

# Calculating Relative Frequency with Microsoft Excel: A Step-by-Step Guide

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## RECOMMENDED CITATION

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## Understanding Frequency and Frequency Tables

In the realm of [statistics](#) and data analysis, the essential first step involves organizing vast quantities of raw data into a comprehensible and actionable format. A [frequency table](#) is the foundational statistical tool designed specifically for this purpose. It systematically displays information about observed events or values within a dataset, detailing how often each category occurs. This method effectively transforms chaotic figures into structured data ready for deeper analysis.

The central measurement within this table is [frequency](#), which quantifies the count of occurrences for a specific outcome or item. For example, if we are analyzing sales performance for a retail chain, the frequency would precisely indicate how many items fall into a predetermined category, such as a defined price bracket or product type. Grasping these basic counts is absolutely necessary before transitioning to calculations involving proportional or probabilistic measurements.

Consider a practical scenario where a retail manager monitors weekly sales categorized by the item's price range. The resulting distribution clearly illustrates the volume of items sold within each defined class. This structured organization converts confusing, individual transaction records into clear, immediate insights, providing a powerful summary of the data distribution, as demonstrated in the table below:

Item Price	Frequency
\$1 - \$10	20
\$11 - \$20	21
\$21 - \$30	13
\$31 - \$40	8
\$41 - \$50	4

## Defining and Calculating Relative Frequency

While raw frequency provides the absolute count, it often fails to immediately convey the importance of that count in relation to the overall dataset size. This is precisely why [relative frequency](#) is an indispensable metric in statistical analysis. Relative frequency converts the raw count into a proportion, revealing the exact fraction or percentage of the total observations belonging to a specific class. This measure is essential for comparing distributions of varying sizes or when estimating underlying probabilities.

The mathematical calculation for relative frequency is straightforward: you take the frequency of the specific data class and divide it by the total number of observations in the entire dataset. A

crucial characteristic of this calculation is that when all relative frequencies are correctly computed, their sum across all classes must invariably equal 1 (or 100% if expressed as a percentage). This characteristic makes relative frequency a robust, built-in self-checking metric for validating the accuracy of your statistical work.

Returning to our sales example, the total number of items sold across all price classes is 66. To find the relative frequency for the \$1 - \$10 class, we calculate 20 (frequency) divided by 66 (total), which yields **0.303**. This result means that 30.3% of all weekly sales occurred within that lowest price bracket. Similarly, the relative frequency for the \$11 - \$20 class is calculated as 21 divided by 66, resulting in **0.318**.

Item Price	Frequency	Relative Frequency
\$1 - \$10	20	0.303
\$11 - \$20	21	0.318
\$21 - \$30	13	0.197
\$31 - \$40	8	0.121
\$41 - \$50	4	0.061

## Setting Up the Data for Calculation in Excel

Calculating relative frequency manually can be tedious and prone to error, but the process is significantly streamlined when utilizing [Microsoft Excel](#). The key advantage of using this application lies in its dynamic formula capabilities, ensuring that if any raw data point is updated, the proportions are instantaneously and automatically recalculated. Before leveraging these powerful formulas, the data must be meticulously entered and organized within the spreadsheet.

You should begin by structuring your data across three distinct columns. Column A will contain the class intervals (e.g., Item Price ranges), Column B will hold the raw [frequency](#) counts for each class, and Column C will be reserved for the resulting relative frequencies, which are the proportions we intend to calculate. Clear labeling of these columns is highly recommended for clarity and ease of management.

Following our established retail example, the item price classes are entered into cells A2 through A6, and the corresponding raw frequencies are accurately placed in cells B2 through B6. This initial preparation step is crucial as it defines the necessary inputs required both for calculating the aggregate total count and for determining the individual class proportions.

	A	B	C	D	E
1	<b>Item Price</b>	<b>Frequency</b>			
2	\$1 - \$10	20			
3	\$11 - \$20	21			
4	\$21 - \$30	13			
5	\$31 - \$40	8			
6	\$41 - \$50	4			
7					
8					
9					
10					
11					
12					
13					
14					

## Applying the Relative Frequency Formula in Excel

The first essential step in **Excel** is accurately determining the overall total number of observations. This total will function as the fixed denominator for every single proportion calculation. Locate a cell immediately below the frequency column (cell B7 in our example) and use the built-in **SUM()** function to aggregate all the individual frequencies. Specifically, the formula entered into B7 should be `=SUM(B2:B6)`, which correctly returns the value of 66.

Next, we proceed to calculate the relative frequency for the very first class, which corresponds to the data in cell B2. This calculation is performed in cell C2. The required formula is the specific class frequency divided by the grand total frequency. To ensure that the total (B7) remains fixed and unchanging when the formula is copied down the column, we must convert its reference to an **absolute reference** using dollar signs: **\$B\$7**.

Therefore, the formula entered into cell C2 is `=B2/$B$7`. Once this formula is confirmed, the process becomes extremely efficient: simply drag the fill handle from cell C2 down to C6. Excel intelligently adjusts the numerator (B2 automatically becomes B3, B4, etc.) while successfully maintaining the denominator fixed at the total count (**\$B\$7**). This instantly populates the relative frequencies for all classes, completing the core analysis. The following image clearly illustrates the resulting calculations and the structure of the required formulas.

	A	B	C	D	E
1	<b>Item Price</b>	<b>Frequency</b>	<b>Relative Frequency</b>		
2	\$1 - \$10	20	0.303	=B2/SUM(\$B\$2:\$B\$6)	
3	\$11 - \$20	21	0.318	=B3/SUM(\$B\$2:\$B\$6)	
4	\$21 - \$30	13	0.197	=B4/SUM(\$B\$2:\$B\$6)	
5	\$31 - \$40	8	0.121	=B5/SUM(\$B\$2:\$B\$6)	
6	\$41 - \$50	4	0.061	=B6/SUM(\$B\$2:\$B\$6)	
7					
8					
9					
10					
11					
12					
13					
14					
15					

## Validating the Distribution for Accuracy

To unequivocally confirm the accuracy of all preceding calculations and verify that the entire sample space has been comprehensively accounted for, it is mandatory to calculate the sum of the **relative frequency** column. According to the foundational principles of probability distributions, the total sum of all relative frequencies must equal exactly 1.0.

In cell C7, immediately below the last relative frequency entry, apply the **SUM()** function across the entire column: `=SUM(C2:C6)`. If the calculations have been executed correctly, the result displayed should be precisely 1.0. This immediate verification step instills confidence in the derived proportions. Any noticeable deviation from 1.0 strongly suggests an error, most commonly stemming from an incorrect cell range selection or a failure to properly utilize absolute referencing for the total denominator.

This powerful self-checking mechanism is the most crucial component in creating a reliable **frequency table**. It ensures that the calculated proportions accurately and comprehensively represent the distribution of the data relative to the whole sample being studied.

	A	B	C	D	E
1	<b>Item Price</b>	<b>Frequency</b>	<b>Relative Frequency</b>		
2	\$1 - \$10	20	0.303	=B2/SUM(\$B\$2:\$B\$6)	
3	\$11 - \$20	21	0.318	=B3/SUM(\$B\$2:\$B\$6)	
4	\$21 - \$30	13	0.197	=B4/SUM(\$B\$2:\$B\$6)	
5	\$31 - \$40	8	0.121	=B5/SUM(\$B\$2:\$B\$6)	
6	\$41 - \$50	4	0.061	=B6/SUM(\$B\$2:\$B\$6)	
7			1	=SUM(C2:C6)	
8					
9					
10					
11					
12					
13					
14					
15					

## Visualizing the Data: Creating a Relative Frequency Histogram

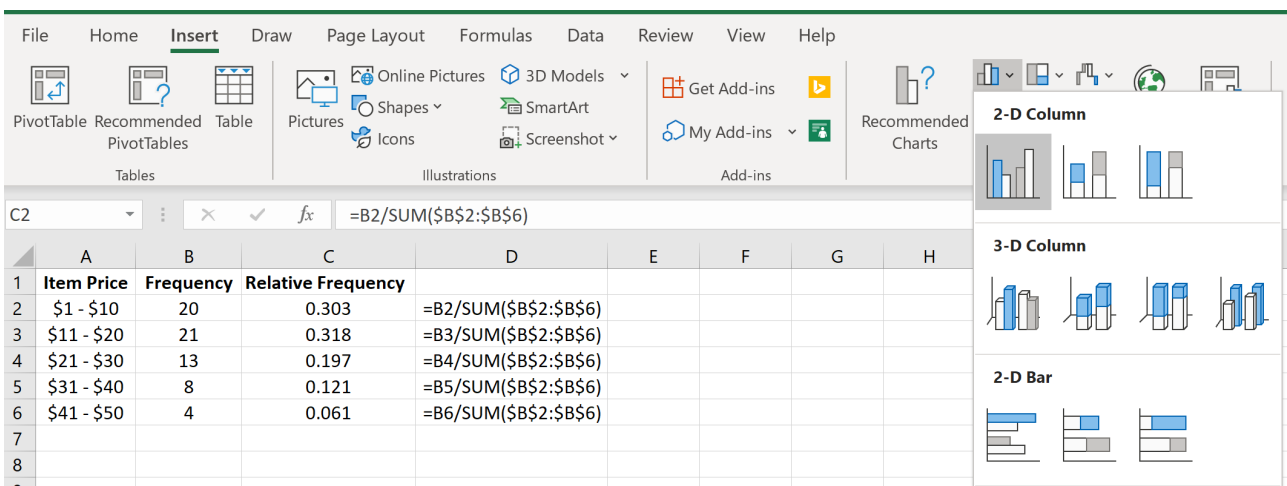
Once the relative frequencies are calculated, the [histogram](#) stands as the most insightful graphical tool for presenting this distribution visually. **Excel** offers rapid generation capabilities, allowing you to quickly convert numerical proportions into an easily interpretable visual display that highlights data trends and cluster points.

To begin, highlight only the numerical values of the relative frequencies (cells C2 through C6). Navigate to the **Insert** tab on the Excel ribbon. Locate the **Charts** group, click **Insert Column or Bar Chart**, and then select the first 2-D Column chart option. A basic bar chart will immediately appear, scaling the height of the bars according to the calculated relative frequency data.

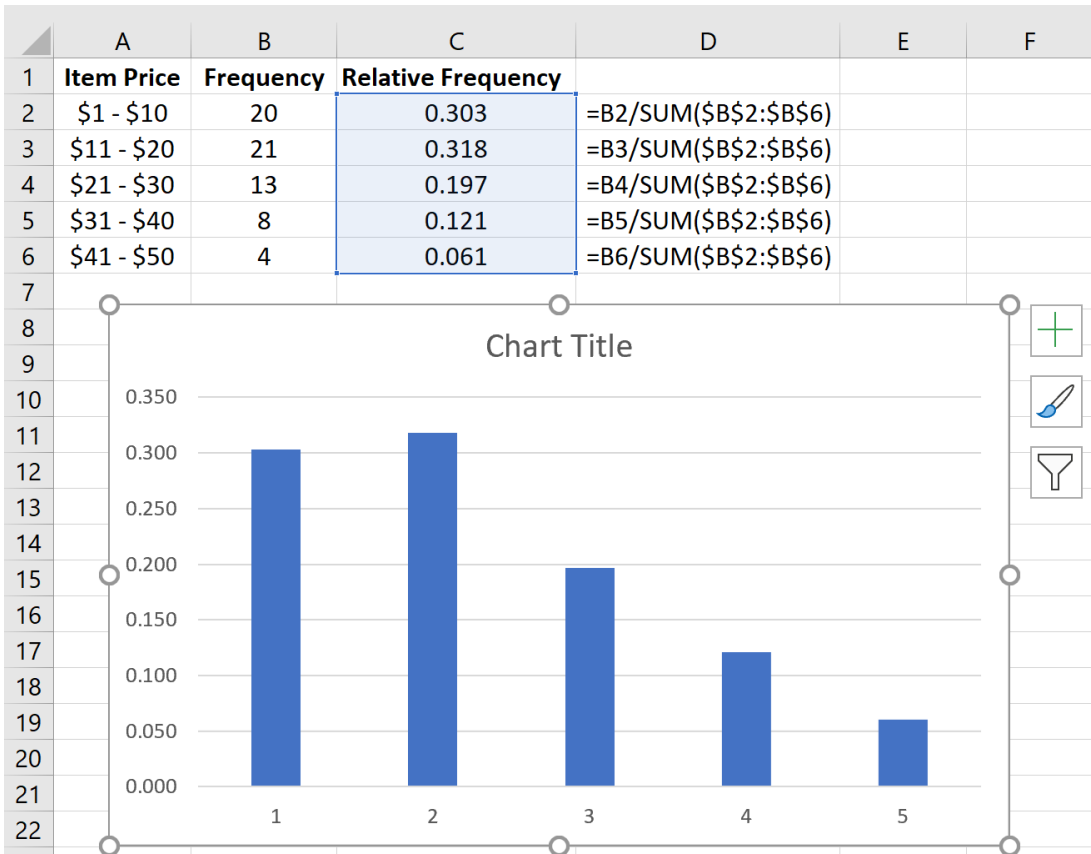
Since only the numerical data was initially selected, the chart's x-axis defaults to generic sequential categories (1, 2, 3, etc.). To create a meaningful visualization, we must update these axis labels to correctly display the actual class intervals (Item Prices). Right-click directly on the chart area and choose the **Select Data** option from the context menu.

	A	B	C	D	E
1	<b>Item Price</b>	<b>Frequency</b>	<b>Relative Frequency</b>		
2	\$1 - \$10	20	0.303	=B2/SUM(\$B\$2:\$B\$6)	
3	\$11 - \$20	21	0.318	=B3/SUM(\$B\$2:\$B\$6)	
4	\$21 - \$30	13	0.197	=B4/SUM(\$B\$2:\$B\$6)	
5	\$31 - \$40	8	0.121	=B5/SUM(\$B\$2:\$B\$6)	
6	\$41 - \$50	4	0.061	=B6/SUM(\$B\$2:\$B\$6)	
7					
8					
9					
10					

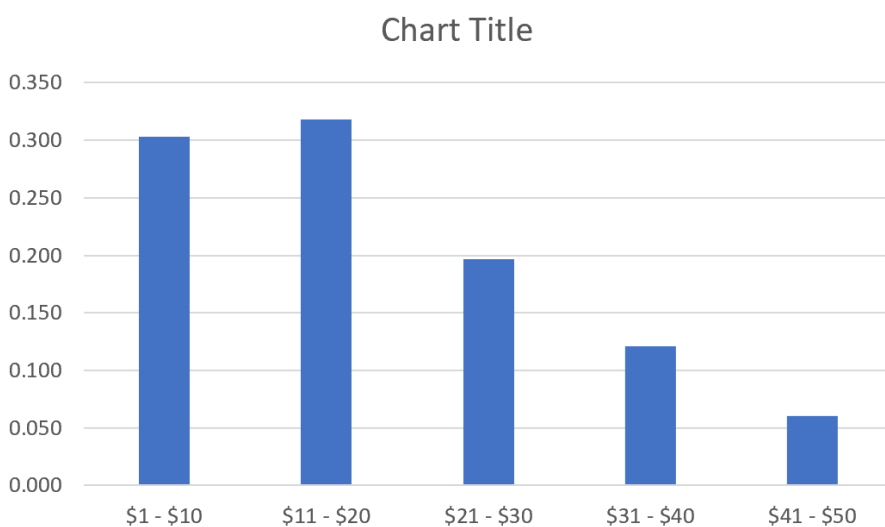
Then go to the **Charts** group in the **Insert** tab and click the first chart type in **Insert Column or Bar Chart**:



In the subsequent **Select Data Source** dialogue box, locate the **Horizontal (Category) Axis Labels** section and click the **Edit** button. Here, you will specify the cell range containing your descriptive item prices (A2:A6). Click **OK** to confirm this selection. The new axis labels will instantly update the **histogram**, providing a comprehensive and accurate visual analysis of the relative distribution of sales data.



Modify the x-axis labels by right-clicking on the chart and clicking **Select Data**. Under **Horizontal (Category) Axis Labels** click **Edit** and type in the cell range that contains the item prices. Click **OK** and the new axis labels will automatically appear:



## Additional Resources

For users aiming to further solidify their grasp of fundamental statistical methods or explore advanced functionalities within [Microsoft Excel](#), the following resources provide guidance on key concepts covered in this tutorial.

Further reading on measures of [frequency](#) and the broader theory of statistical distribution.

Detailed tutorials on creating and customizing various statistical charts and graphs specifically within Excel.

Exploration of more complex distribution types, such as cumulative [relative frequency](#).