# How to Create and Use a Distribution Table for Statistical Analysis

Authored by

**stats writer**

February 28, 2026

## The Fundamental Role of Distribution Tables in Data Science

In the expansive field of **statistics**, the ability to transform raw data into actionable insights is paramount. A **distribution table** serves as a primary instrument in this transformation, acting as a structured framework designed to organize and present complex information in a clear, concise, and highly accessible format. By systematically categorizing individual data points, these tables allow researchers to move beyond the chaos of raw observations toward a more refined understanding of the underlying variables. The core purpose of such a table is to provide a comprehensive visual summary of the **frequency** or proportion of specific values within a **dataset**, ensuring that the researcher can identify the spread and concentration of data at a glance.

Beyond simple organization, a distribution table facilitates the identification of essential patterns and trends that might otherwise remain hidden within a large volume of information. When dealing with substantial quantities of data, it becomes nearly impossible to interpret results without some form of **data summarization**. The distribution table bridges this gap by grouping data into manageable intervals or categories, thereby highlighting the most common occurrences and identifying outliers. This structured approach is not merely a matter of convenience; it is a fundamental requirement for **quantitative research**, providing the clarity necessary to make informed decisions and draw reliable conclusions from empirical evidence.

Furthermore, the utility of a distribution table extends to its role as a precursor to more advanced **statistical analysis**. By presenting data in an ordered fashion, it becomes significantly easier to calculate key measures of central tendency and dispersion. Researchers utilize these tables to gain a holistic view of the data's behavior, allowing for a more nuanced comparison between different groups or experimental conditions. Whether one is examining economic trends, medical trial results, or social science surveys, the distribution table remains an essential component of the analytical toolkit, ensuring that **data interpretation** is both efficient and accurate.

Ultimately, the adoption of distribution tables empowers analysts to communicate their findings with greater precision. In a professional or academic setting, presenting a well-structured table is often more effective than providing a list of raw numbers. It allows the audience to grasp the weight of the evidence quickly and provides a standardized format that is universally recognized across scientific disciplines. This standardization is critical for the **reproducibility** of research, as it allows other investigators to verify results and perform their own secondary analyses with ease.

## Navigating the Structural Framework of Frequency Distributions

To fully appreciate the power of a distribution table, one must understand its structural components, most notably the **frequency distribution**. This structure typically consists of two primary columns: one representing the variable of interest (often grouped into classes or intervals)

and another representing the count of how often those variables occur. The process of **data binning**--the act of grouping continuous data into discrete intervals--is a critical step in constructing these tables. Proper binning ensures that the data is neither too fragmented nor too generalized, maintaining a balance that preserves the integrity of the information while enhancing its readability.

In addition to simple frequency counts, many distribution tables incorporate **relative frequency** and cumulative frequency. Relative frequency expresses the proportion of the total count that falls within a specific category, often represented as a percentage. This is particularly useful when comparing datasets of different sizes, as it provides a normalized view of the distribution. Cumulative frequency, on the other hand, provides a running total of frequencies across the classes, which is indispensable for identifying the **percentile rank** of specific data points. Together, these elements provide a multi-dimensional view of the dataset's characteristics.

The construction of these tables requires meticulous attention to detail to avoid **statistical bias** or misleading representations. For instance, the choice of class width can significantly impact the visual shape of the distribution. If the intervals are too wide, important nuances in the data may be smoothed over and lost; if they are too narrow, the table may become cluttered and fail to reveal any meaningful trends. Analysts must use logical criteria to determine these boundaries, often relying on established rules of thumb or the specific requirements of the **research design** to ensure the most accurate representation possible.

## Enhancing Statistical Clarity through Data Organization

One of the primary benefits of utilizing a distribution table is the immediate improvement in **statistical clarity**. When data is presented in an unorganized state, the human brain struggles to process the magnitude and variation of the information. By contrast, a distribution table categorizes information so that the observer can instantly discern the range of the data, the most frequent values, and any gaps where data points are missing. This level of organization is the first step toward **descriptive statistics**, which aims to summarize the main features of a collection of information quantitatively.

The clarity provided by these tables also aids in the detection of **skewness** and symmetry within the data. By observing the distribution of frequencies across categories, a researcher can determine if the data follows a **normal distribution** or if it is skewed to the left or right. This observation is vital because many statistical tests assume a specific type of distribution. Identifying these properties early in the analysis process prevents the application of inappropriate tests and ensures the validity of the final results. Thus, the distribution table acts as a diagnostic tool that guides the entire analytical journey.

Moreover, distribution tables serve as the foundation for creating visual aids such as **histograms** and frequency polygons. These graphical representations are direct translations of the data found

within the table. While the table provides the precise numerical counts, the chart provides a visual impact that can make complex data more accessible to a non-technical audience. The synergy between tabulated data and graphical visualization is a cornerstone of effective **data science**, ensuring that the insights derived from the analysis are both robust and communicable.

## Theoretical Frameworks: Transitioning to Probability Distributions

As analysis moves from descriptive to inferential, the role of the distribution table evolves. In **inferential statistics**, we often rely on theoretical **probability distributions** to make predictions about a population based on a sample. Standardized distribution tables, such as those for the Z-score, T-distribution, and F-distribution, provide **critical values** that are essential for **hypothesis testing**. These tables allow researchers to determine the probability of observing a particular result under a specific set of assumptions, typically defined by the **null hypothesis**.

Using these theoretical tables requires an understanding of **significance levels**, commonly denoted by the Greek letter alpha ($\alpha$). The significance level represents the threshold for rejecting the null hypothesis; common values include 0.05, 0.01, and 0.10. A distribution table for a specific probability distribution will list critical values corresponding to these alpha levels and various **degrees of freedom**. By comparing a calculated test statistic to the value found in the table, a researcher can decide whether to reject or fail to reject their hypothesis with a known level of confidence.

The transition from empirical data tables to theoretical probability tables marks the shift from observing "what is" to predicting "what could be." This predictive power is what makes statistics so valuable in fields like engineering, economics, and social policy. Without these standardized tables, every researcher would have to calculate complex integrals and probability density functions manually for every test they perform. The existence of these tables streamlines the process of **statistical inference**, making rigorous scientific inquiry more efficient and less prone to calculation errors.

## The Utility of the F-Distribution Table in Comparative Analysis

Specifically, the **F-distribution** table is an indispensable tool when performing an **ANOVA** (Analysis of Variance) or comparing the variances of two different populations. The F-test helps determine if the means of several groups are equal or if there is a statistically significant difference between them. This is achieved by calculating the **F-statistic**, which is a ratio of two variances. To interpret this statistic, researchers must refer to an F-distribution table that matches their chosen alpha level and the degrees of freedom for both the numerator and the denominator of their ratio.

Below are several examples of F-distribution tables tailored to different levels of **statistical significance**. These tables are used to identify the boundaries of the rejection region in hypothesis

testing. Depending on the rigor required for the study--whether a more lenient 0.10 level or a highly stringent 0.001 level--the researcher will select the appropriate table to find the necessary critical value. Using the correct table is vital, as a value that is significant at $\alpha = 0.10$ may not be significant at $\alpha = 0.01$.

# F Distribution Table

## F Table for $\alpha = 0.10$ (Click to zoom in)

| | DF1 | α = 0.10 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DF2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 | 60 | 120 | Inf |
| 1 | 39.863 | 49.5 | 53.593 | 55.833 | 57.24 | 58.204 | 58.906 | 59.439 | 59.858 | 60.195 | 60.705 | 61.22 | 61.74 | 62.002 | 62.265 | 62.529 | 62.794 | 63.061 | 63.328 |
| 2 | 8.5263 | 9 | 9.1618 | 9.2434 | 9.2926 | 9.3255 | 9.3491 | 9.3668 | 9.3805 | 9.3916 | 9.4081 | 9.4247 | 9.4413 | 9.4496 | 9.4579 | 9.4662 | 9.4746 | 9.4829 | 9.4912 |
| 3 | 5.5383 | 5.4624 | 5.3908 | 5.3426 | 5.3092 | 5.2847 | 5.2662 | 5.2517 | 5.24 | 5.2304 | 5.2156 | 5.2003 | 5.1845 | 5.1764 | 5.1681 | 5.1597 | 5.1512 | 5.1425 | 5.1337 |
| 4 | 4.5448 | 4.3246 | 4.1909 | 4.1073 | 4.0506 | 4.0098 | 3.979 | 3.9549 | 3.9357 | 3.9199 | 3.8955 | 3.8704 | 3.8443 | 3.831 | 3.8174 | 3.8036 | 3.7896 | 3.7753 | 3.7607 |
| 5 | 4.0604 | 3.7797 | 3.6195 | 3.5202 | 3.453 | 3.4045 | 3.3679 | 3.3393 | 3.3163 | 3.2974 | 3.2682 | 3.238 | 3.2067 | 3.1905 | 3.1741 | 3.1573 | 3.1402 | 3.1228 | 3.105 |
| 6 | 3.776 | 3.4633 | 3.2888 | 3.1808 | 3.1075 | 3.0546 | 3.0145 | 2.983 | 2.9577 | 2.9369 | 2.9047 | 2.8712 | 2.8363 | 2.8183 | 2.8 | 2.7812 | 2.762 | 2.7423 | 2.7222 |
| 7 | 3.5894 | 3.2574 | 3.0741 | 2.9605 | 2.8833 | 2.8274 | 2.7849 | 2.7516 | 2.7247 | 2.7025 | 2.6681 | 2.6322 | 2.5947 | 2.5753 | 2.5555 | 2.5351 | 2.5142 | 2.4928 | 2.4708 |
| 8 | 3.4579 | 3.1131 | 2.9238 | 2.8064 | 2.7265 | 2.6683 | 2.6241 | 2.5894 | 2.5612 | 2.538 | 2.502 | 2.4642 | 2.4246 | 2.4041 | 2.383 | 2.3614 | 2.3391 | 2.3162 | 2.2926 |
| 9 | 3.3603 | 3.0065 | 2.8129 | 2.6927 | 2.6106 | 2.5509 | 2.5053 | 2.4694 | 2.4403 | 2.4163 | 2.3789 | 2.3396 | 2.2983 | 2.2768 | 2.2547 | 2.232 | 2.2085 | 2.1843 | 2.1592 |
| 10 | 3.285 | 2.9245 | 2.7277 | 2.6053 | 2.5216 | 2.4606 | 2.414 | 2.3772 | 2.3473 | 2.3226 | 2.2841 | 2.2435 | 2.2007 | 2.1784 | 2.1554 | 2.1317 | 2.1072 | 2.0818 | 2.0554 |
| 11 | 3.2252 | 2.8595 | 2.6602 | 2.5362 | 2.4512 | 2.3891 | 2.3416 | 2.304 | 2.2735 | 2.2482 | 2.2087 | 2.1671 | 2.1231 | 2.1 | 2.0762 | 2.0516 | 2.0261 | 1.9997 | 1.9721 |
| 12 | 3.1766 | 2.8068 | 2.6055 | 2.4801 | 2.394 | 2.331 | 2.2828 | 2.2446 | 2.2135 | 2.1878 | 2.1474 | 2.1049 | 2.0597 | 2.036 | 2.0115 | 1.9861 | 1.9597 | 1.9323 | 1.9036 |
| 13 | 3.1362 | 2.7632 | 2.5603 | 2.4337 | 2.3467 | 2.283 | 2.2341 | 2.1954 | 2.1638 | 2.1376 | 2.0966 | 2.0532 | 2.007 | 1.9827 | 1.9576 | 1.9315 | 1.9043 | 1.8759 | 1.8462 |
| 14 | 3.1022 | 2.7265 | 2.5222 | 2.3947 | 2.3069 | 2.2426 | 2.1931 | 2.1539 | 2.122 | 2.0954 | 2.0537 | 2.0095 | 1.9625 | 1.9377 | 1.9119 | 1.8852 | 1.8572 | 1.828 | 1.7973 |
| 15 | 3.0732 | 2.6952 | 2.4898 | 2.3614 | 2.273 | 2.2081 | 2.1582 | 2.1185 | 2.0862 | 2.0593 | 2.0171 | 1.9722 | 1.9243 | 1.899 | 1.8728 | 1.8454 | 1.8168 | 1.7867 | 1.7551 |
| 16 | 3.0481 | 2.6682 | 2.4618 | 2.3327 | 2.2438 | 2.1783 | 2.128 | 2.088 | 2.0553 | 2.0282 | 1.9854 | 1.9399 | 1.8913 | 1.8656 | 1.8388 | 1.8108 | 1.7816 | 1.7508 | 1.7182 |
| 17 | 3.0262 | 2.6446 | 2.4374 | 2.3078 | 2.2183 | 2.1524 | 2.1017 | 2.0613 | 2.0284 | 2.0009 | 1.9577 | 1.9117 | 1.8624 | 1.8362 | 1.809 | 1.7805 | 1.7506 | 1.7191 | 1.6856 |
| 18 | 3.007 | 2.624 | 2.416 | 2.2858 | 2.1958 | 2.1296 | 2.0785 | 2.0379 | 2.0047 | 1.977 | 1.9333 | 1.8868 | 1.8369 | 1.8104 | 1.7827 | 1.7537 | 1.7232 | 1.691 | 1.6567 |
| 19 | 2.9899 | 2.6056 | 2.397 | 2.2663 | 2.176 | 2.1094 | 2.058 | 2.0171 | 1.9836 | 1.9557 | 1.9117 | 1.8647 | 1.8142 | 1.7873 | 1.7592 | 1.7298 | 1.6988 | 1.6659 | 1.6308 |
| 20 | 2.9747 | 2.5893 | 2.3801 | 2.2489 | 2.1582 | 2.0913 | 2.0397 | 1.9985 | 1.9649 | 1.9367 | 1.8924 | 1.8449 | 1.7938 | 1.7667 | 1.7382 | 1.7083 | 1.6768 | 1.6433 | 1.6074 |
| 21 | 2.961 | 2.5746 | 2.3649 | 2.2333 | 2.1423 | 2.0751 | 2.0233 | 1.9819 | 1.948 | 1.9197 | 1.875 | 1.8272 | 1.7756 | 1.7481 | 1.7193 | 1.689 | 1.6569 | 1.6228 | 1.5862 |
| 22 | 2.9486 | 2.5613 | 2.3512 | 2.2193 | 2.1279 | 2.0605 | 2.0084 | 1.9668 | 1.9327 | 1.9043 | 1.8593 | 1.8111 | 1.759 | 1.7312 | 1.7021 | 1.6714 | 1.6389 | 1.6042 | 1.5668 |
| 23 | 2.9374 | 2.5493 | 2.3387 | 2.2065 | 2.1149 | 2.0472 | 1.9949 | 1.9531 | 1.9189 | 1.8903 | 1.845 | 1.7964 | 1.7439 | 1.7159 | 1.6864 | 1.6554 | 1.6224 | 1.5871 | 1.549 |
| 24 | 2.9271 | 2.5383 | 2.3274 | 2.1949 | 2.103 | 2.0351 | 1.9826 | 1.9407 | 1.9063 | 1.8775 | 1.8319 | 1.7831 | 1.7302 | 1.7019 | 1.6721 | 1.6407 | 1.6073 | 1.5715 | 1.5327 |
| 25 | 2.9177 | 2.5283 | 2.317 | 2.1842 | 2.0922 | 2.0241 | 1.9714 | 1.9293 | 1.8947 | 1.8658 | 1.82 | 1.7708 | 1.7175 | 1.689 | 1.659 | 1.6272 | 1.5934 | 1.557 | 1.5176 |
| 26 | 2.9091 | 2.5191 | 2.3075 | 2.1745 | 2.0822 | 2.0139 | 1.961 | 1.9188 | 1.8841 | 1.855 | 1.809 | 1.7596 | 1.7059 | 1.6771 | 1.6468 | 1.6147 | 1.5805 | 1.5437 | 1.5036 |
| 27 | 2.9012 | 2.5106 | 2.2987 | 2.1655 | 2.073 | 2.0045 | 1.9515 | 1.9091 | 1.8743 | 1.8451 | 1.7989 | 1.7492 | 1.6951 | 1.6662 | 1.6356 | 1.6032 | 1.5686 | 1.5313 | 1.4906 |
| 28 | 2.8939 | 2.5028 | 2.2906 | 2.1571 | 2.0645 | 1.9959 | 1.9427 | 1.9001 | 1.8652 | 1.8359 | 1.7895 | 1.7395 | 1.6852 | 1.656 | 1.6252 | 1.5925 | 1.5575 | 1.5198 | 1.4784 |
| 29 | 2.887 | 2.4955 | 2.2831 | 2.1494 | 2.0566 | 1.9878 | 1.9345 | 1.8918 | 1.8568 | 1.8274 | 1.7808 | 1.7306 | 1.6759 | 1.6466 | 1.6155 | 1.5825 | 1.5472 | 1.509 | 1.467 |
| 30 | 2.8807 | 2.4887 | 2.2761 | 2.1422 | 2.0493 | 1.9803 | 1.9269 | 1.8841 | 1.849 | 1.8195 | 1.7727 | 1.7223 | 1.6673 | 1.6377 | 1.6065 | 1.5732 | 1.5376 | 1.4989 | 1.4564 |
| 40 | 2.8354 | 2.4404 | 2.2261 | 2.091 | 1.9968 | 1.9269 | 1.8725 | 1.8289 | 1.7929 | 1.7627 | 1.7146 | 1.6624 | 1.6052 | 1.5741 | 1.5411 | 1.5056 | 1.4672 | 1.4248 | 1.3769 |
| 60 | 2.7911 | 2.3933 | 2.1774 | 2.041 | 1.9457 | 1.8747 | 1.8194 | 1.7748 | 1.738 | 1.707 | 1.6574 | 1.6034 | 1.5435 | 1.5107 | 1.4755 | 1.4373 | 1.3952 | 1.3476 | 1.2915 |
| 120 | 2.7478 | 2.3473 | 2.13 | 1.9923 | 1.8959 | 1.8238 | 1.7675 | 1.722 | 1.6843 | 1.6524 | 1.6012 | 1.545 | 1.4821 | 1.4472 | 1.4094 | 1.3676 | 1.3203 | 1.2646 | 1.1926 |
| Inf | 2.7055 | 2.3026 | 2.0838 | 1.9449 | 1.8473 | 1.7741 | 1.7167 | 1.6702 | 1.6315 | 1.5987 | 1.5458 | 1.4871 | 1.4206 | 1.3832 | 1.3419 | 1.2951 | 1.24 | 1.1686 | 1 |

## F Table for $\alpha = 0.05$ (Click to zoom in)

| | DF1 | α = 0.05 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DF2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 | 60 | 120 | Inf |
| 1 | 161.45 | 199.5 | 215.71 | 224.58 | 230.16 | 233.99 | 236.77 | 238.88 | 240.54 | 241.88 | 243.91 | 245.95 | 248.01 | 249.05 | 250.1 | 251.14 | 252.2 | 253.25 | 254.31 |
| 2 | 18.513 | 19 | 19.164 | 19.247 | 19.296 | 19.33 | 19.353 | 19.371 | 19.385 | 19.396 | 19.413 | 19.429 | 19.446 | 19.454 | 19.462 | 19.471 | 19.479 | 19.487 | 19.496 |
| 3 | 10.128 | 9.5521 | 9.2766 | 9.1172 | 9.0135 | 8.9406 | 8.8867 | 8.8452 | 8.8123 | 8.7855 | 8.7446 | 8.7029 | 8.6602 | 8.6385 | 8.6166 | 8.5944 | 8.572 | 8.5494 | 8.5264 |
| 4 | 7.7086 | 6.9443 | 6.5914 | 6.3882 | 6.2561 | 6.1631 | 6.0942 | 6.041 | 5.9988 | 5.9644 | 5.9117 | 5.8578 | 5.8025 | 5.7744 | 5.7459 | 5.717 | 5.6877 | 5.6581 | 5.6281 |
| 5 | 6.6079 | 5.7861 | 5.4095 | 5.1922 | 5.0503 | 4.9503 | 4.8759 | 4.8183 | 4.7725 | 4.7351 | 4.6777 | 4.6188 | 4.5581 | 4.5272 | 4.4957 | 4.4638 | 4.4314 | 4.3985 | 4.365 |
| 6 | 5.9874 | 5.1433 | 4.7571 | 4.5337 | 4.3874 | 4.2839 | 4.2067 | 4.1468 | 4.099 | 4.06 | 3.9999 | 3.9381 | 3.8742 | 3.8415 | 3.8082 | 3.7743 | 3.7398 | 3.7047 | 3.6689 |
| 7 | 5.5914 | 4.7374 | 4.3468 | 4.1203 | 3.9715 | 3.866 | 3.787 | 3.7257 | 3.6767 | 3.6365 | 3.5747 | 3.5107 | 3.4445 | 3.4105 | 3.3758 | 3.3404 | 3.3043 | 3.2674 | 3.2298 |
| 8 | 5.3177 | 4.459 | 4.0662 | 3.8379 | 3.6875 | 3.5806 | 3.5005 | 3.4381 | 3.3881 | 3.3472 | 3.2839 | 3.2184 | 3.1503 | 3.1152 | 3.0794 | 3.0428 | 3.0053 | 2.9669 | 2.9276 |
| 9 | 5.1174 | 4.2565 | 3.8625 | 3.6331 | 3.4817 | 3.3738 | 3.2927 | 3.2296 | 3.1789 | 3.1373 | 3.0729 | 3.0061 | 2.9365 | 2.9005 | 2.8637 | 2.8259 | 2.7872 | 2.7475 | 2.7067 |
| 10 | 4.9646 | 4.1028 | 3.7083 | 3.478 | 3.3258 | 3.2172 | 3.1355 | 3.0717 | 3.0204 | 2.9782 | 2.913 | 2.845 | 2.774 | 2.7372 | 2.6996 | 2.6609 | 2.6211 | 2.5801 | 2.5379 |
| 11 | 4.8443 | 3.9823 | 3.5874 | 3.3567 | 3.2039 | 3.0946 | 3.0123 | 2.948 | 2.8962 | 2.8536 | 2.7876 | 2.7186 | 2.6464 | 2.609 | 2.5705 | 2.5309 | 2.4901 | 2.448 | 2.4045 |
| 12 | 4.7472 | 3.8853 | 3.4903 | 3.2592 | 3.1059 | 2.9961 | 2.9134 | 2.8486 | 2.7964 | 2.7534 | 2.6866 | 2.6169 | 2.5436 | 2.5055 | 2.4663 | 2.4259 | 2.3842 | 2.341 | 2.2962 |
| 13 | 4.6672 | 3.8056 | 3.4105 | 3.1791 | 3.0254 | 2.9153 | 2.8321 | 2.7669 | 2.7144 | 2.671 | 2.6037 | 2.5331 | 2.4589 | 2.4202 | 2.3803 | 2.3392 | 2.2966 | 2.2524 | 2.2064 |
| 14 | 4.6001 | 3.7389 | 3.3439 | 3.1122 | 2.9582 | 2.8477 | 2.7642 | 2.6987 | 2.6458 | 2.6022 | 2.5342 | 2.463 | 2.3879 | 2.3487 | 2.3082 | 2.2664 | 2.2229 | 2.1778 | 2.1307 |
| 15 | 4.5431 | 3.6823 | 3.2874 | 3.0556 | 2.9013 | 2.7905 | 2.7066 | 2.6408 | 2.5876 | 2.5437 | 2.4753 | 2.4034 | 2.3275 | 2.2878 | 2.2468 | 2.2043 | 2.1601 | 2.1141 | 2.0658 |
| 16 | 4.494 | 3.6337 | 3.2389 | 3.0069 | 2.8524 | 2.7413 | 2.6572 | 2.5911 | 2.5377 | 2.4935 | 2.4247 | 2.3522 | 2.2756 | 2.2354 | 2.1938 | 2.1507 | 2.1058 | 2.0589 | 2.0096 |
| 17 | 4.4513 | 3.5915 | 3.1968 | 2.9647 | 2.81 | 2.6987 | 2.6143 | 2.548 | 2.4943 | 2.4499 | 2.3807 | 2.3077 | 2.2304 | 2.1898 | 2.1477 | 2.104 | 2.0584 | 2.0107 | 1.9604 |
| 18 | 4.4139 | 3.5546 | 3.1599 | 2.9277 | 2.7729 | 2.6613 | 2.5767 | 2.5102 | 2.4563 | 2.4117 | 2.3421 | 2.2686 | 2.1906 | 2.1497 | 2.1071 | 2.0629 | 2.0166 | 1.9681 | 1.9168 |
| 19 | 4.3807 | 3.5219 | 3.1274 | 2.8951 | 2.7401 | 2.6283 | 2.5435 | 2.4768 | 2.4227 | 2.3779 | 2.308 | 2.2341 | 2.1555 | 2.1141 | 2.0712 | 2.0264 | 1.9795 | 1.9302 | 1.878 |
| 20 | 4.3512 | 3.4928 | 3.0984 | 2.8661 | 2.7109 | 2.599 | 2.514 | 2.4471 | 2.3928 | 2.3479 | 2.2776 | 2.2033 | 2.1242 | 2.0825 | 2.0391 | 1.9938 | 1.9464 | 1.8963 | 1.8432 |
| 21 | 4.3248 | 3.4668 | 3.0725 | 2.8401 | 2.6848 | 2.5727 | 2.4876 | 2.4205 | 2.366 | 2.321 | 2.2504 | 2.1757 | 2.096 | 2.054 | 2.0102 | 1.9645 | 1.9165 | 1.8657 | 1.8117 |
| 22 | 4.3009 | 3.4434 | 3.0491 | 2.8167 | 2.6613 | 2.5491 | 2.4638 | 2.3965 | 2.3419 | 2.2967 | 2.2258 | 2.1508 | 2.0707 | 2.0283 | 1.9842 | 1.938 | 1.8894 | 1.838 | 1.7831 |
| 23 | 4.2793 | 3.4221 | 3.028 | 2.7955 | 2.64 | 2.5277 | 2.4422 | 2.3748 | 2.3201 | 2.2747 | 2.2036 | 2.1282 | 2.0476 | 2.005 | 1.9605 | 1.9139 | 1.8648 | 1.8128 | 1.757 |
| 24 | 4.2597 | 3.4028 | 3.0088 | 2.7763 | 2.6207 | 2.5082 | 2.4226 | 2.3551 | 2.3002 | 2.2547 | 2.1834 | 2.1077 | 2.0267 | 1.9838 | 1.939 | 1.892 | 1.8424 | 1.7896 | 1.733 |
| 25 | 4.2417 | 3.3852 | 2.9912 | 2.7587 | 2.603 | 2.4904 | 2.4047 | 2.3371 | 2.2821 | 2.2365 | 2.1649 | 2.0889 | 2.0075 | 1.9643 | 1.9192 | 1.8718 | 1.8217 | 1.7684 | 1.711 |
| 26 | 4.2252 | 3.369 | 2.9752 | 2.7426 | 2.5868 | 2.4741 | 2.3883 | 2.3205 | 2.2655 | 2.2197 | 2.1479 | 2.0716 | 1.9898 | 1.9464 | 1.901 | 1.8533 | 1.8027 | 1.7488 | 1.6906 |
| 27 | 4.21 | 3.3541 | 2.9604 | 2.7278 | 2.5719 | 2.4591 | 2.3732 | 2.3053 | 2.2501 | 2.2043 | 2.1323 | 2.0558 | 1.9736 | 1.9299 | 1.8842 | 1.8361 | 1.7851 | 1.7306 | 1.6717 |
| 28 | 4.196 | 3.3404 | 2.9467 | 2.7141 | 2.5581 | 2.4453 | 2.3593 | 2.2913 | 2.236 | 2.19 | 2.1179 | 2.0411 | 1.9586 | 1.9147 | 1.8687 | 1.8203 | 1.7689 | 1.7138 | 1.6541 |
| 29 | 4.183 | 3.3277 | 2.934 | 2.7014 | 2.5454 | 2.4324 | 2.3463 | 2.2783 | 2.2229 | 2.1768 | 2.1045 | 2.0275 | 1.9446 | 1.9005 | 1.8543 | 1.8055 | 1.7537 | 1.6981 | 1.6376 |
| 30 | 4.1709 | 3.3158 | 2.9223 | 2.6896 | 2.5336 | 2.4205 | 2.3343 | 2.2662 | 2.2107 | 2.1646 | 2.0921 | 2.0148 | 1.9317 | 1.8874 | 1.8409 | 1.7918 | 1.7396 | 1.6835 | 1.6223 |
| 40 | 4.0847 | 3.2317 | 2.8387 | 2.606 | 2.4495 | 2.3359 | 2.249 | 2.1802 | 2.124 | 2.0772 | 2.0035 | 1.9245 | 1.8389 | 1.7929 | 1.7444 | 1.6928 | 1.6373 | 1.5766 | 1.5089 |
| 60 | 4.0012 | 3.1504 | 2.7581 | 2.5252 | 2.3683 | 2.2541 | 2.1665 | 2.097 | 2.0401 | 1.9926 | 1.9174 | 1.8364 | 1.748 | 1.7001 | 1.6491 | 1.5943 | 1.5343 | 1.4673 | 1.3893 |
| 120 | 3.9201 | 3.0718 | 2.6802 | 2.4472 | 2.2899 | 2.175 | 2.0868 | 2.0164 | 1.9588 | 1.9105 | 1.8337 | 1.7505 | 1.6587 | 1.6084 | 1.5543 | 1.4952 | 1.429 | 1.3519 | 1.2539 |
| Inf | 3.8415 | 2.9957 | 2.6049 | 2.3719 | 2.2141 | 2.0986 | 2.0096 | 1.9384 | 1.8799 | 1.8307 | 1.7522 | 1.6664 | 1.5705 | 1.5173 | 1.4591 | 1.394 | 1.318 | 1.2214 | 1 |

## F Table for α = 0.025 (Click to zoom in)

| | DF1 | α = 0.025 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DF2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 | 60 | 120 | Inf |
| 1 | 647.79 | 799.5 | 864.16 | 899.58 | 921.85 | 937.11 | 948.22 | 956.66 | 963.28 | 968.63 | 976.71 | 984.87 | 993.1 | 997.25 | 1001.4 | 1005.6 | 1009.8 | 1014 | 1018.3 |
| 2 | 38.506 | 39 | 39.166 | 39.248 | 39.298 | 39.332 | 39.355 | 39.373 | 39.387 | 39.398 | 39.415 | 39.431 | 39.448 | 39.456 | 39.465 | 39.473 | 39.481 | 39.49 | 39.498 |
| 3 | 17.443 | 16.044 | 15.439 | 15.101 | 14.885 | 14.735 | 14.624 | 14.54 | 14.473 | 14.419 | 14.337 | 14.253 | 14.167 | 14.124 | 14.081 | 14.037 | 13.992 | 13.947 | 13.902 |
| 4 | 12.218 | 10.649 | 9.9792 | 9.6045 | 9.3645 | 9.1973 | 9.0741 | 8.9796 | 8.9047 | 8.8439 | 8.7512 | 8.6565 | 8.5599 | 8.5109 | 8.461 | 8.411 | 8.36 | 8.309 | 8.257 |
| 5 | 10.007 | 8.4336 | 7.7636 | 7.3879 | 7.1464 | 6.9777 | 6.8531 | 6.7572 | 6.6811 | 6.6192 | 6.5245 | 6.4277 | 6.3286 | 6.278 | 6.227 | 6.175 | 6.123 | 6.069 | 6.015 |
| 6 | 8.8131 | 7.2599 | 6.5988 | 6.2272 | 5.9876 | 5.8198 | 5.6955 | 5.5996 | 5.5234 | 5.4613 | 5.3662 | 5.2687 | 5.1684 | 5.1172 | 5.065 | 5.012 | 4.959 | 4.904 | 4.849 |
| 7 | 8.0727 | 6.5415 | 5.8898 | 5.5226 | 5.2852 | 5.1186 | 4.9949 | 4.8993 | 4.8232 | 4.7611 | 4.6658 | 4.5678 | 4.4667 | 4.415 | 4.362 | 4.309 | 4.254 | 4.199 | 4.142 |
| 8 | 7.5709 | 6.0595 | 5.416 | 5.0526 | 4.8173 | 4.6517 | 4.5286 | 4.4333 | 4.3572 | 4.2951 | 4.1997 | 4.1012 | 3.9995 | 3.9472 | 3.894 | 3.84 | 3.784 | 3.728 | 3.67 |
| 9 | 7.2093 | 5.7147 | 5.0781 | 4.7181 | 4.4844 | 4.3197 | 4.197 | 4.102 | 4.026 | 3.9639 | 3.8682 | 3.7694 | 3.6669 | 3.6142 | 3.56 | 3.505 | 3.449 | 3.392 | 3.333 |
| 10 | 6.9367 | 5.4564 | 4.8256 | 4.4683 | 4.2361 | 4.0721 | 3.9498 | 3.8549 | 3.779 | 3.7168 | 3.6209 | 3.5217 | 3.4185 | 3.3654 | 3.311 | 3.255 | 3.198 | 3.14 | 3.08 |
| 11 | 6.7241 | 5.2559 | 4.63 | 4.2751 | 4.044 | 3.8807 | 3.7586 | 3.6638 | 3.5879 | 3.5257 | 3.4296 | 3.3299 | 3.2261 | 3.1725 | 3.118 | 3.061 | 3.004 | 2.944 | 2.883 |
| 12 | 6.5538 | 5.0959 | 4.4742 | 4.1212 | 3.8911 | 3.7283 | 3.6065 | 3.5118 | 3.4358 | 3.3736 | 3.2773 | 3.1772 | 3.0728 | 3.0187 | 2.963 | 2.906 | 2.848 | 2.787 | 2.725 |
| 13 | 6.4143 | 4.9653 | 4.3472 | 3.9959 | 3.7667 | 3.6043 | 3.4827 | 3.388 | 3.312 | 3.2497 | 3.1532 | 3.0527 | 2.9477 | 2.8932 | 2.837 | 2.78 | 2.72 | 2.659 | 2.595 |
| 14 | 6.2979 | 4.8567 | 4.2417 | 3.8919 | 3.6634 | 3.5014 | 3.3799 | 3.2853 | 3.2093 | 3.1469 | 3.0502 | 2.9493 | 2.8437 | 2.7888 | 2.732 | 2.674 | 2.614 | 2.552 | 2.487 |
| 15 | 6.1995 | 4.765 | 4.1528 | 3.8043 | 3.5764 | 3.4147 | 3.2934 | 3.1987 | 3.1227 | 3.0602 | 2.9633 | 2.8621 | 2.7559 | 2.7006 | 2.644 | 2.585 | 2.524 | 2.461 | 2.395 |
| 16 | 6.1151 | 4.6867 | 4.0768 | 3.7294 | 3.5021 | 3.3406 | 3.2194 | 3.1248 | 3.0488 | 2.9862 | 2.889 | 2.7875 | 2.6808 | 2.6252 | 2.568 | 2.509 | 2.447 | 2.383 | 2.316 |
| 17 | 6.042 | 4.6189 | 4.0112 | 3.6648 | 3.4379 | 3.2767 | 3.1556 | 3.061 | 2.9849 | 2.9222 | 2.8249 | 2.723 | 2.6158 | 2.5598 | 2.502 | 2.442 | 2.38 | 2.315 | 2.247 |
| 18 | 5.9781 | 4.5597 | 3.9539 | 3.6083 | 3.382 | 3.2209 | 3.0999 | 3.0053 | 2.9291 | 2.8664 | 2.7689 | 2.6667 | 2.559 | 2.5027 | 2.445 | 2.384 | 2.321 | 2.256 | 2.187 |
| 19 | 5.9216 | 4.5075 | 3.9034 | 3.5587 | 3.3327 | 3.1718 | 3.0509 | 2.9563 | 2.8801 | 2.8172 | 2.7196 | 2.6171 | 2.5089 | 2.4523 | 2.394 | 2.333 | 2.27 | 2.203 | 2.133 |
| 20 | 5.8715 | 4.4613 | 3.8587 | 3.5147 | 3.2891 | 3.1283 | 3.0074 | 2.9128 | 2.8365 | 2.7737 | 2.6758 | 2.5731 | 2.4645 | 2.4076 | 2.349 | 2.287 | 2.223 | 2.156 | 2.085 |
| 21 | 5.8266 | 4.4199 | 3.8188 | 3.4754 | 3.2501 | 3.0895 | 2.9686 | 2.874 | 2.7977 | 2.7348 | 2.6368 | 2.5338 | 2.4247 | 2.3675 | 2.308 | 2.246 | 2.182 | 2.114 | 2.042 |
| 22 | 5.7863 | 4.3828 | 3.7829 | 3.4401 | 3.2151 | 3.0546 | 2.9338 | 2.8392 | 2.7628 | 2.6998 | 2.6017 | 2.4984 | 2.389 | 2.3315 | 2.272 | 2.21 | 2.145 | 2.076 | 2.003 |
| 23 | 5.7498 | 4.3492 | 3.7505 | 3.4083 | 3.1835 | 3.0232 | 2.9023 | 2.8077 | 2.7313 | 2.6682 | 2.5699 | 2.4665 | 2.3567 | 2.2989 | 2.239 | 2.176 | 2.111 | 2.041 | 1.968 |
| 24 | 5.7166 | 4.3187 | 3.7211 | 3.3794 | 3.1548 | 2.9946 | 2.8738 | 2.7791 | 2.7027 | 2.6396 | 2.5411 | 2.4374 | 2.3273 | 2.2693 | 2.209 | 2.146 | 2.08 | 2.01 | 1.935 |
| 25 | 5.6864 | 4.2909 | 3.6943 | 3.353 | 3.1287 | 2.9685 | 2.8478 | 2.7531 | 2.6766 | 2.6135 | 2.5149 | 2.411 | 2.3005 | 2.2422 | 2.182 | 2.118 | 2.052 | 1.981 | 1.906 |
| 26 | 5.6586 | 4.2655 | 3.6697 | 3.3289 | 3.1048 | 2.9447 | 2.824 | 2.7293 | 2.6528 | 2.5896 | 2.4908 | 2.3867 | 2.2759 | 2.2174 | 2.157 | 2.093 | 2.026 | 1.954 | 1.878 |
| 27 | 5.6331 | 4.2421 | 3.6472 | 3.3067 | 3.0828 | 2.9228 | 2.8021 | 2.7074 | 2.6309 | 2.5676 | 2.4688 | 2.3644 | 2.2533 | 2.1946 | 2.133 | 2.069 | 2.002 | 1.93 | 1.853 |
| 28 | 5.6096 | 4.2205 | 3.6264 | 3.2863 | 3.0626 | 2.9027 | 2.782 | 2.6872 | 2.6106 | 2.5473 | 2.4484 | 2.3438 | 2.2324 | 2.1735 | 2.112 | 2.048 | 1.98 | 1.907 | 1.829 |
| 29 | 5.5878 | 4.2006 | 3.6072 | 3.2674 | 3.0438 | 2.884 | 2.7633 | 2.6686 | 2.5919 | 2.5286 | 2.4295 | 2.3248 | 2.2131 | 2.154 | 2.092 | 2.028 | 1.959 | 1.886 | 1.807 |
| 30 | 5.5675 | 4.1821 | 3.5894 | 3.2499 | 3.0265 | 2.8667 | 2.746 | 2.6513 | 2.5746 | 2.5112 | 2.412 | 2.3072 | 2.1952 | 2.1359 | 2.074 | 2.009 | 1.94 | 1.866 | 1.787 |
| 40 | 5.4239 | 4.051 | 3.4633 | 3.1261 | 2.9037 | 2.7444 | 2.6238 | 2.5289 | 2.4519 | 2.3882 | 2.2882 | 2.1819 | 2.0677 | 2.0069 | 1.943 | 1.875 | 1.803 | 1.724 | 1.637 |
| 60 | 5.2856 | 3.9253 | 3.3425 | 3.0077 | 2.7863 | 2.6274 | 2.5068 | 2.4117 | 2.3344 | 2.2702 | 2.1692 | 2.0613 | 1.9445 | 1.8817 | 1.815 | 1.744 | 1.667 | 1.581 | 1.482 |
| 120 | 5.1523 | 3.8046 | 3.2269 | 2.8943 | 2.674 | 2.5154 | 2.3948 | 2.2994 | 2.2217 | 2.157 | 2.0548 | 1.945 | 1.8249 | 1.7597 | 1.69 | 1.614 | 1.53 | 1.433 | 1.31 |
| Inf | 5.0239 | 3.6889 | 3.1161 | 2.7858 | 2.5665 | 2.4082 | 2.2875 | 2.1918 | 2.1136 | 2.0483 | 1.9447 | 1.8326 | 1.7085 | 1.6402 | 1.566 | 1.484 | 1.388 | 1.268 | 1 |



## F Table for α = 0.01 (Click to zoom in)

| | DF1 | α = 0.01 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DF2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 | 60 | 120 | Inf |
| 1 | 4052.2 | 4999.5 | 5403.4 | 5624.6 | 5763.7 | 5859 | 5928.4 | 5981.1 | 6022.5 | 6055.8 | 6106.3 | 6157.3 | 6208.7 | 6234.6 | 6260.6 | 6286.8 | 6313 | 6339.4 | 6365.9 |
| 2 | 98.503 | 99 | 99.166 | 99.249 | 99.299 | 99.333 | 99.356 | 99.374 | 99.388 | 99.399 | 99.416 | 99.433 | 99.449 | 99.458 | 99.466 | 99.474 | 99.482 | 99.491 | 99.499 |
| 3 | 34.116 | 30.817 | 29.457 | 28.71 | 28.237 | 27.911 | 27.672 | 27.489 | 27.345 | 27.229 | 27.052 | 26.872 | 26.69 | 26.598 | 26.505 | 26.411 | 26.316 | 26.221 | 26.125 |
| 4 | 21.198 | 18 | 16.694 | 15.977 | 15.522 | 15.207 | 14.976 | 14.799 | 14.659 | 14.546 | 14.374 | 14.198 | 14.02 | 13.929 | 13.838 | 13.745 | 13.652 | 13.558 | 13.463 |
| 5 | 16.258 | 13.274 | 12.06 | 11.392 | 10.967 | 10.672 | 10.456 | 10.289 | 10.158 | 10.051 | 9.888 | 9.722 | 9.553 | 9.466 | 9.379 | 9.291 | 9.202 | 9.112 | 9.02 |
| 6 | 13.745 | 10.925 | 9.78 | 9.148 | 8.746 | 8.466 | 8.26 | 8.102 | 7.976 | 7.874 | 7.718 | 7.559 | 7.396 | 7.313 | 7.229 | 7.143 | 7.057 | 6.969 | 6.88 |
| 7 | 12.246 | 9.547 | 8.451 | 7.847 | 7.46 | 7.191 | 6.993 | 6.84 | 6.719 | 6.62 | 6.469 | 6.314 | 6.155 | 6.074 | 5.992 | 5.908 | 5.824 | 5.737 | 5.65 |
| 8 | 11.259 | 8.649 | 7.591 | 7.006 | 6.632 | 6.371 | 6.178 | 6.029 | 5.911 | 5.814 | 5.667 | 5.515 | 5.359 | 5.279 | 5.198 | 5.116 | 5.032 | 4.946 | 4.859 |
| 9 | 10.561 | 8.022 | 6.992 | 6.422 | 6.057 | 5.802 | 5.613 | 5.467 | 5.351 | 5.257 | 5.111 | 4.962 | 4.808 | 4.729 | 4.649 | 4.567 | 4.483 | 4.398 | 4.311 |
| 10 | 10.044 | 7.559 | 6.552 | 5.994 | 5.636 | 5.386 | 5.2 | 5.057 | 4.942 | 4.849 | 4.706 | 4.558 | 4.405 | 4.327 | 4.247 | 4.165 | 4.082 | 3.996 | 3.909 |
| 11 | 9.646 | 7.206 | 6.217 | 5.668 | 5.316 | 5.069 | 4.886 | 4.744 | 4.632 | 4.539 | 4.397 | 4.251 | 4.099 | 4.021 | 3.941 | 3.86 | 3.776 | 3.69 | 3.602 |
| 12 | 9.33 | 6.927 | 5.953 | 5.412 | 5.064 | 4.821 | 4.64 | 4.499 | 4.388 | 4.296 | 4.155 | 4.01 | 3.858 | 3.78 | 3.701 | 3.619 | 3.535 | 3.449 | 3.361 |
| 13 | 9.074 | 6.701 | 5.739 | 5.205 | 4.862 | 4.62 | 4.441 | 4.302 | 4.191 | 4.1 | 3.96 | 3.815 | 3.665 | 3.587 | 3.507 | 3.425 | 3.341 | 3.255 | 3.165 |
| 14 | 8.862 | 6.515 | 5.564 | 5.035 | 4.695 | 4.456 | 4.278 | 4.14 | 4.03 | 3.939 | 3.8 | 3.656 | 3.505 | 3.427 | 3.348 | 3.266 | 3.181 | 3.094 | 3.004 |
| 15 | 8.683 | 6.359 | 5.417 | 4.893 | 4.556 | 4.318 | 4.142 | 4.004 | 3.895 | 3.805 | 3.666 | 3.522 | 3.372 | 3.294 | 3.214 | 3.132 | 3.047 | 2.959 | 2.868 |
| 16 | 8.531 | 6.226 | 5.292 | 4.773 | 4.437 | 4.202 | 4.026 | 3.89 | 3.78 | 3.691 | 3.553 | 3.409 | 3.259 | 3.181 | 3.101 | 3.018 | 2.933 | 2.845 | 2.753 |
| 17 | 8.4 | 6.112 | 5.185 | 4.669 | 4.336 | 4.102 | 3.927 | 3.791 | 3.682 | 3.593 | 3.455 | 3.312 | 3.162 | 3.084 | 3.003 | 2.92 | 2.835 | 2.746 | 2.653 |
| 18 | 8.285 | 6.013 | 5.092 | 4.579 | 4.248 | 4.015 | 3.841 | 3.705 | 3.597 | 3.508 | 3.371 | 3.227 | 3.077 | 2.999 | 2.919 | 2.835 | 2.749 | 2.66 | 2.566 |
| 19 | 8.185 | 5.926 | 5.01 | 4.5 | 4.171 | 3.939 | 3.765 | 3.631 | 3.523 | 3.434 | 3.297 | 3.153 | 3.003 | 2.925 | 2.844 | 2.761 | 2.674 | 2.584 | 2.489 |
| 20 | 8.096 | 5.849 | 4.938 | 4.431 | 4.103 | 3.871 | 3.699 | 3.564 | 3.457 | 3.368 | 3.231 | 3.088 | 2.938 | 2.859 | 2.778 | 2.695 | 2.608 | 2.517 | 2.421 |
| 21 | 8.017 | 5.78 | 4.874 | 4.369 | 4.042 | 3.812 | 3.64 | 3.506 | 3.398 | 3.31 | 3.173 | 3.03 | 2.88 | 2.801 | 2.72 | 2.636 | 2.548 | 2.457 | 2.36 |
| 22 | 7.945 | 5.719 | 4.817 | 4.313 | 3.988 | 3.758 | 3.587 | 3.453 | 3.346 | 3.258 | 3.121 | 2.978 | 2.827 | 2.749 | 2.667 | 2.583 | 2.495 | 2.403 | 2.305 |
| 23 | 7.881 | 5.664 | 4.765 | 4.264 | 3.939 | 3.71 | 3.539 | 3.406 | 3.299 | 3.211 | 3.074 | 2.931 | 2.781 | 2.702 | 2.62 | 2.535 | 2.447 | 2.354 | 2.256 |
| 24 | 7.823 | 5.614 | 4.718 | 4.218 | 3.895 | 3.667 | 3.496 | 3.363 | 3.256 | 3.168 | 3.032 | 2.889 | 2.738 | 2.659 | 2.577 | 2.492 | 2.403 | 2.31 | 2.211 |
| 25 | 7.77 | 5.568 | 4.675 | 4.177 | 3.855 | 3.627 | 3.457 | 3.324 | 3.217 | 3.129 | 2.993 | 2.85 | 2.699 | 2.62 | 2.538 | 2.453 | 2.364 | 2.27 | 2.169 |
| 26 | 7.721 | 5.526 | 4.637 | 4.14 | 3.818 | 3.591 | 3.421 | 3.288 | 3.182 | 3.094 | 2.958 | 2.815 | 2.664 | 2.585 | 2.503 | 2.417 | 2.327 | 2.233 | 2.131 |
| 27 | 7.677 | 5.488 | 4.601 | 4.106 | 3.785 | 3.558 | 3.388 | 3.256 | 3.149 | 3.062 | 2.926 | 2.783 | 2.632 | 2.552 | 2.47 | 2.384 | 2.294 | 2.198 | 2.097 |
| 28 | 7.636 | 5.453 | 4.568 | 4.074 | 3.754 | 3.528 | 3.358 | 3.226 | 3.12 | 3.032 | 2.896 | 2.753 | 2.602 | 2.522 | 2.44 | 2.354 | 2.263 | 2.167 | 2.064 |
| 29 | 7.598 | 5.42 | 4.538 | 4.045 | 3.725 | 3.499 | 3.33 | 3.198 | 3.092 | 3.005 | 2.868 | 2.726 | 2.574 | 2.495 | 2.412 | 2.325 | 2.234 | 2.138 | 2.034 |
| 30 | 7.562 | 5.39 | 4.51 | 4.018 | 3.699 | 3.473 | 3.304 | 3.173 | 3.067 | 2.979 | 2.843 | 2.7 | 2.549 | 2.469 | 2.386 | 2.299 | 2.208 | 2.111 | 2.006 |
| 40 | 7.314 | 5.179 | 4.313 | 3.828 | 3.514 | 3.291 | 3.124 | 2.993 | 2.888 | 2.801 | 2.665 | 2.522 | 2.369 | 2.288 | 2.203 | 2.114 | 2.019 | 1.917 | 1.805 |
| 60 | 7.077 | 4.977 | 4.126 | 3.649 | 3.339 | 3.119 | 2.953 | 2.823 | 2.718 | 2.632 | 2.496 | 2.352 | 2.198 | 2.115 | 2.028 | 1.936 | 1.836 | 1.726 | 1.601 |
| 120 | 6.851 | 4.787 | 3.949 | 3.48 | 3.174 | 2.956 | 2.792 | 2.663 | 2.559 | 2.472 | 2.336 | 2.192 | 2.035 | 1.95 | 1.86 | 1.763 | 1.656 | 1.533 | 1.381 |
| Inf | 6.635 | 4.605 | 3.782 | 3.319 | 3.017 | 2.802 | 2.639 | 2.511 | 2.407 | 2.321 | 2.185 | 2.039 | 1.878 | 1.791 | 1.696 | 1.592 | 1.473 | 1.325 | 1 |

## F Table for α = 0.001 (Click to zoom in)

| | DF1 | α = 0.001 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DF2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 | 60 | 120 | Inf |
| 1 | 405284 | 500000 | 540379 | 562500 | 576405 | 585937 | 592873 | 598144 | 602284 | 605621 | 610668 | 615764 | 620908 | 623497 | 626099 | 628712 | 631337 | 633972 | 636619 |
| 2 | 998.5 | 999 | 999.17 | 999.25 | 999.3 | 999.33 | 999.36 | 999.37 | 999.39 | 999.4 | 999.42 | 999.43 | 999.45 | 999.46 | 999.47 | 999.47 | 999.48 | 999.49 | 999.5 |
| 3 | 167.03 | 148.5 | 141.11 | 137.1 | 134.58 | 132.85 | 131.58 | 130.62 | 129.86 | 129.25 | 128.32 | 127.37 | 126.42 | 125.93 | 125.45 | 124.96 | 124.47 | 123.97 | 123.47 |
| 4 | 74.137 | 61.246 | 56.177 | 53.436 | 51.712 | 50.525 | 49.658 | 48.996 | 48.475 | 48.053 | 47.412 | 46.761 | 46.1 | 45.766 | 45.429 | 45.089 | 44.746 | 44.4 | 44.051 |
| 5 | 47.181 | 37.122 | 33.202 | 31.085 | 29.752 | 28.834 | 28.163 | 27.649 | 27.244 | 26.917 | 26.418 | 25.911 | 25.395 | 25.133 | 24.869 | 24.602 | 24.333 | 24.06 | 23.785 |
| 6 | 35.507 | 27 | 23.703 | 21.924 | 20.803 | 20.03 | 19.463 | 19.03 | 18.688 | 18.411 | 17.989 | 17.559 | 17.12 | 16.897 | 16.672 | 16.445 | 16.214 | 15.981 | 15.745 |
| 7 | 29.245 | 21.689 | 18.772 | 17.198 | 16.206 | 15.521 | 15.019 | 14.634 | 14.33 | 14.083 | 13.707 | 13.324 | 12.932 | 12.732 | 12.53 | 12.326 | 12.119 | 11.909 | 11.696 |
| 8 | 25.415 | 18.494 | 15.829 | 14.392 | 13.485 | 12.858 | 12.398 | 12.046 | 11.767 | 11.54 | 11.194 | 10.841 | 10.48 | 10.295 | 10.109 | 9.9194 | 9.7272 | 9.5321 | 9.3337 |
| 9 | 22.857 | 16.387 | 13.902 | 12.56 | 11.714 | 11.128 | 10.698 | 10.368 | 10.107 | 9.8943 | 9.57 | 9.2381 | 8.8976 | 8.7239 | 8.5476 | 8.3685 | 8.1865 | 8.0014 | 7.8128 |
| 10 | 21.04 | 14.905 | 12.553 | 11.283 | 10.481 | 9.9256 | 9.5175 | 9.2041 | 8.9558 | 8.7539 | 8.4452 | 8.1288 | 7.8037 | 7.6376 | 7.4688 | 7.2971 | 7.1224 | 6.9443 | 6.7625 |
| 11 | 19.687 | 13.812 | 11.561 | 10.346 | 9.5784 | 9.0466 | 8.6553 | 8.3548 | 8.1163 | 7.9224 | 7.6256 | 7.321 | 7.0076 | 6.8471 | 6.6839 | 6.5178 | 6.3483 | 6.1753 | 5.9983 |
| 12 | 18.643 | 12.974 | 10.804 | 9.6327 | 8.8921 | 8.3788 | 8.0009 | 7.7104 | 7.4797 | 7.292 | 7.0046 | 6.7092 | 6.4048 | 6.2488 | 6.0898 | 5.9278 | 5.7623 | 5.5931 | 5.4195 |
| 13 | 17.815 | 12.313 | 10.209 | 9.0727 | 8.3541 | 7.8557 | 7.4886 | 7.2061 | 6.9818 | 6.7992 | 6.5192 | 6.2312 | 5.934 | 5.7814 | 5.6258 | 5.467 | 5.3046 | 5.1381 | 4.9671 |
| 14 | 17.143 | 11.779 | 9.7294 | 8.6223 | 7.9218 | 7.4358 | 7.0775 | 6.8017 | 6.5826 | 6.4041 | 6.1302 | 5.8483 | 5.5568 | 5.407 | 5.2542 | 5.0979 | 4.9378 | 4.7735 | 4.6042 |
| 15 | 16.587 | 11.339 | 9.3353 | 8.2527 | 7.5674 | 7.0917 | 6.7408 | 6.4707 | 6.2559 | 6.0808 | 5.8121 | 5.5351 | 5.2484 | 5.1009 | 4.9502 | 4.7959 | 4.6377 | 4.475 | 4.307 |
| 16 | 16.12 | 10.971 | 9.0059 | 7.9442 | 7.2719 | 6.8049 | 6.4604 | 6.195 | 5.9839 | 5.8117 | 5.5473 | 5.2745 | 4.9918 | 4.8462 | 4.6972 | 4.5446 | 4.3878 | 4.2263 | 4.0592 |
| 17 | 15.722 | 10.658 | 8.7269 | 7.6831 | 7.0219 | 6.5625 | 6.2234 | 5.962 | 5.7541 | 5.5844 | 5.3237 | 5.0544 | 4.7751 | 4.6311 | 4.4836 | 4.3323 | 4.1767 | 4.016 | 3.8496 |
| 18 | 15.379 | 10.39 | 8.4875 | 7.4593 | 6.8078 | 6.355 | 6.0206 | 5.7628 | 5.5575 | 5.39 | 5.1324 | 4.8663 | 4.5899 | 4.4471 | 4.3009 | 4.1507 | 3.996 | 3.836 | 3.6698 |
| 19 | 15.081 | 10.157 | 8.2799 | 7.2655 | 6.6225 | 6.1754 | 5.8452 | 5.5904 | 5.3876 | 5.2219 | 4.9672 | 4.7037 | 4.4297 | 4.2881 | 4.1429 | 3.9936 | 3.8396 | 3.6801 | 3.5141 |
| 20 | 14.819 | 9.9526 | 8.0984 | 7.096 | 6.4606 | 6.0186 | 5.692 | 5.44 | 5.2392 | 5.0752 | 4.8229 | 4.5618 | 4.29 | 4.1493 | 4.005 | 3.8564 | 3.703 | 3.5438 | 3.3778 |
| 21 | 14.587 | 9.7723 | 7.9383 | 6.9467 | 6.3179 | 5.8805 | 5.5571 | 5.3076 | 5.1087 | 4.9462 | 4.696 | 4.4369 | 4.167 | 4.0272 | 3.8836 | 3.7357 | 3.5827 | 3.4237 | 3.2575 |
| 22 | 14.38 | 9.612 | 7.796 | 6.8142 | 6.1914 | 5.758 | 5.4376 | 5.1901 | 4.9929 | 4.8317 | 4.5835 | 4.3262 | 4.0579 | 3.9189 | 3.7759 | 3.6285 | 3.4759 | 3.317 | 3.1505 |
| 23 | 14.195 | 9.4685 | 7.6688 | 6.6957 | 6.0783 | 5.6486 | 5.3308 | 5.0853 | 4.8896 | 4.7296 | 4.4831 | 4.2274 | 3.9606 | 3.8222 | 3.6798 | 3.5328 | 3.3804 | 3.2216 | 3.0548 |
| 24 | 14.028 | 9.3394 | 7.5545 | 6.5892 | 5.9768 | 5.5504 | 5.2349 | 4.9912 | 4.7968 | 4.6379 | 4.3929 | 4.1387 | 3.8732 | 3.7354 | 3.5935 | 3.4468 | 3.2946 | 3.1357 | 2.9685 |
| 25 | 13.877 | 9.2225 | 7.4511 | 6.4931 | 5.8851 | 5.4617 | 5.1484 | 4.9063 | 4.7131 | 4.5551 | 4.3116 | 4.0587 | 3.7944 | 3.657 | 3.5155 | 3.3692 | 3.2171 | 3.0581 | 2.8904 |
| 26 | 13.739 | 9.1163 | 7.3572 | 6.4057 | 5.8018 | 5.3812 | 5.0698 | 4.8292 | 4.6372 | 4.4801 | 4.2378 | 3.9861 | 3.7228 | 3.5859 | 3.4448 | 3.2987 | 3.1467 | 2.9875 | 2.8193 |
| 27 | 13.613 | 9.0194 | 7.2715 | 6.3261 | 5.7259 | 5.3078 | 4.9983 | 4.759 | 4.568 | 4.4117 | 4.1706 | 3.92 | 3.6576 | 3.5211 | 3.3803 | 3.2344 | 3.0825 | 2.9231 | 2.7543 |
| 28 | 13.498 | 8.9305 | 7.1931 | 6.2532 | 5.6565 | 5.2407 | 4.9328 | 4.6947 | 4.5047 | 4.3491 | 4.1091 | 3.8595 | 3.598 | 3.4618 | 3.3213 | 3.1755 | 3.0236 | 2.864 | 2.6947 |
| 29 | 13.391 | 8.8488 | 7.121 | 6.1863 | 5.5927 | 5.1791 | 4.8727 | 4.6358 | 4.4466 | 4.2917 | 4.0526 | 3.8039 | 3.5432 | 3.4074 | 3.2671 | 3.1215 | 2.9695 | 2.8097 | 2.6397 |
| 30 | 13.293 | 8.7734 | 7.0545 | 6.1245 | 5.5339 | 5.1223 | 4.8173 | 4.5814 | 4.393 | 4.2388 | 4.0006 | 3.7527 | 3.4928 | 3.3572 | 3.2171 | 3.0716 | 2.9196 | 2.7595 | 2.5889 |
| 40 | 12.609 | 8.2508 | 6.5945 | 5.6981 | 5.1283 | 4.7306 | 4.4355 | 4.207 | 4.0243 | 3.8744 | 3.6425 | 3.4003 | 3.145 | 3.0111 | 2.8721 | 2.7268 | 2.5737 | 2.4103 | 2.2326 |
| 60 | 11.973 | 7.7678 | 6.1712 | 5.3067 | 4.7565 | 4.3721 | 4.0864 | 3.8648 | 3.6873 | 3.5415 | 3.3153 | 3.0781 | 2.8266 | 2.6938 | 2.5549 | 2.4086 | 2.2523 | 2.0821 | 1.8905 |
| 120 | 11.38 | 7.3211 | 5.7814 | 4.9472 | 4.4157 | 4.0437 | 3.767 | 3.5519 | 3.3792 | 3.2372 | 3.0162 | 2.7833 | 2.5344 | 2.4019 | 2.2621 | 2.1128 | 1.9502 | 1.7667 | 1.5433 |
| Inf | 10.828 | 6.9078 | 5.4221 | 4.6167 | 4.103 | 3.743 | 3.4746 | 3.2656 | 3.0975 | 2.9588 | 2.7425 | 2.5132 | 2.2657 | 2.1324 | 1.9901 | 1.835 | 1.6601 | 1.4468 | 1 |



## Practical Application: Interpreting Critical Values and Alpha Levels

**Interpreting the tables provided above requires a systematic approach. Each table corresponds to a specific alpha level, which represents the probability of committing a Type I error--falsely rejecting a true null hypothesis. For instance, an alpha of 0.05 suggests a 5% risk of concluding that a difference exists when it actually does not. As the alpha level decreases (e.g., from 0.05 to 0.01), the critical value required to achieve significance increases, meaning the evidence must be stronger to reject the null hypothesis. This relationship is fundamental to maintaining the integrity of scientific**

research and ensuring that findings are not merely the result of random chance.

To use these tables, one must first identify the degrees of freedom for the numerator (usually based on the number of groups being compared) and the degrees of freedom for the denominator (usually based on the total sample size minus the number of groups). In the F-table, the numerator degrees of freedom are typically listed along the top horizontal axis, while the denominator degrees of freedom are listed down the vertical axis. The intersection of these two values within the table for the chosen alpha provides the critical F-value. If the calculated F-statistic from the experiment is greater than this critical value, the result is considered **statistically significant**.

This process is highly structured and objective, removing much of the guesswork from **data analysis**. By relying on these standardized tables, researchers around the world can apply the same rigorous criteria to their datasets, ensuring that "significance" has a consistent meaning across different studies. Whether one is evaluating the efficacy of a new pharmaceutical

drug or the impact of a social intervention, these tables provide the mathematical foundation for validating experimental results and advancing human knowledge.

### Calculating Central Tendency and Dispersion from Tabulated Data

Beyond its role in hypothesis testing, a distribution table is an invaluable tool for calculating fundamental descriptive statistics. When data is organized into a frequency distribution, the arithmetic mean can be calculated by taking the weighted average of the class midpoints. This approach is much more efficient than summing thousands of individual raw data points. Similarly, the median can be estimated by identifying the class interval that contains the middle value of the cumulative frequency, providing a measure of the dataset's center that is resistant to outliers.

The mode is perhaps the easiest statistic to identify from a distribution table, as it simply corresponds to the class interval with the highest frequency. Identifying the mode is particularly useful in categorical data analysis, where it reveals the most popular or common response among participants. In addition to these measures of central tendency, distribution tables allow

for the estimation of variance and standard deviation. These metrics describe the spread or dispersion of the data, indicating whether the values are tightly clustered around the mean or widely dispersed.

Understanding both the center and the spread of a dataset is essential for a complete statistical profile. For example, two different datasets could have the same mean but vastly different standard deviations. A distribution table makes this distinction immediately apparent. By providing the necessary data to calculate these measures, the table enables researchers to describe the "typical" case within their study while also accounting for the diversity and variability present in the real world. This depth of analysis is what allows for meaningful conclusions and nuanced understanding in any scientific endeavor.



### Strategic Decision Making through Statistical Inference

In the final analysis, the purpose of a distribution table is to facilitate strategic decision making. By providing a structured view of data, these tables allow stakeholders to visualize risks, identify opportunities, and predict future outcomes with greater confidence. In a business

context, a distribution table might summarize customer purchase behavior, allowing a company to target its marketing efforts more effectively. In public health, it might track the spread of a disease, enabling officials to allocate resources where they are most needed. The ability to interpret these tables is, therefore, a critical skill for leaders and researchers alike.

The rigorous use of distribution tables also protects against the pitfalls of anecdotal evidence. Rather than relying on a few isolated examples, the table presents the entire scope of the evidence, ensuring that decisions are based on the totality of the data. This commitment to evidence-based practice is what separates scientific inquiry from mere speculation. By adhering to the structured methodologies of statistical analysis, we can navigate the complexities of the modern world with greater clarity and purpose.

As we have explored, the distribution table is far more than a simple list of numbers; it is a sophisticated tool for data organization, a diagnostic instrument for distribution analysis, and a gateway to advanced inferential statistics. Whether you are using a simple

**frequency table to summarize survey results or a complex F-distribution table to conduct an ANOVA, the principles remain the same: clarity, accuracy, and structured interpretation. By mastering the use of these tables, analysts can unlock the full potential of their data, transforming raw information into the meaningful insights that drive progress in every field of human endeavor.**