

Calculate Deciles in Excel (With Examples)

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In the complex landscape of [statistics](#), [deciles](#) serve as fundamental measures for understanding the distribution and structure of a given [dataset](#). Deciles effectively segment the entire set of observations into ten distinct groups, each holding an equal frequency of data points. This process of division is vital for non-parametric analysis and comparative studies.

These statistical markers define the decile boundaries, representing the points below which 10%, 20%, 30%, and subsequent increments of the data values are located. For instance, the first decile (D1) marks the threshold below which 10% of observations fall, while the fifth decile (D5) is equivalent to the median, separating the lower 50% from the upper 50%. Understanding these boundaries is essential for properly interpreting data distributions.

Although [Excel](#) does not feature a dedicated `DECILE` function, analysts can seamlessly calculate these values by leveraging the versatile, built-in [PERCENTILE function](#). Since deciles are fundamentally defined as specific percentiles (D1 = 10th percentile, D9 = 90th percentile), this function provides a precise and efficient solution.

The general structure required for executing this calculation within an Excel spreadsheet is straightforward, requiring only the data range and the desired percentile expressed as a decimal:

=PERCENTILE(CELL RANGE, PERCENTILE)

The following comprehensive examples will clearly illustrate the practical application of these key statistical tools within the Microsoft Excel environment, guiding users through both calculating the cutoff points and classifying individual observations.

Understanding Deciles and Their Statistical Significance

In data analysis, measures of position--such as quartiles, percentiles, and deciles--are far more informative than simple averages (means), especially when dealing with skewed or non-normal distributions. [Deciles](#) offer a granular view of dispersion, providing nine distinct cutoff points that summarize how values are spread across the range. For instance, in financial modeling, deciles are frequently used to categorize portfolios based on risk or return performance.

The fundamental purpose of calculating deciles is to facilitate comparative evaluation. By identifying the value associated with the 10th, 20th, or 70th percentile, analysts can quickly determine if an individual data point performs poorly, moderately, or excellently relative to the entire sample. This classification ability makes decile analysis indispensable in performance evaluation systems, such as grading student scores or ranking customer satisfaction results.

It is critical to distinguish between the decile boundary (the cutoff value calculated by the `PERCENTILE` function) and the decile group (the section of data falling between two boundaries).

There are nine decile boundaries (D1 through D9), but these define ten decile groups (Group 1 through Group 10). The value of D4, for example, is the numerical boundary separating the lowest 40% of observations from the upper 60%.

The PERCENTILE Function: Excel's Gateway to Decile Calculation

To calculate deciles in Excel, we rely entirely on the `PERCENTILE` function family. Excel offers two primary versions: `PERCENTILE.INC` (Inclusive) and `PERCENTILE.EXC` (Exclusive). The Inclusive version includes the endpoints (0 and 1) in the calculation range, meaning it can return the minimum or maximum value of the array. The Exclusive version, often preferred in academic statistics, excludes the endpoints, calculating percentiles strictly between 0 and 1.

For decile calculation, the percentage argument (k) must be entered as a decimal representation of the decile rank. To find the first decile (D1), we use $k = 0.1$. To find the ninth decile (D9), we use $k = 0.9$. This mapping allows us to convert the desire for a decile classification directly into a functional Excel formula. Selecting the correct version of the `PERCENTILE` function--Inclusive or Exclusive--depends heavily on the specific statistical standards or requirements of the project.

Mastering this function is the core technical step in decile analysis. It allows users to bypass the tedious manual sorting and counting steps traditionally required to find these cutoffs. By inputting the array (the cell range containing the data) and the desired percentile, Excel instantly delivers the precise numerical value that serves as the decile boundary for that specific distribution.

Example 1: Calculating Decile Boundaries in Excel

Consider a scenario where we are analyzing a crucial performance metric, such as test scores or processing times. We have compiled a raw [dataset](#) comprising 20 distinct numerical values, arranged in a column in our Excel sheet. The immediate goal is to establish the nine decile markers (D1 through D9) that define the dispersion of this distribution.

	A	B	C	D	E	F	G
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							
23							
24							
25							
26							
27							
28							
29							

To achieve this, we recognize that deciles correspond exactly to the 10th, 20th, 30th, all the way up to the 90th [percentile](#). Therefore, we utilize the `PERCENTILE.EXC` function--or the standard `PERCENTILE` function if working with older versions of Excel--and specify the corresponding decimal values (0.1 for D1, 0.2 for D2, 0.9 for D9). If our data resides in cells A1:A20, the formula for the first decile would be `=PERCENTILE.EXC(A1:A20, 0.1)`.

The image below showcases the application of these formulas to calculate all nine boundaries. The array argument remains constant (the data range), while the percentile argument is systematically increased by 0.1 increments. This method provides a rapid and accurate way to map the entire data distribution using these critical measures of position.

	A	B	C	D	E	F	G
1	Data Value			Decile	Value		
2	56			1	=PERCENTILE(\$A\$2:\$A\$21, D2/10)		
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							
24							
25							
26							
27							

Interpreting Decile Boundary Results

Once the nine decile boundaries are calculated, the resulting values offer immediate and quantifiable insight into the overall structure and skewness of the dataset. The interpretation of these [deciles](#) is highly informative for decision-making, as they define performance tiers without requiring the assumption of a normal distribution.

The interpretation is based directly on the definition of a percentile rank. Each boundary value signifies the numerical score or measurement below which the specified percentage of the data lies. The following examples illustrate this concept using the results from our dataset:

The second decile (D2) is 67.8. This means that 20% of all data values recorded in the sample fall below the score of **67.8**.

The third decile (D3) is 76.5. This indicates precisely that 30% of all data values lie below **76.5**.

The fourth decile (D4) is 83.6. Consequently, 40% of all data values lie below **83.6**.

This systematic pattern allows analysts to establish clear, empirically derived thresholds for

categorizing performance--identifying low performers (D1-D3), average performers (D4-D6), and high performers (D7-D9). Such rapid identification is crucial for comparative evaluation, benchmarking, and resource allocation based on statistical rank.

Classifying Individual Points Using PERCENTRANK.EXC

While calculating the decile boundaries provides the cutoff scores, a subsequent and equally important task is determining the specific decile group into which each individual data value falls. To classify individual scores relative to the entire distribution, we turn to the [PERCENTRANK.EXC\(\) function](#). This function calculates the percentile rank of a specific value within a given array, outputting a decimal value between 0 and 1.

The syntax for `PERCENTRANK.EXC()` requires three necessary arguments: the array (the full data range), the specific value (the individual score being tested), and the significance (the number of decimal places for the resulting rank). A high significance level, such as 4, provides greater precision in the ranking.

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

By applying this formula dynamically to every score in our initial dataset, we assign a precise percentile rank to each observation. This rank is a floating-point number (e.g., 0.235) that immediately tells us where the score sits relative to the whole sample. Once the percentile rank is established, simple conditional logic (or mental calculation) is used to translate the rank into its corresponding decile classification.

	A	B	C	D	E	F
1	Data Value	Decile		Decile	Value	
2	56	=PERCENTRANK.EXC(\$A\$2:\$A\$21,A2,1)				
3	58	0		2	67.8	
4	64	0.1		3	76.5	
5	67	0.1		4	83.6	
6	68	0.2		5	88.5	
7	73	0.2		6	90.4	
8	78	0.3		7	92.3	
9	83	0.3		8	93.2	
10	84	0.4		9	95.2	
11	88	0.4				
12	89	0.5				
13	90	0.5				
14	91	0.6				
15	92	0.6				
16	93	0.7				
17	93	0.7				
18	94	0.8				
19	95	0.8				
20	97	0.9				
21	99	0.9				
22						
23						
24						
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26						

Detailed Interpretation of Decile Classification

The output from `PERCENTRANK.EXC()`, as depicted in the image above, provides the percentile rank for each data point. To determine the exact decile classification, we interpret these fractional results by grouping them into 0.1 intervals. A rank between 0 and 0.1 falls into Decile 1 (D1), a rank between 0.1 and 0.2 falls into Decile 2 (D2), and so on, up to the highest rank between 0.9 and 1.0, which constitutes Decile 10 (D10).

This detailed classification process allows for a granular understanding of every observation's relative standing. We can interpret the results from the example as follows:

The data value 58, which has a percentile rank between 0 and 0.1, is classified into the first [decile](#) (D1). This confirms it is among the lowest 10% of scores.

The data value 64 falls between the percentile rank 0.1 and 0.2, placing it securely in the second decile (D2).

The data value 67 also falls between the percentile rank 0.1 and 0.2, confirming its position in the second decile (D2). This demonstrates how multiple observations can share the same decile group.

The data value 68 falls between the percentile rank 0.2 and 0.3, meaning it belongs to the third decile (D3).

This dual approach--first calculating the boundaries using `PERCENTILE` and then classifying individual points using `PERCENTRANK.EXC`--constitutes a complete and robust methodology for distributional analysis in [Excel](#). Mastering these functions provides analysts and researchers with a powerful toolkit for understanding the relative position of every observation within any numerical [dataset](#).

Advanced Considerations and Conclusion

While decile calculation is straightforward, its accuracy and utility are highly dependent on the size and characteristics of the underlying dataset. Deciles are most meaningful when applied to large samples where the data distribution is continuous. For very small samples, the difference between the decile boundaries may become statistically insignificant, and simpler descriptive statistics might be more appropriate.

Furthermore, when applying these methods in a professional environment, it is crucial to document whether the `PERCENTILE.INC` or `PERCENTILE.EXC` method was chosen, as this choice can subtly alter the resulting boundary values, particularly at the extremes of the distribution. Consistency is key when comparing decile results across different studies or time periods.

In conclusion, although Excel lacks a dedicated decile function, its powerful statistical suite, specifically the `PERCENTILE` and `PERCENTRANK` functions, offers a comprehensive and precise means to perform decile analysis. These tools are essential for anyone seeking to move beyond basic averages and gain a deeper understanding of data dispersion, categorization, and relative ranking.

Additional Resources