

Table 5. PROBABILITIES FOR THE χ^2 DISTRIBUTION [χ^2_v]

[Calculated with *qchisq* in **Spplus** V3.0R1 using 17-digit arithmetic; accuracy of all digits in the table entries has *not* been verified]

Df (v)	Each table entry is the value (y) of the random variable $Y \sim \chi^2_v$ such that $\Pr(Y \leq y) =$ the probability given in the column heading																		
	0.50	0.60	0.70	0.75	0.80	0.85	0.90	0.95	0.975	0.99	0.995	0.999	0.999 5	0.999 9	0.999 95	0.999 99	0.999 995	0.999 999	
1	.454 936	.708 326	1.07 419	1.32 330	1.64 237	2.07 225	2.70 554	3.84 146	5.02 389	6.63 490	7.87 944	10.8 276	12.1 157	15.1 367	16.4 481	19.5 114	20.8 373	23.9 281	1
2	1.38 629	1.83 258	2.40 795	2.77 259	3.21 888	3.79 424	4.60 517	5.99 146	7.37 776	9.21 034	10.5 966	13.8 155	15.2 018	18.4 207	19.8 070	23.0 259	24.4 121	27.6 310	
3	2.36 597	2.94 617	3.66 487	4.10 834	4.64 163	5.31 705	6.25 139	7.81 473	9.34 840	11.3 449	12.8 382	16.2 662	17.7 300	21.1 075	22.5 547	25.9 017	27.3 384	30.6 648	
4	3.35 669	4.04 463	4.87 843	5.38 527	5.98 862	6.74 488	7.77 944	9.48 773	11.1 433	13.2 767	14.8 603	18.4 668	19.9 974	23.5 127	25.0 133	28.4 733	29.9 545	33.3 768	
5	4.35 146	5.13 187	6.06 443	6.62 568	7.28 928	8.11 520	9.23 636	11.0 705	12.8 325	15.0 863	16.7 496	20.5 150	22.1 053	25.7 448	27.2 937	30.8 562	32.3 781	35.8 882	5
6	5.34 812	6.21 076	7.23 114	7.84 080	8.55 806	9.44 610	10.6 446	12.5 916	14.4 494	16.8 119	18.5 476	22.4 577	24.1 028	27.8 563	29.4 497	33.1 071	34.6 667	38.2 583	
7	6.34 581	7.28 321	8.38 343	9.03 715	9.80 325	10.7 479	12.0 170	14.0 671	16.0 128	18.4 753	20.2 777	24.3 219	26.0 178	29.8 775	31.5 124	35.2 585	36.8 535	40.5 218	
8	7.34 412	8.35 053	9.52 446	10.2 189	11.0 301	12.0 271	13.3 616	15.5 073	17.5 345	20.0 902	21.9 550	26.1 245	27.8 680	31.8 276	33.5 017	37.3 316	38.9 600	42.7 009	
9	8.34 283	9.41 364	10.6 564	11.3 888	12.2 421	13.2 880	14.6 837	16.9 190	19.0 228	21.6 660	23.5 894	27.8 772	29.6 658	33.7 199	35.4 312	39.3 407	41.0 009	44.8 109	
10	9.34 182	10.4 732	11.7 807	12.5 489	13.4 420	14.5 339	15.9 872	18.3 070	20.4 831	23.2 092	25.1 882	29.5 883	31.4 198	35.5 640	37.3 107	41.2 962	42.9 869	46.8 630	10
11	10.3 410	11.5 298	12.8 987	13.7 007	14.6 314	15.7 671	17.2 750	19.6 751	21.9 200	24.7 249	26.7 568	31.2 641	33.1 366	37.3 670	39.1 476	43.2 060	44.9 259	48.8 656	
12	11.3 403	12.5 838	14.0 111	14.8 454	15.8 120	16.9 893	18.5 493	21.0 260	23.3 366	26.2 169	28.2 995	32.9 095	34.8 213	39.1 344	40.9 476	45.0 761	46.8 242	50.8 253	
13	12.3 398	13.6 356	15.1 187	15.9 839	16.9 848	18.2 020	19.8 119	22.3 620	24.7 356	27.6 882	29.8 195	34.5 282	36.4 778	40.8 707	42.7 153	46.9 116	48.6 868	52.7 471	
14	13.3 393	14.6 853	16.2 221	17.1 169	18.1 508	19.4 062	21.0 641	23.6 848	26.1 189	29.1 412	31.3 193	36.1 233	38.1 094	42.5 793	44.4 544	48.7 161	50.5 176	54.6 353	
15	14.3 389	15.7 332	17.3 217	18.2 451	19.3 107	20.6 030	22.3 071	24.9 958	27.4 884	30.5 779	32.8 013	37.6 973	39.7 188	44.2 632	46.1 678	50.4 930	52.3 201	56.4 934	15
16	15.3 385	16.7 795	18.4 179	19.3 689	20.4 651	21.7 930	23.5 418	26.2 962	28.8 453	31.9 999	34.2 672	39.2 524	41.3 081	45.9 249	47.8 581	52.2 450	54.0 968	58.3 244	
17	16.3 382	17.8 244	19.5 110	20.4 887	21.6 146	22.9 770	24.7 690	27.5 871	30.1 910	33.4 087	35.7 185	40.7 902	42.8 792	47.5 664	49.5 274	53.9 743	55.8 503	60.1 306	
18	17.3 379	18.8 679	20.6 014	21.6 049	22.7 595	24.1 555	25.9 894	28.8 693	31.5 264	34.8 053	37.1 565	42.3 124	44.4 338	49.1 894	51.1 775	55.6 829	57.5 824	61.9 142	
19	18.3 377	19.9 102	21.6 891	22.7 178	23.9 004	25.3 288	27.2 036	30.1 435	32.8 523	36.1 909	38.5 823	43.8 202	45.9 731	50.7 955	52.8 100	57.3 725	59.2 950	63.6 771	
20	19.3 374	20.9 514	22.7 745	23.8 277	25.0 375	26.4 976	28.4 120	31.4 104	34.1 696	37.5 662	39.9 968	45.3 147	47.4 985	52.3 860	54.4 263	59.0 446	60.9 895	65.4 207	20
21	20.3 372	21.9 915	23.8 578	24.9 348	26.1 711	27.6 620	29.6 151	32.6 706	35.4 789	38.9 322	41.4 011	46.7 970	49.0 108	53.9 620	56.0 276	60.7 003	62.6 673	67.1 465	
22	21.3 370	23.0 307	24.9 390	26.0 393	27.3 014	28.8 224	30.8 133	33.9 244	36.7 807	40.2 894	42.7 957	48.2 679	50.5 111	55.5 246	57.6 149	62.3 410	64.3 295	68.8 558	
23	22.3 369	24.0 689	26.0 184	27.1 413	28.4 288	29.9 792	32.0 069	35.1 725	38.0 756	41.6 384	44.1 813	49.7 282	52.0 002	57.0 746	59.1 891	63.9 675	65.9 771	70.5 496	
24	23.3 367	25.1 063	27.0 960	28.2 411	29.5 533	31.1 325	33.1 962	36.4 150	39.3 641	42.9 798	45.5 585	51.1 786	53.4 788	58.6 130	60.7 512	65.5 808	67.6 111	72.2 289	
25	24.3 366	26.1 430	28.1 719	29.3 388	30.6 752	32.2 825	34.3 816	37.6 525	40.6 465	44.3 141	46.9 279	52.6 197	54.9 475	60.1 403	62.3 017	67.1 818	69.2 323	73.8 945	25
26	25.3 365	27.1 789	29.2 463	30.4 346	31.7 946	33.4 295	35.5 632	38.8 851	41.9 232	45.6 417	48.2 899	54.0 520	56.4 069	61.6 573	63.8 415	68.7 710	70.8 415	75.5 474	
27	26.3 363	28.2 141	30.3 193	31.5 284	32.9 117	34.5 736	36.7 412	40.1 133	43.1 945	46.9 629	49.6 449	55.4 760	57.8 576	63.1 645	65.3 712	70.3 492	72.4 393	77.1 882	
28	27.3 362	29.2 486	31.3 909	32.6 205	34.0 266	35.7 150	37.9 159	41.3 371	44.4 608	48.2 782	50.9 934	56.8 923	59.3 000	64.6 624	66.8 912	71.9 170	74.0 263	78.8 175	
29	28.3 361	30.2 825	32.4 612	33.7 109	35.1 394	36.8 538	39.0 875	42.5 570	45.7 223	49.5 879	52.3 356	58.3 012	60.7 346	66.1 517	68.4 022	73.4 749	75.6 032	80.4 360	
30	29.3 360	31.3 159	33.5 302	34.7 997	36.2 502	37.9 902	40.2 560	43.7 730	46.9 792	50.8 922	53.6 720	59.7 031	62.1 619	67.6 326	69.9 045	75.0 234	77.1 704	82.0 441	30
32	31.3 359	33.3 809	35.6 649	36.9 730	38.4 663	40.2 563	42.5 847	46.1 943	49.4 804	53.4 858	56.3 281	62.4 872	64.9 955	70.5 712	72.8 848	78.0 942	80.2 777	85.2 316	
34	33.3 357	35.4 438	37.7 954	39.1 408	40.6 756	42.5 140	44.9 032	48.6 024	51.9 660	56.0 609	58.9 639	65.2 472	67.8 035	73.4 812	75.8 353	81.1 325	83.3 516	88.3 833	
36	35.3 356	37.5 049	39.9 220	41.3 036	42.8 788	44.7 641	47.2 122	50.9 985	54.4 373	58.6 192	61.5 812	67.9 852	70.5 881	76.3 650	78.7 585	84.1 412	86.3 948	91.5 024	
38	37.3 355	39.5 643	42.0 450	43.4 619	45.0 763	47.0 072	49.5 126	53.3 835	56.8 955	61.1 621	64.1 814	70.7 029	73.3 512	79.2 247	81.6 567	87.1 227	89.4 100	94.5 915	
40	39.3 353	41.6 222	44.1 649	45.6 160	47.2 685	49.2 438	51.8 051	55.7 585	59.3 617	63.6 907	66.7 660	73.4 020	76.0 946	82.0 623	84.5 318	90.0 791	92.3 993	97.6 530	40
42	41.3 352	43.6 786	46.2 817	47.7 662	49.4 560	51.4 746	54.0 902	58.1 240	61.7 768	66.2 062	69.3 360	76.0 838	78.8 197	84.8 793	87.3 854	93.0 122	95.3 645	100. 689	
44	43.3 352	45.7 336	48.3 957	49.9 129	51.6 389	53.6 998	56.3 685	60.4 809	64.2 015	68.7 095	71.8 926	78.7 495	81.5 277	87.6 773	90.2 192	95.9 236	98.3 073	103. 701	
46	45.3 351	47.7 874	50.5 071	52.0 562	53.8 177	55.9 199	58.6 405	62.8 296	66.6 165	71.2 014	74.4 365	81.4 003	84.2 198	90.4 574	93.0 343	98.8 148	101. 229	106. 690	
48	47.3 350	49.8 401	52.6 161	54.1 964	55.9 926	58.1 352	60.9 066	65.1 708	69.0 226	73.6 826	76.9 688	84.0 371	86.8 971	93.2 209	95.8 322	101. 687	104. 132	1099	

2010-06-20

χ^2_{ν}
left
half

Df (ν)	Each table entry is the value (y) of the random variable $Y \sim \chi^2_{\nu}$ such that $\Pr(Y \leq y) =$ the probability given in the column heading																	
	0.000 001	0.000 005	0.000 01	0.000 05	0.000 1	0.000 5	0.001	0.005	0.01	0.025	0.05	0.10	0.15	0.20	0.25	0.30	0.40	0.50
1	.0 ¹¹ 157 080	.0 ¹⁰ 392 699	.0 ⁹ 157 080	.0 ⁸ 392 699	.0 ⁷ 157 080	.0 ⁶ 392 699	.0 ⁵ 157 080	.0 ⁴ 392 704	.0 ³ 157 788	.0 ² 982 069	.00393 214	.0157 908	.0357 658	.0641 848	.101 531	.148 472	.274 996	.454 936
2	.0 ⁵ 200 000	.0 ⁴ 100 000	.0 ⁴ 200 001	.0 ³ 100 003	.0 ³ 200 010	.00100 025	.00200 100	.0100 251	.0201 007	.0506 356	.102 587	.210 721	.325 038	.446 287	.575 364	.713 350	1.02 165	1.38 629
3	.0 ³ 241 810	.0 ³ 707 124	.00112 258	.00328 387	.00521 483	.0152 790	.0242 976	.0717 218	.114 832	.215 795	.351 846	.584 374	.797 771	1.00 517	1.21 253	1.42 365	1.86 917	2.36 597
4	.002 830	.006 331	.008 958	.020 067	.028 418	.063 922	.090 804	.206 989	.297 109	.484 419	.710 723	1.06 362	1.36 648	1.64 878	1.92 256	2.19 470	2.75 284	3.35 669
5	.012 896	.024 591	.032 484	.062 101	.082 177	.158 138	.210 213	.411 742	.554 298	.831 212	1.14 548	1.61 031	1.99 382	2.34 253	2.67 460	2.99 991	3.65 550	4.35 146
6	.036 509	.062 633	.079 074	.136 181	.172 352	.299 408	.381 067	.675 727	.872 090	1.23 734	1.63 538	2.20 413	2.66 127	3.07 009	3.45 460	3.82 755	4.57 015	5.34 812
7	.078 524	.125 010	.152 860	.244 572	.299 967	.484 875	.598 494	.989 256	1.23 904	1.68 987	2.16 735	2.83 311	3.35 828	3.82 232	4.25 485	4.67 133	5.49 323	6.34 581
8	.141 985	.213 843	.255 358	.386 877	.463 594	.710 379	.857 105	1.34 441	1.64 650	2.17 973	2.73 264	3.48 954	4.07 820	4.59 357	5.07 064	5.52 742	6.42 265	7.34 412
9	.228 385	.329 590	.386 459	.561 424	.660 809	.971 699	1.15 195	1.73 493	2.08 790	2.70 039	3.32 511	4.16 816	4.81 652	5.38 005	5.89 883	6.39 331	7.35 703	8.34 283
10	.338 126	.471 719	.545 170	.766 047	.888 920	1.26 498	1.47 874	2.15 586	2.55 821	3.24 697	3.94 030	4.86 518	5.57 006	6.17 908	6.73 720	7.26 722	8.29 547	9.34 182
11	.470 918	.639 174	.730 073	.998 472	1.14 530	1.58 685	1.83 385	2.60 322	3.05 348	3.81 575	4.57 481	5.57 778	6.33 643	6.98 867	7.58 414	8.14 787	9.23 729	10.3 410
12	.626 063	.830 648	.939 595	1.25 651	1.42 750	1.93 438	2.21 421	3.07 382	3.57 057	4.40 379	5.22 603	6.30 380	7.11 384	7.80 733	8.43 842	9.03 428	10.1 820	11.3 403
13	.802 643	1.04 475	1.17 214	1.53 813	1.73 332	2.30 506	2.61 722	3.56 503	4.10 692	5.00 875	5.89 186	7.04 150	7.90 084	8.63 386	9.29 907	9.92 566	11.1 291	12.3 398
14	.999 638	1.28 010	1.42 618	1.84 147	2.06 080	2.69 673	3.04 067	4.07 467	4.66 043	5.62 873	6.57 063	7.78 953	8.69 630	9.46 733	10.1 653	10.8 215	12.0 785	13.3 393
15	1.21 600	1.53 538	1.70 028	2.16 488	2.40 819	3.10 752	3.48 268	4.60 092	5.22 935	6.26 214	7.26 094	8.54 676	9.49 928	10.3 070	11.0 365	11.7 212	13.0 297	14.3 389
16	1.45 069	1.80 933	1.99 310	2.50 685	2.77 394	3.53 581	3.94 163	5.14 221	5.81 221	6.90 766	7.96 165	9.31 224	10.3 090	11.1 521	11.9 122	12.6 243	13.9 827	15.3 385
17	1.70 272	2.10 078	2.30 342	2.86 604	3.15 667	3.98 018	4.41 609	5.69 722	6.40 776	7.56 419	8.67 176	10.0 852	11.1 249	12.0 023	12.7 919	13.5 307	14.9 373	16.3 382
18	1.97 114	2.40 868	2.63 012	3.24 126	3.55 517	4.43 939	4.90 485	6.26 480	7.01 491	8.23 075	9.39 046	10.8 649	11.9 463	12.8 570	13.6 753	14.4 399	15.8 932	17.3 379
19	2.25 505	2.73 204	2.97 218	3.63 142	3.96 832	4.91 234	5.40 682	6.84 397	7.63 273	8.90 652	10.1 170	11.6 509	12.7 727	13.7 158	14.5 620	15.3 517	16.8 504	18.3 377
20	2.55 364	3.06 994	3.32 868	4.03 555	4.39 516	5.39 807	5.92 104	7.43 384	8.26 400	9.59 078	10.8 508	12.4 426	13.6 039	14.5 784	15.4 518	16.2 659	17.8 088	19.3 374
21	2.86 612	3.42 156	3.69 875	4.45 278	4.83 481	5.89 570	6.44 668	8.03 365	8.89 720	10.2 829	11.5 913	13.2 396	14.4 393	15.4 446	16.3 444	17.1 823	18.7 683	20.3 372
22	3.19 177	3.78 613	4.08 162	4.88 231	5.28 646	6.40 447	6.98 297	8.64 272	9.54 249	10.9 823	12.3 380	14.0 415	15.2 788	16.3 140	17.2 396	18.1 007	19.7 288	21.3 370
23	3.52 993	4.16 296	4.47 659	5.32 341	5.74 941	6.92 368	7.52 924	9.26 042	10.1 957	11.6 886	13.0 905	14.8 480	16.1 219	17.1 865	18.1 373	19.0 211	20.6 902	22.3 369
24	3.87 997	4.55 139	4.88 300	5.77 544	6.22 300	7.45 269	8.08 488	9.88 623	10.8 564	12.4 012	13.8 484	15.6 587	16.9 686	18.0 618	19.0 373	19.9 432	21.6 525	23.3 367
25	4.24 133	4.95 084	5.30 025	6.23 780	6.70 663	7.99 096	8.64 934	10.5 197	11.5 240	13.1 197	14.6 114	16.4 734	17.8 184	18.9 398	19.9 393	20.8 670	22.6 156	24.3 366
26	4.61 346	5.36 076	5.72 780	6.70 994	7.19 978	8.53 795	9.22 213	11.1 602	12.1 981	13.8 439	15.3 792	17.2 919	18.6 714	19.8 202	20.8 434	21.7 924	23.5 794	25.3 365
27	4.99 587	5.78 064	6.16 513	7.19 136	7.70 193	9.09 320	9.80 278	11.8 076	12.8 785	14.5 734	16.1 514	18.1 139	19.5 272	20.7 030	21.7 494	22.7 192	24.5 440	26.3 363
28	5.38 810	6.21 001	6.61 177	7.68 159	8.21 264	9.65 627	10.3 909	12.4 613	13.5 647	15.3 079	16.9 279	18.9 392	20.3 857	21.5 880	22.6 572	23.6 475	25.5 093	27.3 362
29	5.78 790	6.64 843	7.06 730	8.18 022	8.73 149	10.2 268	10.9 861	13.1 211	14.2 565	16.0 471	17.7 084	19.7 677	21.2 468	22.4 751	23.5 666	24.5 770	26.4 751	28.3 361
30	6.20 029	7.09 551	7.53 131	8.68 684	9.25 809	10.8 044	11.5 880	13.7 867	14.9 535	16.7 908	18.4 927	20.5 992	22.1 103	23.3 641	24.4 776	25.5 078	27.4 416	29.3 360
32	7.04 694	8.01 414	8.48 330	9.72 266	10.3 331	11.9 794	12.8 107	15.1 340	16.3 622	18.2 908	20.0 719	22.2 706	23.8 442	25.1 478	26.3 041	27.3 728	29.3 763	31.3 359
34	7.92 529	8.96 319	9.46 505	10.7 864	11.4 352	13.1 791	14.0 567	16.5 013	17.7 891	19.8 063	21.6 643	23.9 523	25.5 864	26.9 383	28.1 361	29.2 421	31.3 130	33.3 357
36	8.83 296	9.94 029	10.4 742	11.8 759	12.5 622	14.4 012	15.3 241	17.8 867	19.2 327	21.3 359	23.2 686	25.6 433	27.3 362	28.7 350	29.9 730	31.1 152	33.2 517	35.3 356
38	9.76 781	10.9 433	11.5 087	12.9 891	13.7 120	15.6 441	16.6 112	19.2 889	20.6 914	22.8 785	24.8 839	27.3 430	29.0 931	30.5 373	31.8 146	32.9 919	35.1 920	37.3 355
40	10.7 280	11.9 705	12.5 667	14.1 242	14.8 831	16.9 062	17.9 164	20.7 065	22.1 643	24.4 330	26.5 093	29.0 505	30.8 563	32.3 450	33.6 603	34.8 719	37.1 340	39.3 353
42	11.7 118	13.0 202	13.6 467	15.2 798	16.0 738	18.1 861	19.2 385	22.1 385	23.6 501	25.9 987	28.1 440	30.7 654	32.6 255	34.1 574	35.5 099	36.7 550	39.0 774	41.3 352
44	12.7 176	14.0 908	14.7 471	16.4 544	17.2 829	19.4 825	20.5 763	23.5 837	25.1 480	27.5 746	29.7 875	32.4 871	34.4 002	35.9 743	37.3 631	38.6 408	41.0 222	43.3 352
46	13.7 443	15.1 811	15.8 667	17.6 469	18.5 093	20.7 945	21.9 287	25.0 413	26.6 572	29.1 601	31.4 390	34.2 152	36.1 801	37.7 955	39.2 197	40.5 292	42.9 682	45.3 351
48	14.7 905	16.2 900	17.0 043	18.8 561	19.7 517	22.1 209	23.2 949	26.5 106	28.1 770	30.7 545	33.0 981	35.9 491	37.9 648	39.6 205	41.0 794	42.4 201	44.9 154	47.3 350
50	15.8 551	17.4 163	18.1 588	20.0 810	21.0 093	23.4 610	24.6 739	27.9 907	29.7 067	32.3 574	34.7 643	37.6 886	39.7 539	41.4 492	42.9 421	44.3 133	46.8 638	49.3 349
55	18.5 907	20.3 020	21.1 134	23.2 066	24.2 141	26.8 658	28.1 731	31.7 348	33.5 705	36.3 981	38.9 580	42.0 596	44.2 448	46.0 356	47.6 105	49.0 554	51.7 391	54.3 348
60	21.4 218	23.2 780	24.1 556	26.4 133	27.4 969	30.3 405	31.7 383	35.5 345	37.4 849	40.4 817	43.1 880	46.4 589	48.7 587	50.6 406	52.2 938	53.8 091	56.6 200	59.3 347
65	24.3 372	26.3 333	27.2 749	29.6 913	30.8 483	33.8 767	35.3 616	39.3 831	41.4 436	44.6 030	47.4 496	50.8 829	53.2 926	55.2 620	56.9 903	58.5 731	61.5 059	64.3 346
70	27.3 280	29.4 596	30.4 631	33.0 328	34.2 607	37.4 674	39.0 364	43.2 752	45.4 417	48.7 576	51.7 393	55.3 289	57.8 443	59.8 978	61.6 983	63.3 460	66.3 961	69.3 345
75	30.3 865	32.6 495	33.7 130	36.4 314	37.7 279	41.0 072	42.7 573	47.2 060	49.4 750	52.9 419	56.0 541	59.7 946	62.4 119	64.5 466	66.4 168	68.1 271	71.2 903	74.3 344
80	33.5 063	35.8 972	37.0 189	39.8 814	41.2 445	44.7 911	46.5 199	51.1 719	53.5 401	57.1 532	60.3 915	64.2 778	66.9 938	69.2 069	71.1 445	72.9 153	76.1 879	79.3 343
85	36.6 822	39.1 973	40.3 757	43.3 784	44.8 061	48.5 151	50.3 203	55.1 696	57.6 339	61.3 888	64.7 494	68.7 772	71.5 887	73.8 779	75.8 807	77.7 102	81.0 888	84.3 343
90	39.9 092	42.5 454	43.7 790	46.9 182	48.4 087	52.2 758	54.1 552	59.1 963	61.7 541	65.6 466	69.1 260	73.2 911	76.1 954	78.5 584	80.6 247	82.5 111	85.9 925	89.3 342
95	43.1 835</																	