

How to Calculate Relative Frequency Using a TI-84 Calculator: A Step-by-Step Guide

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Calculating [relative frequencies](#) is a fundamental skill in the field of [statistics](#) and **quantitative data analysis**. These values are not merely counts; they are essential proportions that quantify how often a specific event, observation, or data point occurs in relation to the overall size of the sample space. Essentially, the relative frequency distribution provides a normalized and highly useful view of the data's structure, making it significantly easier to compare different categories or analyze probabilities across various outcomes.

Understanding this concept is crucial because raw frequency counts alone do not always paint a complete statistical picture. For instance, knowing that 50 people selected Option A is meaningless without knowing if the total sample size was 100 or 10,000. By converting these raw counts into proportions or percentages, we gain valuable insight into the likelihood, prevalence, or weight of an event within the total population. This guide provides the precise steps required to automate this calculation efficiently using a [TI-84 calculator](#), a powerful tool widely adopted by students and professionals for advanced statistical manipulation.

The entire process on the TI-84 involves two core steps: first, entering the raw frequency counts into the calculator's statistical lists, and second, applying a powerful single-line list operation that calculates the proportions automatically. This systematic method not only saves significant time compared to performing division manually for every data point but also virtually eliminates the chance of calculation and rounding errors inherent in manual statistical work, ensuring high accuracy in your final results.

Defining and Interpreting Relative Frequency Distributions

A [relative frequency](#) is mathematically defined as the ratio of the frequency of a particular class interval (or category) to the total number of observations in the [data](#) set. In simple mathematical terms, if **f** represents the absolute frequency (the raw count) of a class and **N** represents the total number of observations (the sum of all frequencies), the relative frequency (RF) is calculated using the formula: $RF = f / N$.

This calculation transforms the absolute count into a decimal value between 0 and 1, which can easily be converted into a percentage by multiplying by 100. For example, if we conducted a survey where 25 out of 100 respondents preferred a certain color, the absolute frequency is 25, the total observations (N) is 100, and the relative frequency is $25 / 100$, or 0.25. This indicates that 25% of the sample population exhibits that characteristic.

A fundamental property of any valid relative frequency distribution is that when all [relative frequencies](#) for all classes are summed up, the total must equal exactly 1 (or 100%). This property serves as an absolutely vital check for accuracy and confirms that all observations within the sample have been comprehensively accounted for in the statistical distribution. If your calculated sum deviates significantly from 1, it indicates an error in either the data entry or the calculation of

the total population size (N).

Establishing the Sample Data Set for Calculation

To provide a clear, practical illustration of the calculation process on the TI-84, we will utilize a sample dataset concerning item sales across different price points in a retail store during a single week. This example demonstrates how raw counts are organized into frequency classes before calculating their respective proportions. The table below presents the raw counts, or absolute frequencies, for five distinct price classes, which will serve as our input data.

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

The critical starting point for this calculation is determining the total number of observations, N. This value is simply the sum of all the frequencies presented in the second column, which in this case equals **66**. Every relative frequency in the third column is derived by dividing the corresponding frequency by this calculated total (N=66). For example, the most frequent category, \$11 - \$20, had an absolute frequency of 21. The corresponding [relative frequency](#) is thus $21 / 66$, which results in approximately **0.318**.

Conversely, the least frequent category, \$41 - \$50, had a count of only 4, yielding a relative frequency of $4 / 66 = \mathbf{0.061}$. Our goal is to use the TI-84's advanced list functionality to execute all these division operations simultaneously across the entire data set and populate a new list with the resultant proportions. This automated approach ensures efficiency and accuracy far beyond what is possible with manual calculation.

Step 1: Inputting Frequency Data into List L1

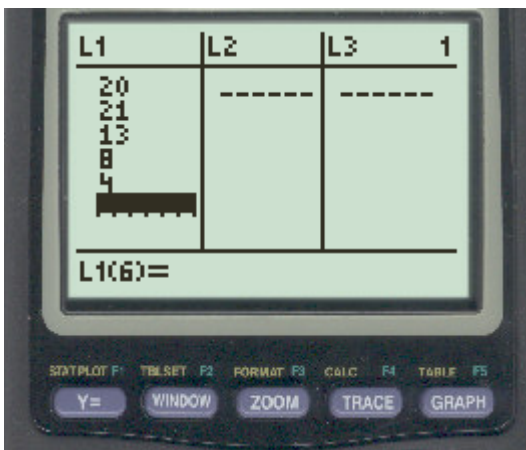
The initial and most crucial step in calculating relative frequencies involves properly entering your raw frequency [data](#) into the TI-84 graphing calculator's statistical list editor. The list editor is the central hub for all statistical operations on the TI-84, allowing you to manage multiple columns of numerical data essential for performing calculations across entire data sets concurrently.

To access this list editor, locate and press the Stat button, which is typically situated below the directional pad on the calculator keyboard. When the STAT menu appears, select the first option,

EDIT (usually by pressing ENTER). This action will open the list view, which defaults to displaying columns L1, L2, L3, and so on. If you have existing data in L1, it is considered best practice to clear it before inputting new information to avoid calculation errors. To clear L1, use the arrow keys to highlight the list name (L1) at the very top, press CLEAR, and then press ENTER.

Once L1 is empty, you must enter the frequency values from our sample data set (20, 21, 13, 8, 4) sequentially into the L1 column. It is vital to press ENTER after each numerical entry to move to the next row. Accuracy in this data entry phase is paramount, as any mistake here will propagate through all subsequent calculations. You should double-check that the number of entries matches the number of classes (five in our example).

After the complete data entry is finalized, your calculator screen should accurately reflect the arrangement shown in the image below, with the five frequency counts listed vertically in column L1:



Step 2: Calculating Relative Frequency Using List Formulas (L2)

With the raw frequencies securely stored in L1, we can now leverage the TI-84's list formula functionality to calculate the [relative frequency](#) for every item simultaneously. We will store these calculated results in the adjacent list, L2, keeping our raw data and resulting proportions separate for clarity and validation.

The core of this powerful calculation relies on entering a single formula into the L2 header: **L1 / sum(L1)**. The structure of this command is highly efficient: L1 represents the list of individual frequencies (f), and the command **sum(L1)** calculates the total number of observations ($N=66$ in our example). By instructing the calculator to divide the entire list L1 by this single constant sum, the device automatically executes the division (f / N) for every corresponding row in L1, populating L2 with the correct proportions.

To apply this formula, you must use the arrow keys to move the cursor up and highlight the header of column L2. This is the crucial step that informs the calculator that the formula you are about to input should apply to the entire list L2, rather than just a single cell. Once L2 is highlighted, the input line at the bottom of the screen will display the formula as you type it.

With the L2 header highlighted, carefully input the following formula, ensuring precision with every keystroke:



Follow these precise keystrokes to generate the formula $L1 / \text{sum}(L1)$:

To input "L1": Press 2nd, then press 1. (L1 is usually labeled above the 1 key).

To input the division symbol "/": Press \div .

To access the "sum(" function: Press 2nd, then press STAT (which accesses the LIST menu). Scroll right using the arrow key to the "MATH" submenu. Scroll down or press 5 to select "sum(".

To input "L1" again inside the sum function: Press 2nd, then press 1.

To close the function: Press).

After the complete formula ($L1 / \text{sum}(L1)$) appears correctly in the L2 header or command line, press ENTER. The calculator will execute the command instantaneously, performing 66 divisions and populating the entire L2 column with the calculated decimal values for the relative frequencies.

Interpreting and Validating the Calculated Distribution

Upon pressing ENTER, the list L2 will immediately display the precise decimal values representing the relative frequencies, often carried out to many decimal places to maintain maximum computational accuracy. This newly populated list, L2, now represents the clean, calculated relative frequency distribution based on your original frequency [data](#) input in L1.

The resulting L2 list should appear as depicted in the image below, showing the proportions corresponding to the five frequency classes:



We can now interpret the resulting relative frequencies as follows, corresponding directly to the original price classes from L1:

The relative frequency for the \$1 - \$10 class is approximately **0.30303** (or 30.30%).

The relative frequency for the \$11 - \$20 class is approximately **0.31818** (or 31.82%).

The relative frequency for the \$21 - \$30 class is approximately **0.19697** (or 19.70%).

The relative frequency for the \$31 - \$40 class is approximately **0.12121** (or 12.12%).

The relative frequency for the \$41 - \$50 class is approximately **0.06061** (or 6.06%).

A crucial final step in validating your work is to confirm that the total sum of these [relative frequencies](#) is exactly 1. You can perform this check instantly on the TI-84 by exiting the list editor (press 2nd, then MODE to QUIT) and then using the sum function on L2 (i.e., typing `sum(L2)`). If the sum is exactly 1, or deviates only minutely (e.g., 0.999999999), the calculation is mathematically accurate, with any minor display discrepancy due to the calculator's internal number representation. This confirmation ensures that your division by the total population N was performed correctly and provides high confidence in your statistical results.

Expanding Your Statistical Toolkit on the TI-84

For users seeking to further explore the TI-84's powerful statistical capabilities, mastering list operations is the next logical step. The same list structure used here for relative frequency can be adapted for a multitude of other analyses. Learning how to sort data, perform one-variable statistics (like mean, median, and standard deviation), or conduct linear regressions using these lists can greatly enhance your efficiency and depth in data exploration.

The use of lists (L1, L2, L3, etc.) is truly the backbone of advanced statistical calculations on the [TI-84 calculator](#). By automating complex computations and allowing users to apply formulas across entire columns simultaneously, the TI-84 transforms from a basic arithmetic tool into a

sophisticated, high-speed statistical processor, making complex coursework and professional data interpretation significantly more manageable and accurate.