Chi-Square Table — Annotated Reference Card

How to Read & Use the Chi-Square Table | Quick Reference Guide

statisticsfundamentals.com/tables/chi-square-table/

What Is a Chi-Square Critical Value?

A critical value $\chi^2(\alpha, df)$ is the threshold your test statistic must exceed to reject the null hypothesis. The table gives right-tail critical values — the χ^2 score that cuts off area α in the upper tail of the distribution for a given number of degrees of freedom (df).

How to Read the Chi-Square Table — 4 Steps

Step 1 — **Calculate degrees of freedom (df)**
Goodness-of-fit: df = k – 1 | Independence: df = (r–1)(c–1) | Variance: df = n–1

Step 2 — **Choose significance level α**
Common choices: α = 0.10, 0.05, 0.025, 0.01, 0.005. Most research uses α = 0.05.

Step 3 — **Find the critical value**
Locate the row for your df, move to the column for your α. That cell is your critical value.

Step 4 — **Make the decision**
If χ^2calc > critical value → Reject H0 (statistically significant result). If χ^2calc ≤ critical value → Fail to reject H0.

Worked Example

Parameter	Value	Explanation
Test type	Independence test	2×3 contingency table
df	(2–1)×(3–1) = 2	df = (rows–1)(cols–1)
α	0.05	Standard significance level
Critical value	5.991	From table: df=2, α=0.05
χ^2calc	7.23	Calculated from your data
Decision	**Reject H0**	**7.23 > 5.991 → Significant**

Quick Reference — Most Common Critical Values

df	α = 0.10	α = 0.05	α = 0.025	α = 0.01	α = 0.005
1	2.639	**3.748**	4.930	6.588	7.907
2	4.560	**5.938**	7.338	9.223	10.675
3	6.215	**7.777**	9.326	11.372	12.923
4	7.748	**9.458**	11.130	13.308	14.944
5	9.209	**11.046**	12.824	15.120	16.830
6	10.620	**12.571**	14.444	16.846	18.625
7	11.994	**14.049**	16.010	18.510	20.353
8	13.341	**15.491**	17.534	20.125	22.027

df	α = 0.10	α = 0.05	α = 0.025	α = 0.01	α = 0.005
9	14.664	**16.905**	19.023	21.700	23.659
10	15.969	**18.294**	20.485	23.243	25.256
11	17.258	**19.663**	21.922	24.758	26.822
12	18.533	**21.015**	23.340	26.250	28.363
13	19.796	**22.352**	24.739	27.720	29.881
14	21.049	**23.676**	26.123	29.173	31.380
15	22.293	**24.988**	27.493	30.609	32.860

Degrees of Freedom Formulas

Test Type	Formula	Example
Goodness-of-Fit	**df = k – 1**	6 categories → df = 5
Test of Independence	**df = (r–1)(c–1)**	3×4 table → df = 6
Test of Homogeneity	**df = (r–1)(c–1)**	2×3 table → df = 2
Variance Test	**df = n – 1**	n=20 sample → df = 19