

Handout 1 $\frac{e}{\pi^2}$
 Chi-Squared (χ^2) Cumulative Distribution Function (CDF): Approximations for Cut-values
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$$\chi_\nu^2 : \mathbb{R} \longrightarrow \mathbb{R} \quad Chi(x, \nu) = \frac{x^{(\nu-2)/2}}{2^{\nu/2}\Gamma(\nu/2) \cdot e^{(x/2)}}, x \in [0, \infty); \quad 0, x \in (-\infty, 0) \quad Chi(x, \nu) = \chi_\nu^2.$$

$\alpha \rightarrow$	0.25	0.20	0.15	0.10	0.05	0.025	0.02	0.01	0.005	0.0025	0.001	0.0005 \downarrow
01	01.32	01.64	02.07	02.71	03.84	05.02	05.41	06.63	07.88	09.14	10.83	12.12
02	02.77	03.22	03.79	04.61	05.99	07.38	07.82	09.21	10.60	11.98	13.82	15.20
03	04.11	04.64	05.32	06.25	07.81	09.35	09.84	11.34	12.84	14.32	16.27	17.73
04	05.39	05.59	06.74	07.78	09.49	11.14	11.67	13.23	14.86	16.42	18.47	20.00
05	06.63	07.29	08.12	09.24	11.07	12.83	13.33	15.09	16.75	18.39	20.51	22.11
06	07.84	08.56	09.45	10.64	12.53	14.45	15.03	16.81	18.55	20.25	22.46	24.10
07	09.04	09.80	10.75	12.02	14.07	16.01	16.62	18.48	20.28	22.04	24.32	26.02
08	10.22	11.03	12.03	13.36	15.51	17.53	18.17	20.09	21.95	23.77	26.12	27.87
09	11.39	12.24	13.29	14.68	16.92	19.02	19.63	21.67	23.59	25.46	27.83	29.67
10	12.55	13.44	14.53	15.99	18.31	20.48	21.16	23.21	25.19	27.11	29.59	31.42
11	13.70	14.63	15.77	17.29	19.68	21.92	22.62	24.72	26.76	28.73	31.26	33.14
12	14.85	15.81	16.99	18.55	21.03	23.34	24.05	26.22	28.30	30.32	32.91	34.82
13	15.93	15.58	18.90	19.81	22.36	24.74	25.47	27.69	29.82	31.88	34.53	36.48
14	17.12	18.15	19.40	21.06	23.68	26.12	26.87	29.14	31.32	33.43	36.12	38.11
15	18.25	19.31	20.60	22.31	25.00	27.49	28.26	30.58	32.80	34.95	37.70	39.72
16	19.37	20.47	21.79	23.54	26.30	28.85	29.63	32.00	34.27	36.46	39.25	41.31
17	20.49	21.61	22.98	24.77	27.59	30.19	31.00	33.41	35.72	37.95	40.79	42.88
18	21.60	22.76	24.16	25.99	28.87	31.53	32.35	34.81	37.16	39.42	42.31	44.43
19	22.72	23.90	25.33	27.20	30.14	32.85	33.69	36.19	38.58	40.88	43.82	45.97

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$\alpha \rightarrow$ df	0.25	0.20	0.15	0.10	0.05	0.025	0.02	0.01	0.005	0.0025	0.001	0.0005 \downarrow
20	23.83	25.04	26.50	28.41	31.41	34.17	35.02	37.57	40.00	42.34	45.31	47.50
21	24.93	26.17	27.66	29.62	32.91	35.48	36.34	38.93	41.40	43.78	46.80	49.01
22	26.04	27.30	28.82	30.81	33.92	36.78	37.66	40.29	42.80	45.20	48.27	50.51
23	27.14	28.43	29.98	32.01	35.17	38.08	38.97	41.64	44.18	46.62	49.73	52.00
24	28.24	29.55	31.13	33.20	36.42	39.36	40.27	42.98	45.56	48.03	51.18	53.48
25	29.34	30.68	32.28	34.38	37.65	40.65	41.57	44.31	46.93	49.44	52.62	54.95
26	30.43	31.79	33.43	35.56	38.89	41.92	42.86	45.64	48.29	50.83	54.05	56.41
27	31.53	32.91	34.57	36.74	40.11	43.19	44.14	46.96	49.64	52.22	55.48	57.86
28	32.62	34.03	35.71	37.92	41.34	44.46	45.42	48.28	50.99	53.59	56.89	59.30
29	33.71	35.14	36.85	39.09	42.56	45.72	46.69	49.59	52.34	54.97	58.30	60.73
30	34.80	36.25	37.99	40.26	43.77	46.98	47.96	50.89	53.67	56.33	59.70	62.16
40	45.62	47.27	49.24	51.81	55.76	59.34	60.44	63.69	66.77	69.70	73.40	76.09
50	56.33	53.16	60.35	63.17	67.50	71.42	72.61	76.15	79.49	82.66	86.66	89.56
60	66.98	68.97	71.34	74.40	79.08	83.30	84.58	88.38	91.95	95.34	99.61	102.7
80	88.13	90.41	93.11	96.58	101.9	106.6	108.1	112.3	116.3	120.1	124.8	128.3
100	109.10	111.7	114.7	118.5	124.3	129.6	131.1	135.8	140.2	144.3	149.4	153.2