



## think-cell round

think-cell round is an add-in for Microsoft® Excel that ensures consistent rounding for all derived data in your Excel sheets. Using think-cell round, you can focus on the meaning of the data and forget about answering questions regarding miscalculated totals.

### The problem

When data is compiled for a report or PowerPoint presentation, rounding summations in Excel is a frequent problem. It is often desirable but difficult to achieve, that rounded totals match the total of the rounded addends.

Let's look at a simple example:

$$1.5 + 2.6 + 3.6 = 7.7$$

When rounding all numbers to the nearest integer, you get:

$$2 + 3 + 4 = 8$$

For some, this is the most desirable outcome, because each number is as close to the unrounded number as possible. The largest deviation is 0.5, from 1.5 to 2. You can achieve this result in Excel by using "Format Cell" on each value.

But some people object, because the arithmetic is not correct. They propose to add up the rounded values:

$$2 + 3 + 4 = 9$$

You can do this in Excel by using "`=ROUND(x,0)`" on the addends. The problem is that now the largest deviation, from 7.7 to 9, is 1.3, much larger than before.

The spreadsheets to the right show the same steps as above on a more complex example with row and column sums. In the second sheet, totals that appear to be "miscalculated" are highlighted. In the third sheet, totals that deviate from the original value by 1 or more are highlighted.

				Total:
	4.3	15.3	21.4	41.0
	10.5	7.6	3.7	21.8
	17.5	18.3	19.5	55.3
	11.5	17.4	20.9	49.8
Total:	43.8	58.6	65.5	167.9

Sample sheet with precise data

				Total:
	4	15	21	41
	11	8	4	22
	18	18	20	55
	12	17	21	50
Total:	44	59	66	168

Using "Format Cell" on the sample sheet, "miscalculated" totals highlighted

				Total:
	4	15	21	40
	11	8	4	23
	18	18	20	56
	12	17	21	50
Total:	45	58	66	169

Using "`=ROUND(x, 0)`" on the sample sheet, totals with a deviation  $\geq 1$  highlighted



## The solution

Is there some middle-ground between correct rounding and correct arithmetic? Yes, there is, because you can round our simple example as follows:

$$1 + 3 + 4 = 8$$

The sum adds up and the maximum deviation is now 0.5, from 1.5 to 1. Rounding in such a way is trivial in this case, but becomes very complicated if you sum over larger two- or even three-dimensional tables. This process is automated by think-cell round.

Using think-cell round, you can achieve consistently rounded totals with minimal "tuning": while most values are rounded to the nearest integer, a few values are rounded in the opposite direction, thus maintaining correct calculations without accumulating rounding errors.

Since there are many possibilities to achieve correctly rounded totals by changing values, the software picks a solution that requires the minimum number of values to be changed and the minimum deviation from the precise values. The sheet on the right shows an optimal solution for our complex sample sheet with "tuned" values highlighted.

## Key benefits

### Reduced cost

Stop rounding numbers on the white board. This add-in will relieve you of hours of tedious work.

### Ease of use

think-cell round's functionality is as easy to use as any other Excel function. Plus, its toolbar allows easy and quick access to its calculation power for several cells at a time.

### Full flexibility

Simply apply think-cell round to your problem and see how it solves it in seconds, or control the rounding decision on a cell-by-cell basis using additional think-cell round functions.

### Fewer errors

With think-cell round, your numbers are always rounded correctly, and you will no longer worry about getting comments like "The percentages do not add up", or "Why does three plus five equal nine?"

				Total:
	4	15	22	41
	10	8	4	22
	18	18	19	55
	12	17	21	50
Total:	44	58	66	168

Sample sheet rounded by think-cell round, "tuned" values highlighted