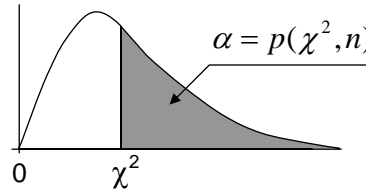


# Percentage points for upper probability of chi-square distribution

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$$\alpha = p(\chi^2, n) = \int_{\chi^2}^{\infty} \frac{1}{2\Gamma(n/2)} \left(\frac{\chi^2}{2}\right)^{\frac{n}{2}-1} e^{-\frac{\chi^2}{2}} d\chi^2$$



$\alpha$ $n$	0.995	0.990	0.975	0.950	0.900	0.750	0.500	0.250	0.100	0.050	0.025	0.010	0.005	$\alpha$ $n$
1	0.00004	0.00016	0.00098	0.00393	0.01579	0.10153	0.45494	1.32330	2.70554	3.84146	5.02389	6.63490	7.87944	1
2	0.01003	0.02010	0.05064	0.10259	0.21072	0.57536	1.38629	2.77259	4.60517	5.99146	7.37776	9.21034	10.5966	2
3	0.07172	0.11483	0.21579	0.35185	0.58438	1.21253	2.36597	4.10835	6.25139	7.81473	9.34840	11.3449	12.8382	3
4	0.20699	0.29711	0.48442	0.71072	1.06362	1.92256	3.35669	5.38527	7.77944	9.48773	11.1433	13.2767	14.8603	4
5	0.41174	0.55430	0.83122	1.14548	1.61031	2.67460	4.35146	6.62568	9.23636	11.0705	12.8325	15.0863	16.7496	5
6	0.67573	0.87209	1.23734	1.63538	2.20413	3.45460	5.34812	7.84080	10.6446	12.5916	14.4494	16.8119	18.5476	6
7	0.98926	1.23904	1.68986	2.16735	2.83311	4.25485	6.34581	9.03715	12.0170	14.0671	16.0128	18.4753	20.2777	7
8	1.34441	1.64650	2.17973	2.73264	3.48954	5.07064	7.34412	10.2189	13.3616	15.5073	17.5345	20.0902	21.9550	8
9	1.73491	2.08789	2.70039	3.32512	4.16816	5.89883	8.34283	11.3888	14.6837	16.9190	19.0228	21.6660	23.5894	9
10	2.15586	2.55821	3.24697	3.94030	4.86518	6.73720	9.34182	12.5489	15.9872	18.3070	20.4832	23.2093	25.1882	10
11	2.60321	3.05349	3.81575	4.57481	5.57778	7.58414	10.3410	13.7007	17.2750	19.6751	21.9200	24.7250	26.7568	11
12	3.07382	3.57057	4.40379	5.22603	6.30380	8.43842	11.3403	14.8454	18.5493	21.0261	23.3367	26.2170	28.2995	12
13	3.56507	4.10692	5.00875	5.89186	7.04150	9.29907	12.3398	15.9839	19.8119	22.3620	24.7356	27.6882	29.8195	13
14	4.07467	4.66043	5.62873	6.57063	7.78953	10.1653	13.3393	17.1169	21.0641	23.6848	26.1189	29.1412	31.3193	14
15	4.60092	5.22935	6.26214	7.26094	8.54676	11.0365	14.3389	18.2451	22.3071	24.9958	27.4884	30.5779	32.8013	15
16	5.14221	5.81221	6.90766	7.96165	9.31224	11.9122	15.3385	19.3689	23.5418	26.2962	28.8454	31.9999	34.2672	16
17	5.69722	6.40776	7.56419	8.67176	10.0852	12.7919	16.3382	20.4887	24.7690	27.5871	30.1910	33.4087	35.7185	17
18	6.26480	7.01491	8.23075	9.39046	10.8649	13.6753	17.3379	21.6049	25.9894	28.8693	31.5264	34.8053	37.1565	18
19	6.84397	7.63273	8.90652	10.1170	11.6509	14.5620	18.3377	22.7178	27.2036	30.1435	32.8523	36.1909	38.5823	19
20	7.43384	8.26040	9.59078	10.8508	12.4426	15.4518	19.3374	23.8277	28.4120	31.4104	34.1696	37.5662	39.9968	20
21	8.03365	8.89720	10.2829	11.5913	13.2396	16.3444	20.3372	24.9348	29.6151	32.6706	35.4789	38.9322	41.4011	21
22	8.64272	9.54249	10.9823	12.3380	14.0415	17.2396	21.3370	26.0393	30.8133	33.9244	36.7807	40.2894	42.7957	22
23	9.26042	10.1957	11.6886	13.0905	14.8480	18.1373	22.3369	27.1413	32.0069	35.1725	38.0756	41.6384	44.1813	23
24	9.88623	10.8564	12.4012	13.8484	15.6587	19.0373	23.3367	28.2412	33.1962	36.4150	39.3641	42.9798	45.5585	24
25	10.5197	11.5240	13.1197	14.6114	16.4734	19.9393	24.3366	29.3389	34.3816	37.6525	40.6465	44.3141	46.9279	25
26	11.1602	12.1981	13.8439	15.3792	17.2919	20.8434	25.3365	30.4346	35.5632	38.8851	41.9232	45.6417	48.2899	26
27	11.8076	12.8785	14.5734	16.1514	18.1139	21.7494	26.3363	31.5284	36.7412	40.1133	43.1945	46.9629	49.6449	27
28	12.4613	13.5647	15.3079	16.9279	18.9392	22.6572	27.3362	32.6205	37.9159	41.3371	44.4608	48.2782	50.9934	28
29	13.1211	14.2565	16.0471	17.7084	19.7677	23.5666	28.3361	33.7109	39.0875	42.5570	45.7223	49.5879	52.3356	29
30	13.7867	14.9535	16.7908	18.4927	20.5992	24.4776	29.3360	34.7997	40.2560	43.7730	46.9792	50.8922	53.6720	30
32	15.1340	16.3622	18.2908	20.0719	22.2706	26.3041	31.3359	36.9730	42.5847	46.1943	49.4804	53.4858	56.3281	32
34	16.5013	17.7891	19.8063	21.6643	23.9523	28.1361	33.3357	39.1408	44.9032	48.6024	51.9660	56.0609	58.9639	34
36	17.8867	19.2327	21.3359	23.2686	25.6433	29.9730	35.3356	41.3036	47.2122	50.9985	54.4373	58.6192	61.5812	36
38	19.2889	20.6914	22.8785	24.8839	27.3430	31.8146	37.3355	43.4619	49.5126	53.3835	56.8955	61.1621	64.1814	38
40	20.7065	22.1643	24.4330	26.5093	29.0505	33.6603	39.3353	45.6160	51.8051	55.7585	59.3417	63.6907	66.7660	40
42	22.1385	23.6501	25.9987	28.1440	30.7654	35.5099	41.3352	47.7663	54.0902	58.1240	61.7768	66.2062	69.3360	42
44	23.5837	25.1480	27.5746	29.7875	32.4871	37.3631	43.3352	49.9129	56.3685	60.4809	64.2015	68.7095	71.8926	44
46	25.0413	26.6572	29.1601	31.4390	34.2152	39.2197	45.3351	52.0562	58.6405	62.8296	66.6165	71.2014	74.4365	46
48	26.5106	28.1770	30.7545	33.0981	35.9491	41.0794	47.3350	54.1964	60.9066	65.1708	69.0226	73.6826	76.9688	48
50	27.9907	29.7067	32.3574	34.7643	37.6886	42.9421	49.3349	56.3336	63.1671	67.5048	71.4202	76.1539	79.4900	50
55	31.7348	33.5705	36.3981	38.9580	42.0596	47.6105	54.3348	61.6650	68.7962	73.3115	77.3805	82.2921	85.7490	55
60	35.5345	37.4849	40.4817	43.1880	46.4589	52.2938	59.3347	66.9815	74.3970	79.0819	83.2977	88.3794	91.9517	60
65	39.3831	41.4436	44.6030	47.4496	50.8829	56.9903	64.3346	72.2848	79.9730	84.8206	89.1771	94.4221	98.1051	65
70	43.2752	45.4417	48.7576	51.7393	55.3289	61.6983	69.3345	77.5767	85.5270	90.5312	95.0232	100.425	104.215	70
75	47.2060	49.4750	52.9419	56.0541	59.7946	66.4168	74.3344	82.8581	91.0615	96.2167	100.839	106.393	110.286	75
80	51.1719	53.5401	57.1532	60.3915	64.2778	71.1445	79.3343	88.1303	96.5782	101.879	106.629	112.329	116.321	80
85	55.1696	57.6339	61.3888	64.7494	68.7772	75.8807	84.3343	93.3939	102.079	107.522	112.393	118.236	122.325	85
90	59.1963	61.7541	65.6466	69.1260	73.2911	80.6247	89.3342	98.6499	107.565	113.145	118.136	124.116	128.299	90
95	63.2496	65.8984	69.9249	73.5198	77.8184	85.3757	94.3342	103.899	113.038	118.752	123.858	129.973	134.247	95
100	67.3276	70.0649	74.2219	77.9295	82.3581	90.1332	99.3341	109.141	118.498	124.342	129.561	135.807	140.169	100
110	75.5268	78.4435	82.8616	86.7916	91.4746	99.6704	109.335	119.604	129.380	135.478	140.919	147.427	151.971	110
120	83.8293	86.9091	91.5675	95.7047	100.627	109.224	119.335	130.051	140.228	146.565	152.214	158.962	163.670	120
130	92.2010	95.4375	100.326	104.662	109.814	118.796	129.334	140.479	151.041	157.608	163.456	170.435	175.299	130
140	100.634	104.021	109.132	113.659	119.033	128.384	139.334	150.890	161.823	168.611	174.650	181.852	186.867	140
150	109.122	112.655	117.980	122.692	128.278	137.987	149.334	161.288	172.577	179.579	185.803	193.219	198.380	150
160	117.660	121.333	126.866	131.756	137.549	147.602	159.334	171.672	183.307	190.515	196.918	204.541	209.843	160
170	126.243	130.053	135.786	140.849	146.842	157.230	169.334	182.044	194.013	201.422	207.998	215.822	221.261	170
180	134.866	138.809	144.737	149.969	156.156	166.869	179.334	192.405	204.700	212.302	219.047	227.066	232.638	180
190	143.528	147.599	153.717	159.113	165.488	176.517	189.334	202.757	215.367	223.159	230.067	238.276	243.977	190
200	152.224	156.421	162.724	168.279	174.838	186.175	199.334	213.099	226.017	233.993	241.060	249.455	255.281	200
$n$ $\alpha$	0.995	0.990	0.975	0.950	0.900	0.750	0.500	0.250	0.100	0.050	0.025	0.010	0.005	$\alpha$ $n$