

How to Calculate Deciles in Google Sheets: A Step-by-Step Guide

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When analyzing large volumes of information, it is often necessary to divide a dataset into manageable groups to understand the distribution of values. In the realm of statistics, this process is facilitated by quantiles, and specifically, by deciles. Deciles are powerful statistical measures that partition a set of ordered data points into ten equally sized bins. Understanding how to calculate these metrics efficiently is crucial for data professionals and researchers alike, and fortunately, powerful spreadsheet applications like Google Sheets offer built-in functions to perform these calculations with ease.

While some statistical software might have a direct DECIDE() function, Google Sheets relies primarily on the more versatile PERCENTILE function. This function is designed to return the value at a specified percentile (k) of a data range. Since deciles correspond precisely to the 10th, 20th, 30th, up to the 90th percentile, we can leverage the PERCENTILE function by inputting the corresponding percentage value as a decimal (e.g., 0.1 for the first decile, 0.2 for the second, and so on). This robust approach ensures accurate calculation of all decile boundaries, providing deep insight into data concentration and skewness.

This comprehensive guide will walk you through the precise methods for calculating decile values in Google Sheets using the primary method, followed by an advanced technique using the PERCENTRANK.EXC() function to classify individual data points into their respective decile groups. Mastery of these techniques allows for superior comparative analysis, whether you are evaluating student performance, economic indicators, or market trends.

Defining Deciles and Their Importance in Data Analysis

In the field of statistics, deciles serve as specific points that divide the frequency distribution of a dataset into ten equal parts. These measures are fundamentally linked to percentiles, as the first decile (D1) is equivalent to the 10th percentile, the second decile (D2) to the 20th percentile, and so forth, up to the ninth decile (D9), which is the 90th percentile. The primary purpose of using deciles is to understand the position of a particular data point relative to the entire distribution, especially when dealing with variables that exhibit significant spread or variation.

The interpretation of each decile boundary is straightforward yet powerful. The value calculated for the first decile marks the threshold below which 10% of all observed data values fall. Similarly, the second decile indicates the point where 20% of the data lies below it, and 80% lies above. This allows analysts to quickly segment their population into quintiles or other smaller groups based on specific performance thresholds. For example, if evaluating employee salaries, calculating the ninth decile provides the minimum salary earned by the top 10% of earners, offering a crucial metric for compensation fairness analysis.

Unlike quartiles, which divide data into four segments, deciles offer a finer granularity of segmentation. This finer resolution is particularly useful when the analyst requires a more detailed

understanding of the tail ends of the distribution, or when dealing with highly skewed data. By identifying the specific values that delineate each 10% bracket, we gain a more nuanced perspective on central tendency and dispersion, moving beyond simple averages to a positional understanding of the data.

Utilizing the PERCENTILE Function for Decile Calculation

Google Sheets does not feature a dedicated DECIDE() function, but it provides the highly versatile PERCENTILE function, which is perfectly suited for decile calculation. This function is designed to return the k-th percentile of a range of values, where k is a value between 0 and 1, inclusive. Since the first decile corresponds to k=0.1, the second decile to k=0.2, and so on, calculating deciles becomes a simple matter of specifying the correct k-value.

The standard syntax for the function is remarkably simple, requiring two key arguments: the data range and the percentile multiplier (k). Remember that the multiplier k must be expressed as a decimal representation of the desired percentile. For instance, if you are attempting to find the value that separates the bottom 30% of the dataset from the rest, you would use 0.3 as your k-value, corresponding directly to the third decile.

The general structure of the formula used to calculate any decile in Google Sheets is as follows, where CELL RANGE specifies the array of data you are analyzing, and PERCENTILE is the decimal multiplier (0.1, 0.2, 0.3, etc.):

=PERCENTILE(CELL RANGE, PERCENTILE)

As a concrete application, imagine your data resides in cells A1 through A50. To determine the exact value of the third decile (D3), the required formula would be structured precisely as shown below. This calculation yields the numerical boundary where 30% of the scores are equal to or lower than the result.

=PERCENTILE(A1:A50, 0.3)

Practical Example: Calculate Deciles in Google Sheets

To illustrate the efficiency of this method, let us consider a sample dataset consisting of 20 hypothetical test scores. These scores are entered into a column, ready for analysis. Our objective is to determine the values that define the boundaries for the first nine deciles, thereby splitting the 20 scores into ten groups of two scores each, theoretically.

First, ensure your data is correctly entered. Suppose the scores are located in cells B2 through

B21. This forms the CELL RANGE argument for our functions. While the data does not need to be sorted for the PERCENTILE function to work accurately, understanding the data structure is always beneficial.

The initial setup might look like this, showing the raw data before the calculations:

	A	B	C	D
1	Data Value			
2	56			
3	58			
4	64			
5	67			
6	68			
7	73			
8	78			
9	83			
10	84			
11	88			
12	89			
13	90			
14	91			
15	92			
16	93			
17	93			
18	94			
19	95			
20	97			
21	99			
22				

To calculate the first decile (D1), which is the 10th percentile, we use the multiplier 0.1. For the second decile (D2), we use 0.2, and so on. We can apply these formulas sequentially in an adjacent column to derive all necessary decile boundaries. For instance, calculating the first decile (D1) using the range B2:B21 would use the formula: `=PERCENTILE(B2:B21, 0.1)`.

The following image demonstrates the application of these formulas across the dataset and presents the resulting decile values. Notice how the k-value incrementally increases by 0.1 for each subsequent decile calculation, providing a comprehensive statistical breakdown of the score distribution.

D2	fx	=PERCENTILE(\$A\$2:\$A\$21, C2/10)			
	A	B	C	D	E
1	Data Value		Decile	Value	
2	56		1	63.4	
3	58		2	67.8	
4	64		3	76.5	
5	67		4	83.6	
6	68		5	88.5	
7	73		6	90.4	
8	78		7	92.3	
9	83		8	93.2	
10	84		9	95.2	
11	88				
12	89				
13	90				
14	91				
15	92				
16	93				
17	93				
18	94				
19	95				
20	97				
21	99				
22					
23					

Interpreting the Calculated Decile Results

Once the decile calculations are complete, the resulting values provide crucial benchmarks for data distribution analysis. Proper interpretation is essential to translate these numerical outputs into actionable insights. Each result represents a cutoff score or boundary point.

Based on the example calculation shown above, we can draw precise statistical conclusions about the distribution of the 20 scores. For instance, if the first decile (D1) calculates to 63.4, this means that 10% of all test scores in the sample are 63.4 or less. This information immediately identifies the bottom-performing segment of the group.

Here is a detailed breakdown of how to interpret the first three calculated decile values from the example:

The first decile (D1) value of **63.4** signifies that 10% of all data values lie below this threshold.

The second decile (D2) value of **67.8** signifies that 20% of all data values lie below this threshold, and conversely, 80% are above it.

The third decile (D3) value of **76.5** signifies that 30% of all data values lie below this threshold.

This systematic segmentation is vital for identifying outliers, understanding data skewness, and setting performance targets. If this data represented income, the decile values would show the income thresholds required to be in the top 10%, top 20%, and so forth, offering clarity on economic distribution.

Assigning Individual Values to Decile Groups using PERCENTRANK.EXC()

While the PERCENTILE function defines the boundaries, analysts often need to determine which decile group an individual data point falls into. To achieve this classification in Google Sheets, we utilize the powerful PERCENTRANK.EXC() function. This function calculates the percentile rank of a specified value within a dataset, excluding the highest and lowest values from the count for percentile calculation (hence the .EXC suffix, standing for Exclusive).

The result of the PERCENTRANK.EXC() function is a fractional value between 0 and 1, representing the percentage of values in the range that are less than the specific data point provided. By multiplying this result by 10 and rounding up (or using conditional logic), we can determine the corresponding decile group (1st, 2nd, 3rd, etc.) for that specific observation.

The syntax for the PERCENTRANK.EXC() function requires three arguments:

=PERCENTRANK.EXC(CELL RANGE, DATA VALUE, SIGNIFICANCE)

Here, CELL RANGE is the array of data being analyzed; DATA VALUE is the specific data point whose rank you want to find; and SIGNIFICANCE is an optional parameter defining the number of significant digits for the result (we typically omit this or use a high value for precision).

The following image demonstrates the practical application of this function to our existing test score dataset. We apply the formula to each score individually to find its relative percentile rank within the range B2:B21. This yields a column of percentile ranks that can be easily converted into decile assignments by observing where the rank falls (0-0.1 is Decile 1, 0.1-0.2 is Decile 2, and so on).

B2 fx `=PERCENTRANK.EXC($A$2:$A$21, A2, 1)`

	A	B	C	D	E
1	Data Value	Decile			
2	56	0			
3	58	0.1			
4	64	0.1			
5	67	0.2			
6	68	0.2			
7	73	0.3			
8	78	0.3			
9	83	0.4			
10	84	0.4			
11	88	0.5			
12	89	0.5			
13	90	0.6			
14	91	0.6			
15	92	0.7			
16	93	0.7			
17	93	0.7			
18	94	0.8			
19	95	0.9			
20	97	0.9			
21	99	1			
22					

Interpreting the Assignment of Decile Groups

The output generated by the PERCENTRANK.EXC() function is fundamentally a percentile rank, expressed as a decimal. When grouping data into deciles, we interpret the resulting percentile rank relative to the decile boundaries (0.1, 0.2, 0.3, etc.). If a value returns a rank of 0.05, it falls into the first decile. If it returns 0.15, it falls into the second decile, as it is above the 10th percentile boundary but below the 20th percentile boundary.

It is important to note that the result of this function provides the relative rank of a value in the statistics of the sample as a percentage. This percentile rank is directly used to assign the data point to one of the ten decile groups (D1 through D10). We must remember that the decile groups are defined by the values **between** the decile boundaries calculated earlier. A score that yields a rank of 0.85, for example, means the score is greater than 85% of the values in the dataset and thus belongs to the ninth decile group (D9).

Using the output from the image above, let us interpret how specific data values are categorized:

The data value 58 returns a percentile rank between 0 and 0.1. Therefore, it falls in the **First Decile (D1)** group.

The data value 64 returns a percentile rank between 0.1 and 0.2. This means it is better than 10% but worse than 80%, placing it in the **Second Decile (D2)** group.

Similarly, the data value 67 also returns a percentile rank between 0.1 and 0.2, confirming its position in the **Second Decile (D2)** group.

The data value 68 returns a percentile rank between 0.2 and 0.3. This value, being greater than the 20th percentile boundary, is assigned to the **Third Decile (D3)** group.

Advanced Considerations and Summary of Decile Calculations

While the standard decile calculation using the PERCENTILE function is robust, it is essential to understand the underlying statistical methodology. The Google Sheets PERCENTILE function implements an interpolation method when the exact percentile boundary does not align perfectly with an existing data point. This ensures that the calculated decile value accurately represents the statistical division, even in small or discrete datasets. Analysts must be aware that the calculated boundary value might not be an actual value present in the original dataset.

Furthermore, when choosing between the PERCENTILE function variants (PERCENTILE.INC vs. PERCENTILE.EXC), the primary difference lies in how they handle the interpolation and range extremes. For decile calculations corresponding to standard statistical definitions, the base PERCENTILE function (which is an inclusive method) is generally preferred for calculating the boundary points (D1 through D9). However, when assigning individual ranks, the exclusive version, PERCENTRANK.EXC(), provides a more practical ranking system that excludes the extremes, making it suitable for comparative ranking analysis.

In conclusion, mastering the calculation of deciles in Google Sheets is a fundamental skill for advanced data analysis. By strategically using the PERCENTILE function to determine the boundary values (D1-D9) and the PERCENTRANK.EXC() function to classify individual records into their respective groups, you can transform raw data into clear, segmented insights essential for decision-making in statistics and business intelligence. These techniques allow for a much deeper understanding of data distribution than simple mean or median analysis alone.