   | 186   | 153   | 119   | 127   | 177   | 62   | 360   | 366   | 2.3%                    |
| Slovak Republic                   | 6     | 7     | 74    | 355   | 263   | 316   | 443   | 33   | 468   | 353   | 2.2%                    |
| Haiti                             | 708   | 3,240 | 4,247 | 1,438 | 1,060 | 509   | 391   | 331  | 365   | 295   | 1.8%                    |
| Ethiopia                          | 223   | 162   | 198   | 178   | 146   | 185   | 162   | 135  | 161   | 287   | 1.8%                    |
| Eritrea                           | 156   | 155   | 222   | 205   | 147   | 180   | 225   | 228  | 254   | 287   | 1.8%                    |
| Congo, Democratic Republic of the | 412   | 334   | 418   | 310   | 310   | 367   | 354   | 305  | 346   | 285   | 1.8%                    |
| Turkey                            | 267   | 149   | 235   | 238   | 291   | 329   | 365   | 178  | 175   | 266   | 1.7%                    |
| Burundi                           | 420   | 275   | 269   | 131   | 135   | 170   | 176   | 195  | 100   | 265   | 1.6%                    |
| Stateless                         | 184   | 186   | 253   | 184   | 134   | 83    | 86    | 171  | 174   | 263   | 1.6%                    |
| Venezuela                         | 100   | 141   | 181   | 185   | 145   | 106   | 103   | 27   | 162   | 257   | 1.6%                    |
| Sri Lanka                         | 859   | 787   | 1,008 | 817   | 1,170 | 634   | 412   | 188  | 197   | 234   | 1.5%                    |
| Bangladesh                        | 118   | 79    | 92    | 110   | 119   | 118   | 125   | 156  | 323   | 222   | 1.4%                    |
| Cameroon, Federal Republic of     | 127   | 138   | 143   | 139   | 125   | 115   | 132   | 132  | 171   | 213   | 1.3%                    |
| United States of America          | 646   | 1,807 | 2,285 | 1,109 | 770   | 621   | 388   | 125  | 163   | 199   | 1.2%                    |

You can now sort column L in ascending or descending order. To get the hang of this and determine how those percent of totals have changed over the years, perform the same calculation for each year, meaning that you will have to insert a new column after each year.

## Task 2: Percent increases

Many stories have to do with the rate at which events increase or decrease. In this case, we might find a story in the country that produced refugee claimants at the fastest rate from 2014 to 2015, the most recent year for which the data was available at the time this tutorial was prepared.

Copy and paste the table into a new worksheet.

We'll use column M to create our percent change from 2014 to 2015. Label M3 "Percent Change:14-15", and plug in the formula for percent change, which is covered on page 64 of our textbook.

The screenshot shows the Microsoft Excel interface. The ribbon includes 'Formulas', 'Data', 'Review', 'View', 'Developer', 'Tableau', and a search bar 'Tell me what you want to do'. The 'Review' ribbon is active, showing options for 'Wrap Text', 'Merge & Center', and 'Number' formatting. The formula bar displays the formula  $= (K3 - J3) / J3$ . Below the formula bar, a table is visible with columns G through M. The table contains data for the years 2011 through 2015, along with 'Percent of Total - 2015' and 'Percent Change: 2014:15'. The value 0.258823529 is highlighted in the 'Percent Change: 2014:15' column for the first row.

|  | G     | H     | I    | J     | K     | L                       | M                       |
|--|-------|-------|------|-------|-------|-------------------------|-------------------------|
|  | 2011  | 2012  | 2013 | 2014  | 2015  | Percent of Total - 2015 | Percent Change: 2014:15 |
|  | 1,793 | 1,662 | 771  | 1,190 | 1,498 | 9.3%                    | 0.258823529             |
|  | 4,451 | 1,879 | 96   | 390   | 986   | 6.1%                    |                         |
|  | 893   | 862   | 631  | 770   | 899   | 5.6%                    |                         |

Format the number as a percent change, and then copy the formula to the

bottom of the column.

Refugee claimants by top 50 countries of citizenship\_ForTutorial\_updated.xls

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Font Alignment Number

Percentage

Conditional Formatting

Format as Table

fx  $=(K3-J3)/J3$

| 2010  | 2011  | 2012  | 2013 | 2014  | 2015  | Percent of Total - 2015 | Percent Change: 2014:15 |
|-------|-------|-------|------|-------|-------|-------------------------|-------------------------|
| 1,527 | 1,793 | 1,662 | 771  | 1,190 | 1,498 | 9.3%                    | 25.9%                   |
| 2,350 | 4,451 | 1,879 | 96   | 390   | 986   | 6.1%                    | 152.8%                  |
| 516   | 893   | 862   | 631  | 770   | 899   | 5.6%                    | 16.8%                   |
| 847   | 677   | 707   | 469  | 580   | 794   | 4.9%                    | 36.9%                   |
| 1,335 | 863   | 694   | 595  | 578   | 696   | 4.3%                    | 20.4%                   |
| 146   | 156   | 161   | 240  | 576   | 598   | 3.7%                    | 3.8%                    |
| 119   | 176   | 343   | 488  | 565   | 577   | 3.6%                    | 2.1%                    |
| 43    | 181   | 19    | 30   | 157   | 518   | 3.2%                    | 229.9%                  |
| 436   | 427   | 431   | 287  | 330   | 505   | 3.1%                    | 53.0%                   |
| 396   | 417   | 367   | 389  | 467   | 495   | 3.1%                    | 6.0%                    |
| 521   | 642   | 683   | 211  | 278   | 377   | 2.3%                    | 35.6%                   |
| 119   | 127   | 177   | 62   | 360   | 366   | 2.3%                    | 1.7%                    |
| 263   | 316   | 443   | 33   | 468   | 353   | 2.2%                    | -24.6%                  |
| 1,060 | 509   | 391   | 331  | 365   | 295   | 1.8%                    | -19.2%                  |
| 146   | 185   | 162   | 135  | 161   | 287   | 1.8%                    | 78.3%                   |
| 147   | 180   | 225   | 228  | 254   | 287   | 1.8%                    | 13.0%                   |
| 310   | 367   | 354   | 305  | 346   | 285   | 1.8%                    | -17.6%                  |
| 291   | 329   | 365   | 178  | 175   | 266   | 1.7%                    | 52.0%                   |
| 135   | 170   | 176   | 195  | 100   | 265   | 1.6%                    | 165.0%                  |
| 134   | 83    | 86    | 171  | 174   | 263   | 1.6%                    | 51.1%                   |
| 145   | 106   | 103   | 27   | 162   | 257   | 1.6%                    | 58.6%                   |
| 1,170 | 634   | 412   | 188  | 197   | 234   | 1.5%                    | 18.8%                   |
| 119   | 118   | 125   | 156  | 323   | 222   | 1.4%                    | -31.3%                  |
| 125   | 115   | 132   | 132  | 171   | 213   | 1.3%                    | 24.6%                   |
| 770   | 621   | 388   | 125  | 163   | 199   | 1.2%                    | 22.1%                   |

Now we can sort column L in descending order to see which country experienced the fastest increase.

|                                   | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013 | 2014 | 2015 | Percent of Total - 2015 | Percent Change: 2014-15 |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|------|------|------|-------------------------|-------------------------|
| 1 Yemen                           | 14    | 16    | 24    | 16    | 19    | 18    | 26    | 35   | 42   | 170  | 1.1%                    | 304.8%                  |
| 2 Libya                           | 30    | 26    | 21    | 28    | 43    | 181   | 19    | 30   | 157  | 518  | 3.2%                    | 229.9%                  |
| 3 Burundi                         | 420   | 275   | 269   | 131   | 135   | 170   | 176   | 195  | 100  | 265  | 1.6%                    | 165.0%                  |
| 4 Hungary                         | 29    | 23    | 307   | 2,537 | 2,350 | 4,451 | 1,879 | 96   | 390  | 986  | 6.1%                    | 152.8%                  |
| 5 Bahama Islands, The             | 3     | 10    | 11    | 22    | 22    | 41    | 19    | 11   | 25   | 63   | 0.4%                    | 152.0%                  |
| 6 Nepal                           | 137   | 114   | 86    | 97    | 79    | 35    | 41    | 18   | 38   | 89   | 0.6%                    | 134.2%                  |
| 7 Mali, Republic of               | 20    | 15    | 17    | 12    | 10    | 18    | 40    | 22   | 38   | 85   | 0.5%                    | 123.7%                  |
| 8 Congo, People's Republic of the | 27    | 37    | 58    | 28    | 32    | 24    | 34    | 18   | 35   | 65   | 0.4%                    | 85.7%                   |
| 9 Ethiopia                        | 223   | 162   | 198   | 178   | 146   | 185   | 162   | 135  | 161  | 287  | 1.8%                    | 78.3%                   |
| 0 Jordan                          | 77    | 85    | 112   | 78    | 50    | 66    | 54    | 48   | 64   | 107  | 0.7%                    | 67.2%                   |
| 1 Venezuela                       | 100   | 141   | 181   | 185   | 145   | 106   | 103   | 27   | 162  | 257  | 1.6%                    | 58.6%                   |
| 2 Uganda                          | 160   | 33    | 71    | 54    | 58    | 52    | 49    | 31   | 49   | 76   | 0.5%                    | 55.1%                   |
| 3 Somalia, Democratic Republic of | 205   | 244   | 498   | 527   | 436   | 427   | 431   | 287  | 330  | 505  | 3.1%                    | 53.0%                   |
| 4 Turkey                          | 267   | 149   | 235   | 238   | 291   | 329   | 365   | 178  | 175  | 286  | 1.7%                    | 52.0%                   |
| 5 Stateless                       | 184   | 186   | 253   | 184   | 134   | 83    | 86    | 171  | 174  | 263  | 1.6%                    | 51.1%                   |
| 6 Mexico                          | 4,935 | 7,153 | 9,454 | 7,581 | 1,197 | 649   | 321   | 84   | 80   | 111  | 0.7%                    | 38.8%                   |
| 7 Nigeria                         | 667   | 743   | 759   | 767   | 847   | 677   | 707   | 409  | 580  | 794  | 4.9%                    | 36.9%                   |
| 8 Russia                          | 207   | 197   | 203   | 164   | 158   | 153   | 167   | 99   | 71   | 97   | 0.6%                    | 36.6%                   |

It was the Yemen. In order to express the value in a number that may be more conversational for our story, or story pitch, we might want to calculate it as a ratio. Create new column, which you can call “Ratio: 2014-15”. Divide the values in column J into those of column K, and

format the result as a number with one decimal place.

Refugee Claimants by top 50 countries of citizenship\_for tutorial\_updated.xlsx [Compatibility Mode] - Ex

Formulas Data Review View Developer Tableau Tell me what you want to do

Show Queries From Table Recent Sources Refresh All Connections Properties Edit Links Sort Filter Clear Reapply Advanced Text to Columns Flash Fill Remove Duplicates Data Validation Consolidate Relationships Manage Data Mode

Get & Transform Connections Sort & Filter Data Tools

=K3/J3

| F           | G           | H           | I           | J           | K           | L                       | M                       | N              | O |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------------------|-------------------------|----------------|---|
|             |             |             |             |             |             |                         |                         |                |   |
| <b>2010</b> | <b>2011</b> | <b>2012</b> | <b>2013</b> | <b>2014</b> | <b>2015</b> | Percent of Total - 2015 | Percent Change: 2014:15 | Ratio: 2014-15 |   |
| 19          | 18          | 26          | 35          | 42          | 170         | 1.1%                    | 304.8%                  | 4.0            |   |
| 43          | 181         | 19          | 30          | 157         | 518         | 3.2%                    | 229.9%                  |                |   |
| 135         | 170         | 176         | 195         | 100         | 265         | 1.6%                    | 165.0%                  |                |   |
| 2,350       | 4,451       | 1,879       | 96          | 390         | 986         | 6.1%                    | 152.8%                  |                |   |
| 22          | 41          | 19          | 11          | 25          | 63          | 0.4%                    | 152.0%                  |                |   |
| 79          | 35          | 41          | 18          | 38          | 89          | 0.6%                    | 134.2%                  |                |   |
| 10          | 18          | 40          | 22          | 38          | 85          | 0.5%                    | 123.7%                  |                |   |
| 32          | 24          | 34          | 18          | 35          | 65          | 0.4%                    | 85.7%                   |                |   |



Copy the formula to the bottom.

| M                       | N              | O |  |
|-------------------------|----------------|---|--|
|                         |                |   |  |
| Percent Change: 2014:15 | Ratio: 2014-15 |   |  |
| 304.8%                  | 4.0            |   |  |
| 229.9%                  | 3.3            |   |  |
| 165.0%                  | 2.7            |   |  |
| 152.8%                  | 2.5            |   |  |
| 152.0%                  | 2.5            |   |  |
| 134.2%                  | 2.3            |   |  |
| 123.7%                  | 2.2            |   |  |
| 85.7%                   | 1.9            |   |  |
| 78.3%                   | 1.8            |   |  |
| 67.2%                   | 1.7            |   |  |
| 58.6%                   | 1.6            |   |  |
| 55.1%                   | 1.6            |   |  |
| 53.0%                   | 1.5            |   |  |
| 52.0%                   | 1.5            |   |  |
| 51.1%                   | 1.5            |   |  |
| 38.8%                   | 1.4            |   |  |
| 36.9%                   | 1.4            |   |  |
| 36.6%                   | 1.4            |   |  |
| 35.6%                   | 1.4            |   |  |
| 34.2%                   | 1.3            |   |  |
| 26.1%                   | 1.3            |   |  |
| 25.9%                   | 1.3            |   |  |
| 24.6%                   | 1.2            |   |  |
| 22.3%                   | 1.2            |   |  |
| 22.1%                   | 1.2            |   |  |

So now we can say that the rate of claims of refugees from Yemen increased 4-fold, a more conversational way of saying it than 304%. Sometimes it makes more sense to use percent increases, when the value is, say, 50%. But once something increases by 100 or 200 percent, it makes more sense to say that it doubled or tripled, respectively. Using per cent increases is a good habit because in many instances, the story is not with the country or the entity that has the most, but with the one that is increasing at the fastest rate.