

## Cumulative Standard Normal Distribution

احتمال های توزیع تجمعی نرمال استاندارد



Z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.40	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.30	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.20	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.10	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.00	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.90	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.80	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.70	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.60	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.50	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.40	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.30	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.20	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.10	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.00	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.90	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.80	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.70	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.60	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.50	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.40	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.30	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.20	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.10	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.00	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.90	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.80	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.70	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.60	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.50	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.40	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.30	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.20	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.10	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
0.00	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

<b>Z</b>	<b>0</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.04</b>	<b>0.05</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.09</b>
<b>0.00</b>	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
<b>0.10</b>	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
<b>0.20</b>	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
<b>0.30</b>	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
<b>0.40</b>	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
<b>0.50</b>	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
<b>0.60</b>	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
<b>0.70</b>	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
<b>0.80</b>	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
<b>0.90</b>	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
<b>1.00</b>	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
<b>1.10</b>	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
<b>1.20</b>	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
<b>1.30</b>	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
<b>1.40</b>	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
<b>1.50</b>	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
<b>1.60</b>	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
<b>1.70</b>	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
<b>1.80</b>	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
<b>1.90</b>	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
<b>2.00</b>	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
<b>2.10</b>	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
<b>2.20</b>	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
<b>2.30</b>	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
<b>2.40</b>	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
<b>2.50</b>	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
<b>2.60</b>	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
<b>2.70</b>	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
<b>2.80</b>	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
<b>2.90</b>	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
<b>3.00</b>	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
<b>3.10</b>	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
<b>3.20</b>	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
<b>3.30</b>	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
<b>3.40</b>	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

# TABLES OF BINOMIAL PROBABILITY SUMS

## جدول احتمال های تجمعی توزیع دو جمله ای

$$P(x \leq K) = \sum_{x=0}^K b(x; N, P)$$

N = 2

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.81	0.64	0.49	0.36	0.25	0.16	0.09	0.04	0.01
1	0.99	0.96	0.91	0.84	0.75	0.64	0.51	0.36	0.19
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

N = 3

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.729	0.512	0.343	0.216	0.125	0.064	0.027	0.008	0.001
1	0.972	0.896	0.784	0.648	0.500	0.352	0.216	0.104	0.028
2	0.999	0.992	0.973	0.936	0.875	0.784	0.657	0.488	0.271
3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

N = 4

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.6561	0.4096	0.2401	0.1296	0.0625	0.0256	0.0081	0.0016	0.0001
1	0.9477	0.8192	0.6517	0.4752	0.3125	0.1792	0.0837	0.0272	0.0037
2	0.9963	0.9728	0.9163	0.8208	0.6875	0.5248	0.3483	0.1808	0.0523
3	0.9999	0.9984	0.9919	0.9744	0.9375	0.8704	0.7599	0.5904	0.3439
4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

N = 5

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.59049	0.32768	0.16807	0.07776	0.03125	0.01024	0.00243	0.00032	0.00001
1	0.91854	0.73728	0.52822	0.33696	0.18750	0.08704	0.03078	0.00672	0.00046
2	0.99144	0.94208	0.83692	0.68256	0.50000	0.31744	0.16308	0.05792	0.00856
3	0.99954	0.99328	0.96922	0.91296	0.81250	0.66304	0.47178	0.26272	0.08146
4	0.99999	0.99968	0.99757	0.98976	0.96875	0.92224	0.83193	0.67232	0.40951
5	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N = 6

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.53144	0.26214	0.11765	0.04666	0.01562	0.00410	0.00073	0.00006	0.00000
1	0.88574	0.65536	0.42018	0.23328	0.10938	0.04096	0.01094	0.00160	0.00006
2	0.98415	0.90112	0.74431	0.54432	0.34375	0.17920	0.07047	0.01696	0.00127
3	0.99873	0.98304	0.92953	0.82080	0.65625	0.45568	0.25569	0.09888	0.01585
4	0.99994	0.99840	0.98906	0.95904	0.89062	0.76672	0.57982	0.34464	0.11426
5	1.00000	0.99994	0.99927	0.99590	0.98438	0.95334	0.88235	0.73786	0.46856
6	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N = 7

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.47830	0.20972	0.08235	0.02799	0.00781	0.00164	0.00022	0.00001	0.00000
1	0.85031	0.57672	0.32942	0.15863	0.06250	0.01884	0.00379	0.00037	0.00001
2	0.97431	0.85197	0.64707	0.41990	0.22656	0.09626	0.02880	0.00467	0.00018
3	0.99727	0.96666	0.87396	0.71021	0.50000	0.28979	0.12604	0.03334	0.00273
4	0.99982	0.99533	0.97120	0.90374	0.77344	0.58010	0.35293	0.14803	0.02569
5	0.99999	0.99963	0.99621	0.98116	0.93750	0.84137	0.67058	0.42328	0.14969
6	1.00000	0.99999	0.99978	0.99836	0.99219	0.97201	0.91765	0.79028	0.52170
7	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N = 8

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.43047	0.16777	0.05765	0.01680	0.00391	0.00066	0.00007	0.00000	0.00000
1	0.81310	0.50332	0.25530	0.10638	0.03516	0.00852	0.00129	0.00008	0.00000
2	0.96191	0.79692	0.55177	0.31539	0.14453	0.04981	0.01129	0.00123	0.00002
3	0.99498	0.94372	0.80590	0.59409	0.36328	0.17367	0.05797	0.01041	0.00043
4	0.99957	0.98959	0.94203	0.82633	0.63672	0.40591	0.19410	0.05628	0.00502
5	0.99998	0.99877	0.98871	0.95019	0.85547	0.68461	0.44823	0.20308	0.03809
6	1.00000	0.99992	0.99871	0.99148	0.96484	0.89362	0.74470	0.49668	0.18690
7	1.00000	1.00000	0.99993	0.99934	0.99609	0.98320	0.94235	0.83223	0.56953
8	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N = 9

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.38742	0.13422	0.04035	0.01008	0.00195	0.00026	0.00002	0.00000	0.00000
1	0.77484	0.43621	0.19600	0.07054	0.01953	0.00380	0.00043	0.00002	0.00000
2	0.94703	0.73820	0.46283	0.23179	0.08984	0.02503	0.00429	0.00031	0.00000
3	0.99167	0.91436	0.72966	0.48261	0.25391	0.09935	0.02529	0.00307	0.00006
4	0.99911	0.98042	0.90119	0.73343	0.50000	0.26657	0.09881	0.01958	0.00089
5	0.99994	0.99693	0.97471	0.90065	0.74609	0.51739	0.27034	0.08564	0.00833
6	1.00000	0.99969	0.99571	0.97497	0.91016	0.76821	0.53717	0.26180	0.05297
7	1.00000	0.99998	0.99957	0.99620	0.98047	0.92946	0.80400	0.56379	0.22516
8	1.00000	1.00000	0.99998	0.99974	0.99805	0.98992	0.95965	0.86578	0.61258
9	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N = 10

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.34868	0.10737	0.02825	0.00605	0.00098	0.00010	0.00001	0.00000	0.00000
1	0.73610	0.37581	0.14931	0.04636	0.01074	0.00168	0.00014	0.00000	0.00000
2	0.92981	0.67780	0.38278	0.16729	0.05469	0.01229	0.00159	0.00008	0.00000
3	0.98720	0.87913	0.64961	0.38228	0.17188	0.05476	0.01059	0.00086	0.00001
4	0.99837	0.96721	0.84973	0.63310	0.37695	0.16624	0.04735	0.00637	0.00015
5	0.99985	0.99363	0.95265	0.83376	0.62305	0.36690	0.15027	0.03279	0.00163
6	0.99999	0.99914	0.98941	0.94524	0.82812	0.61772	0.35039	0.12087	0.01280
7	1.00000	0.99992	0.99841	0.98771	0.94531	0.83271	0.61722	0.32220	0.07019
8	1.00000	1.00000	0.99986	0.99832	0.98926	0.95364	0.85069	0.62419	0.26390
9	1.00000	1.00000	0.99999	0.99990	0.99902	0.99395	0.97175	0.89263	0.65132
10	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =11

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.31381	0.08590	0.01977	0.00363	0.00049	0.00004	0.00000	0.00000	0.00000
1	0.69736	0.32212	0.11299	0.03023	0.00586	0.00073	0.00005	0.00000	0.00000
2	0.91044	0.61740	0.31274	0.11892	0.03271	0.00592	0.00058	0.00002	0.00000
3	0.98147	0.83886	0.56956	0.29628	0.11328	0.02928	0.00429	0.00024	0.00000
4	0.99725	0.94959	0.78970	0.53277	0.27441	0.09935	0.02162	0.00197	0.00002
5	0.99970	0.98835	0.92178	0.75350	0.50000	0.24650	0.07822	0.01165	0.00030
6	0.99998	0.99803	0.97838	0.90065	0.72559	0.46723	0.21030	0.05041	0.00275
7	1.00000	0.99976	0.99571	0.97072	0.88672	0.70372	0.43044	0.16114	0.01853
8	1.00000	0.99998	0.99942	0.99408	0.96729	0.88108	0.68726	0.38260	0.08956
9	1.00000	1.00000	0.99995	0.99927	0.99414	0.96977	0.88701	0.67788	0.30264
10	1.00000	1.00000	1.00000	0.99996	0.99951	0.99637	0.98023	0.91410	0.68619
11	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =12

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.28243	0.06872	0.01384	0.00218	0.00024	0.00002	0.00000	0.00000	0.00000
1	0.65900	0.27488	0.08503	0.01959	0.00317	0.00032	0.00002	0.00000	0.00000
2	0.88913	0.55835	0.25282	0.08344	0.01929	0.00281	0.00021	0.00000	0.00000
3	0.97436	0.79457	0.49252	0.22534	0.07300	0.01527	0.00169	0.00006	0.00000
4	0.99567	0.92744	0.72366	0.43818	0.19385	0.05731	0.00949	0.00058	0.00000
5	0.99946	0.98059	0.88215	0.66521	0.38721	0.15821	0.03860	0.00390	0.00005
6	0.99995	0.99610	0.96140	0.84179	0.61279	0.33479	0.11785	0.01941	0.00054
7	1.00000	0.99942	0.99051	0.94269	0.80615	0.56182	0.27634	0.07256	0.00433
8	1.00000	0.99994	0.99831	0.98473	0.92700	0.77466	0.50748	0.20543	0.02564
9	1.00000	1.00000	0.99979	0.99719	0.98071	0.91656	0.74718	0.44165	0.11087
10	1.00000	1.00000	0.99998	0.99968	0.99683	0.98041	0.91497	0.72512	0.34100
11	1.00000	1.00000	1.00000	0.99998	0.99976	0.99782	0.98616	0.93128	0.71757
12	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =13

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.25419	0.05498	0.00969	0.00131	0.00012	0.00001	0.00000	0.00000	0.00000
1	0.62134	0.23365	0.06367	0.01263	0.00171	0.00014	0.00000	0.00000	0.00000
2	0.86612	0.50165	0.20248	0.05790	0.01123	0.00132	0.00007	0.00000	0.00000
3	0.96584	0.74732	0.42061	0.16858	0.04614	0.00779	0.00065	0.00002	0.00000
4	0.99354	0.90087	0.65431	0.35304	0.13342	0.03208	0.00403	0.00017	0.00000
5	0.99908	0.96996	0.83460	0.57440	0.29053	0.09767	0.01822	0.00125	0.00001
6	0.99990	0.99300	0.93762	0.77116	0.50000	0.22884	0.06238	0.00700	0.00010
7	0.99999	0.99875	0.98178	0.90233	0.70947	0.42560	0.16540	0.03004	0.00092
8	1.00000	0.99983	0.99597	0.96792	0.86658	0.64696	0.34569	0.09913	0.00646
9	1.00000	0.99998	0.99935	0.99221	0.95386	0.83142	0.57939	0.25268	0.03416
10	1.00000	1.00000	0.99993	0.99868	0.98877	0.94210	0.79752	0.49835	0.13388
11	1.00000	1.00000	1.00000	0.99986	0.99829	0.98737	0.93633	0.76635	0.37866
12	1.00000	1.00000	1.00000	0.99999	0.99988	0.99869	0.99031	0.94502	0.74581
13	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =14

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.22877	0.04398	0.00678	0.00078	0.00006	0.00000	0.00000	0.00000	0.00000
1	0.58463	0.19791	0.04748	0.00810	0.00092	0.00006	0.00000	0.00000	0.00000
2	0.84164	0.44805	0.16084	0.03979	0.00647	0.00061	0.00003	0.00000	0.00000
3	0.95587	0.69819	0.35517	0.12431	0.02869	0.00391	0.00025	0.00000	0.00000
4	0.99077	0.87016	0.58420	0.27926	0.08978	0.01751	0.00167	0.00005	0.00000
5	0.99853	0.95615	0.78052	0.48585	0.21198	0.05832	0.00829	0.00038	0.00000
6	0.99982	0.98839	0.90672	0.69245	0.39526	0.15014	0.03147	0.00240	0.00002
7	0.99998	0.99760	0.96853	0.84986	0.60474	0.30755	0.09328	0.01161	0.00018
8	1.00000	0.99962	0.99171	0.94168	0.78802	0.51415	0.21948	0.04385	0.00147
9	1.00000	0.99995	0.99833	0.98249	0.91022	0.72074	0.41580	0.12984	0.00923
10	1.00000	1.00000	0.99975	0.99609	0.97131	0.87569	0.64483	0.30181	0.04413
11	1.00000	1.00000	0.99997	0.99939	0.99353	0.96021	0.83916	0.55195	0.15836
12	1.00000	1.00000	1.00000	0.99994	0.99908	0.99190	0.95252	0.80209	0.41537
13	1.00000	1.00000	1.00000	1.00000	0.99994	0.99922	0.99322	0.95602	0.77123
14	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =15

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.20589	0.03518	0.00475	0.00047	0.00003	0.00000	0.00000	0.00000	0.00000
1	0.54904	0.16713	0.03527	0.00517	0.00049	0.00003	0.00000	0.00000	0.00000
2	0.81594	0.39802	0.12683	0.02711	0.00369	0.00028	0.00001	0.00000	0.00000
3	0.94444	0.64816	0.29687	0.09050	0.01758	0.00193	0.00009	0.00000	0.00000
4	0.98728	0.83577	0.51549	0.21728	0.05923	0.00935	0.00067	0.00001	0.00000
5	0.99775	0.93895	0.72162	0.40322	0.15088	0.03383	0.00365	0.00011	0.00000
6	0.99969	0.98194	0.86886	0.60981	0.30362	0.09505	0.01524	0.00078	0.00000
7	0.99997	0.99576	0.94999	0.78690	0.50000	0.21310	0.05001	0.00424	0.00003
8	1.00000	0.99922	0.98476	0.90495	0.69638	0.39019	0.13114	0.01806	0.00031
9	1.00000	0.99989	0.99635	0.96617	0.84912	0.59678	0.27838	0.06105	0.00225
10	1.00000	0.99999	0.99933	0.99065	0.94077	0.78272	0.48451	0.16423	0.01272
11	1.00000	1.00000	0.99991	0.99907	0.98242	0.90950	0.70313	0.35184	0.05556
12	1.00000	1.00000	0.99999	0.99972	0.99631	0.97289	0.87317	0.60198	0.18406
13	1.00000	1.00000	1.00000	0.99997	0.99951	0.99483	0.96473	0.83287	0.45096
14	1.00000	1.00000	1.00000	1.00000	0.99997	0.99953	0.99525	0.96482	0.79411
15	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =16

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.18530	0.02815	0.00332	0.00028	0.00002	0.00000	0.00000	0.00000	0.00000
1	0.51473	0.14074	0.02611	0.00329	0.00026	0.00001	0.00000	0.00000	0.00000
2	0.78925	0.35184	0.09936	0.01834	0.00209	0.00013	0.00000	0.00000	0.00000
3	0.93159	0.59813	0.24586	0.06515	0.01064	0.00094	0.00003	0.00000	0.00000
4	0.98300	0.79825	0.44990	0.16657	0.03841	0.00490	0.00027	0.00000	0.00000
5	0.99670	0.91831	0.65978	0.32884	0.10506	0.01914	0.00157	0.00003	0.00000
6	0.99950	0.97334	0.82469	0.52717	0.22725	0.05832	0.00713	0.00025	0.00000
7	0.99994	0.99300	0.92565	0.71606	0.40181	0.14227	0.02567	0.00148	0.00001
8	0.99999	0.99852	0.97433	0.85773	0.59819	0.28394	0.07435	0.00700	0.00006
9	1.00000	0.99975	0.99287	0.94168	0.77275	0.47283	0.17531	0.02666	0.00050
10	1.00000	0.99997	0.99843	0.98086	0.89494	0.67116	0.34022	0.08169	0.00330
11	1.00000	1.00000	0.99973	0.99510	0.96159	0.83343	0.55010	0.20175	0.01700
12	1.00000	1.00000	0.99997	0.99906	0.98936	0.93485	0.75414	0.40187	0.06841
13	1.00000	1.00000	1.00000	0.99987	0.99791	0.98166	0.90064	0.64816	0.21075
14	1.00000	1.00000	1.00000	0.99999	0.99974	0.99671	0.97389	0.85926	0.48527
15	1.00000	1.00000	1.00000	1.00000	0.99998	0.99972	0.99668	0.97185	0.81470
16	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =17

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.16677	0.02252	0.00233	0.00017	0.00001	0.00000	0.00000	0.00000	0.00000
1	0.48179	0.11822	0.01928	0.00209	0.00014	0.00000	0.00000	0.00000	0.00000
2	0.76180	0.30962	0.07739	0.01232	0.00117	0.00006	0.00000	0.00000	0.00000
3	0.91736	0.54888	0.20191	0.04642	0.00636	0.00045	0.00001	0.00000	0.00000
4	0.97786	0.75822	0.38869	0.12600	0.02452	0.00252	0.00010	0.00000	0.00000
5	0.99533	0.89430	0.59682	0.26393	0.07173	0.01059	0.00066	0.00001	0.00000
6	0.99922	0.96234	0.77522	0.44784	0.16615	0.03481	0.00324	0.00008	0.00000
7	0.99989	0.98907	0.89536	0.64051	0.31453	0.09190	0.01269	0.00049	0.00000
8	0.99999	0.99742	0.95972	0.80106	0.50000	0.19894	0.04028	0.00258	0.00001
9	1.00000	0.99951	0.98731	0.90810	0.68547	0.35949	0.10464	0.01093	0.00011
10	1.00000	0.99992	0.99676	0.96519	0.83385	0.55216	0.22478	0.03766	0.00078
11	1.00000	0.99999	0.99934	0.98941	0.92827	0.73607	0.40318	0.10570	0.00467
12	1.00000	1.00000	0.99990	0.99748	0.97548	0.87400	0.61131	0.24178	0.02214
13	1.00000	1.00000	0.99999	0.99955	0.99364	0.95358	0.79809	0.45112	0.08264
14	1.00000	1.00000	1.00000	0.99994	0.99883	0.98768	0.92261	0.69038	0.23820
15	1.00000	1.00000	1.00000	1.00000	0.99986	0.99791	0.98072	0.88178	0.51821
16	1.00000	1.00000	1.00000	1.00000	0.99999	0.99983	0.99767	0.97748	0.83323
17	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =18

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.15009	0.01801	0.00163	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000
1	0.45028	0.09908	0.01419	0.00132	0.00007	0.00000	0.00000	0.00000	0.00000
2	0.73380	0.27134	0.05995	0.00823	0.00066	0.00003	0.00000	0.00000	0.00000
3	0.90180	0.50103	0.16455	0.03278	0.00377	0.00021	0.00000	0.00000	0.00000
4	0.97181	0.71635	0.33265	0.09417	0.01544	0.00128	0.00004	0.00000	0.00000
5	0.99358	0.86708	0.53438	0.20876	0.04813	0.00575	0.00027	0.00000	0.00000
6	0.99883	0.94873	0.72170	0.37428	0.11894	0.02028	0.00143	0.00002	0.00000
7	0.99983	0.98372	0.85932	0.56344	0.24034	0.05765	0.00607	0.00016	0.00000
8	0.99998	0.99575	0.94041	0.73684	0.40726	0.13471	0.02097	0.00091	0.00000
9	1.00000	0.99909	0.97903	0.86529	0.59274	0.26316	0.05959	0.00425	0.00002
10	1.00000	0.99984	0.99393	0.94235	0.75966	0.43656	0.14068	0.01628	0.00017
11	1.00000	0.99998	0.99857	0.97972	0.88106	0.62572	0.27830	0.05127	0.00117
12	1.00000	1.00000	0.99973	0.99425	0.95187	0.79124	0.46562	0.13292	0.00642
13	1.00000	1.00000	0.99996	0.99872	0.98456	0.90583	0.66735	0.28365	0.02819
14	1.00000	1.00000	1.00000	0.99979	0.99623	0.96722	0.83545	0.49897	0.09820
15	1.00000	1.00000	1.00000	0.99997	0.99934	0.99177	0.94005	0.72866	0.26620
16	1.00000	1.00000	1.00000	1.00000	0.99993	0.99868	0.98581	0.90092	0.54972
17	1.00000	1.00000	1.00000	1.00000	1.00000	0.99990	0.99837	0.98199	0.84991
18	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =19

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.13509	0.01441	0.00114	0.00006	0.00000	0.00000	0.00000	0.00000	0.00000
1	0.42026	0.08287	0.01042	0.00083	0.00004	0.00000	0.00000	0.00000	0.00000
2	0.70544	0.23689	0.04622	0.00546	0.00036	0.00001	0.00000	0.00000	0.00000
3	0.88500	0.45509	0.13317	0.02296	0.00221	0.00010	0.00000	0.00000	0.00000
4	0.96481	0.67329	0.28222	0.06961	0.00961	0.00064	0.00001	0.00000	0.00000
5	0.99141	0.83694	0.47386	0.16292	0.03178	0.00307	0.00011	0.00000	0.00000
6	0.99830	0.93240	0.66550	0.30807	0.08353	0.01156	0.00062	0.00001	0.00000
7	0.99973	0.97672	0.81803	0.48778	0.17964	0.03523	0.00282	0.00005	0.00000
8	0.99996	0.99334	0.91608	0.66748	0.32380	0.08847	0.01054	0.00031	0.00000
9	1.00000	0.99842	0.96745	0.81391	0.50000	0.18609	0.03255	0.00158	0.00000
10	1.00000	0.99969	0.98946	0.91153	0.67620	0.33252	0.08392	0.00666	0.00004
11	1.00000	0.99995	0.99718	0.96477	0.82036	0.51222	0.18197	0.02328	0.00027
12	1.00000	0.99999	0.99938	0.98844	0.91647	0.69193	0.33450	0.06760	0.00170
13	1.00000	1.00000	0.99989	0.99693	0.96822	0.83708	0.52614	0.16306	0.00859
14	1.00000	1.00000	0.99999	0.99936	0.99039	0.93039	0.71778	0.32671	0.03519
15	1.00000	1.00000	1.00000	0.99990	0.99779	0.97704	0.86683	0.54491	0.11500
16	1.00000	1.00000	1.00000	0.99999	0.99964	0.99454	0.95378	0.76311	0.29456
17	1.00000	1.00000	1.00000	1.00000	0.99996	0.99917	0.98958	0.91713	0.57974
18	1.00000	1.00000	1.00000	1.00000	1.00000	0.99994	0.99886	0.98559	0.86491
19	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

N =20

K \ P=	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.12158	0.01153	0.00080	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000
1	0.39175	0.06918	0.00764	0.00052	0.00002	0.00000	0.00000	0.00000	0.00000
2	0.67693	0.20608	0.03548	0.00361	0.00020	0.00001	0.00000	0.00000	0.00000
3	0.86705	0.41145	0.10709	0.01596	0.00129	0.00005	0.00000	0.00000	0.00000
4	0.95683	0.62965	0.23751	0.05095	0.00591	0.00032	0.00001	0.00000	0.00000
5	0.98875	0.80421	0.41637	0.12560	0.02069	0.00161	0.00004	0.00000	0.00000
6	0.99761	0.91331	0.60801	0.25001	0.05766	0.00647	0.00026	0.00000	0.00000
7	0.99958	0.96786	0.77227	0.41589	0.13159	0.02103	0.00128	0.00002	0.00000
8	0.99994	0.99002	0.88667	0.59560	0.25172	0.05653	0.00514	0.00010	0.00000
9	0.99999	0.99741	0.95204	0.75534	0.41190	0.12752	0.01714	0.00056	0.00000
10	1.00000	0.99944	0.98286	0.87248	0.58810	0.24466	0.04796	0.00259	0.00001
11	1.00000	0.99990	0.99486	0.94347	0.74828	0.40440	0.11333	0.00998	0.00006
12	1.00000	0.99998	0.99872	0.97897	0.86841	0.58411	0.22773	0.03214	0.00042
13	1.00000	1.00000	0.99974	0.99353	0.94234	0.74999	0.39199	0.08669	0.00239
14	1.00000	1.00000	0.99996	0.99839	0.97931	0.87440	0.58363	0.19579	0.01125
15	1.00000	1.00000	0.99999	0.99968	0.99409	0.94905	0.76249	0.37035	0.04317
16	1.00000	1.00000	1.00000	0.99995	0.99871	0.98404	0.89291	0.58855	0.13295
17	1.00000	1.00000	1.00000	0.99999	0.99980	0.99639	0.96452	0.79392	0.32307
18	1.00000	1.00000	1.00000	1.00000	0.99998	0.99948	0.99236	0.93082	0.60825
19	1.00000	1.00000	1.00000	1.00000	1.00000	0.99996	0.99920	0.98847	0.87842
20	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000



**Cumulative Poisson Distribution Tables**

جدول احتمال های تجمعی توزیع پواسن

$$\lambda = Mean$$

X	0.01	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	0.990	0.951	0.905	0.819	0.741	0.670	0.607	0.549	0.497	0.449	0.407
1	1.000	0.999	0.995	0.982	0.963	0.938	0.910	0.878	0.844	0.809	0.772
2		1.000	1.000	0.999	0.996	0.992	0.986	0.977	0.966	0.953	0.937
3				1.000	1.000	0.999	0.998	0.997	0.994	0.991	0.987
4						1.000	1.000	1.000	0.999	0.999	0.998
5									1.000	1.000	1.000
X	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	0.368	0.333	0.301	0.273	0.247	0.223	0.202	0.183	0.165	0.150	0.135
1	0.736	0.699	0.663	0.627	0.592	0.558	0.525	0.493	0.463	0.434	0.406
2	0.920	0.900	0.879	0.857	0.833	0.809	0.783	0.757	0.731	0.704	0.677
3	0.981	0.974	0.966	0.957	0.946	0.934	0.921	0.907	0.891	0.875	0.857
4	0.996	0.995	0.992	0.989	0.986	0.981	0.976	0.970	0.964	0.956	0.947
5	0.999	0.999	0.998	0.998	0.997	0.996	0.994	0.992	0.990	0.987	0.983
6	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.998	0.997	0.997	0.995
7					1.000	1.000	1.000	1.000	0.999	0.999	0.999
8									1.000	1.000	1.000
X	2.2	2.4	2.6	2.8	3.0	3.5	4.0	4.5	5.0	5.5	6.0
0	0.111	0.091	0.074	0.061	0.050	0.030	0.018	0.011	0.007	0.004	0.002
1	0.355	0.308	0.267	0.231	0.199	0.136	0.092	0.061	0.040	0.027	0.017
2	0.623	0.570	0.518	0.469	0.423	0.321	0.238	0.174	0.125	0.088	0.062
3	0.819	0.779	0.736	0.692	0.647	0.537	0.433	0.342	0.265	0.202	0.151
4	0.928	0.904	0.877	0.848	0.815	0.725	0.629	0.532	0.440	0.358	0.285
5	0.975	0.964	0.951	0.935	0.916	0.858	0.785	0.703	0.616	0.529	0.446
6	0.993	0.988	0.983	0.976	0.966	0.935	0.889	0.831	0.762	0.686	0.606
7	0.998	0.997	0.995	0.992	0.988	0.973	0.949	0.913	0.867	0.809	0.744
8	1.000	0.999	0.999	0.998	0.996	0.990	0.979	0.960	0.932	0.894	0.847
9		1.000	1.000	0.999	0.999	0.997	0.992	0.983	0.968	0.946	0.916
10				1.000	1.000	0.999	0.997	0.993	0.986	0.975	0.957
11						1.000	0.999	0.998	0.995	0.989	0.980
12							1.000	0.999	0.998	0.996	0.991
13								1.000	0.999	0.998	0.996
14									1.000	0.999	0.999
15										1.000	0.999
16											1.000

X	6.5	7.0	7.5	8.0	9.0	10.0	12.0	14.0	16.0	18.0	20.0
0	0.002	0.001	0.001	0.000							
1	0.011	0.007	0.005	0.003	0.001						
2	0.043	0.030	0.020	0.014	0.006	0.003	0.001				
3	0.112	0.082	0.059	0.042	0.021	0.010	0.002				
4	0.224	0.173	0.132	0.100	0.055	0.029	0.008	0.002			
5	0.369	0.301	0.241	0.191	0.116	0.067	0.020	0.006	0.001		
6	0.527	0.450	0.378	0.313	0.207	0.130	0.046	0.014	0.004	0.001	
7	0.673	0.599	0.525	0.453	0.324	0.220	0.090	0.032	0.010	0.003	0.001
8	0.792	0.729	0.662	0.593	0.456	0.333	0.155	0.062	0.022	0.007	0.002
9	0.877	0.830	0.776	0.717	0.587	0.458	0.242	0.109	0.043	0.015	0.005
10	0.933	0.901	0.862	0.816	0.706	0.583	0.347	0.176	0.077	0.030	0.011
11	0.966	0.947	0.921	0.888	0.803	0.697	0.462	0.260	0.127	0.055	0.021
12	0.984	0.973	0.957	0.936	0.876	0.792	0.576	0.358	0.193	0.092	0.039
13	0.993	0.987	0.978	0.966	0.926	0.864	0.682	0.464	0.275	0.143	0.066
14	0.997	0.994	0.990	0.983	0.959	0.917	0.772	0.570	0.368	0.208	0.105
15	0.999	0.998	0.995	0.992	0.978	0.951	0.844	0.669	0.467	0.287	0.157
16	1.000	0.999	0.998	0.996	0.989	0.973	0.899	0.756	0.566	0.375	0.221
17		1.000	0.999	0.998	0.995	0.986	0.937	0.827	0.659	0.469	0.297
18			1.000	0.999	0.998	0.993	0.963	0.883	0.742	0.562	0.381
19				1.000	0.999	0.997	0.979	0.923	0.812	0.651	0.470
20					1.000	0.998	0.988	0.952	0.868	0.731	0.559
21						0.999	0.994	0.971	0.911	0.799	0.644
22						1.000	0.997	0.983	0.942	0.855	0.721
23							0.999	0.991	0.963	0.899	0.787
24							0.999	0.995	0.978	0.932	0.843
25							1.000	0.997	0.987	0.955	0.888
26								0.999	0.993	0.972	0.922
27								0.999	0.996	0.983	0.948
28								1.000	0.998	0.990	0.966
29									0.999	0.994	0.978
30									0.999	0.997	0.987
31									1.000	0.998	0.992
32										0.999	0.995
33										1.000	0.997
34											0.999
35											0.999
36											1.000

### Chi-Squared Values for a Specified Right Tail Area

مقادیر کی دو برای دنباله سمت راست توزیع

$\alpha =$  Right Hand Tail Area (احتمال دنباله سمت راست  $\alpha =$ )

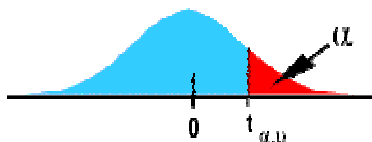
$\nu$	0.999	0.995	0.99	0.975	0.95	0.9	0.1	0.05	0.025	0.01	0.005	0.001
1	0.00	0.00	0.00	0.00	0.00	0.02	2.71	3.84	5.02	6.63	7.88	10.83
2	0.00	0.01	0.02	0.05	0.10	0.21	4.61	5.99	7.38	9.21	10.60	13.82
3	0.02	0.07	0.11	0.22	0.35	0.58	6.25	7.81	9.35	11.34	12.84	16.27
4	0.09	0.21	0.30	0.48	0.71	1.06	7.78	9.49	11.14	13.28	14.86	18.47
5	0.21	0.41	0.55	0.83	1.15	1.61	9.24	11.07	12.83	15.09	16.75	20.51
6	0.38	0.68	0.87	1.24	1.64	2.20	10.64	12.59	14.45	16.81	18.55	22.46
7	0.60	0.99	1.24	1.69	2.17	2.83	12.02	14.07	16.01	18.48	20.28	24.32
8	0.86	1.34	1.65	2.18	2.73	3.49	13.36	15.51	17.53	20.09	21.95	26.12
9	1.15	1.73	2.09	2.70	3.33	4.17	14.68	16.92	19.02	21.67	23.59	27.88
10	1.48	2.16	2.56	3.25	3.94	4.87	15.99	18.31	20.48	23.21	25.19	29.59
11	1.83	2.60	3.05	3.82	4.57	5.58	17.28	19.68	21.92	24.73	26.76	31.26
12	2.21	3.07	3.57	4.40	5.23	6.30	18.55	21.03	23.34	26.22	28.30	32.91
13	2.62	3.57	4.11	5.01	5.89	7.04	19.81	22.36	24.74	27.69	29.82	34.53
14	3.04	4.07	4.66	5.63	6.57	7.79	21.06	23.68	26.12	29.14	31.32	36.12
15	3.48	4.60	5.23	6.26	7.26	8.55	22.31	25.00	27.49	30.58	32.80	37.70
16	3.94	5.14	5.81	6.91	7.96	9.31	23.54	26.30	28.85	32.00	34.27	39.25
17	4.42	5.70	6.41	7.56	8.67	10.09	24.77	27.59	30.19	33.41	35.72	40.79
18	4.90	6.26	7.01	8.23	9.39	10.86	25.99	28.87	31.53	34.81	37.16	42.31
19	5.41	6.84	7.63	8.91	10.12	11.65	27.20	30.14	32.85	36.19	38.58	43.82
20	5.92	7.43	8.26	9.59	10.85	12.44	28.41	31.41	34.17	37.57	40.00	45.31
21	6.45	8.03	8.90	10.28	11.59	13.24	29.62	32.67	35.48	38.93	41.40	46.80
22	6.98	8.64	9.54	10.98	12.34	14.04	30.81	33.92	36.78	40.29	42.80	48.27
23	7.53	9.26	10.20	11.69	13.09	14.85	32.01	35.17	38.08	41.64	44.18	49.73
24	8.08	9.89	10.86	12.40	13.85	15.66	33.20	36.42	39.36	42.98	45.56	51.18
25	8.65	10.52	11.52	13.12	14.61	16.47	34.38	37.65	40.65	44.31	46.93	52.62
26	9.22	11.16	12.20	13.84	15.38	17.29	35.56	38.89	41.92	45.64	48.29	54.05
27	9.80	11.81	12.88	14.57	16.15	18.11	36.74	40.11	43.19	46.96	49.65	55.48
28	10.39	12.46	13.56	15.31	16.93	18.94	37.92	41.34	44.46	48.28	50.99	56.89
29	10.99	13.12	14.26	16.05	17.71	19.77	39.09	42.56	45.72	49.59	52.34	58.30
30	11.59	13.79	14.95	16.79	18.49	20.60	40.26	43.77	46.98	50.89	53.67	59.70
32	12.81	15.13	16.36	18.29	20.07	22.27	42.58	46.19	49.48	53.49	56.33	62.49

<b>34</b>	14.06	16.50	17.79	19.81	21.66	23.95	44.90	48.60	51.97	56.06	58.96	65.25
<b>36</b>	15.32	17.89	19.23	21.34	23.27	25.64	47.21	51.00	54.44	58.62	61.58	67.98
<b>38</b>	16.61	19.29	20.69	22.88	24.88	27.34	49.51	53.38	56.90	61.16	64.18	70.70
<b>40</b>	17.92	20.71	22.16	24.43	26.51	29.05	51.81	55.76	59.34	63.69	66.77	73.40
<b>42</b>	19.24	22.14	23.65	26.00	28.14	30.77	54.09	58.12	61.78	66.21	69.34	76.08
<b>44</b>	20.58	23.58	25.15	27.57	29.79	32.49	56.37	60.48	64.20	68.71	71.89	78.75
<b>46</b>	21.93	25.04	26.66	29.16	31.44	34.22	58.64	62.83	66.62	71.20	74.44	81.40
<b>48</b>	23.29	26.51	28.18	30.75	33.10	35.95	60.91	65.17	69.02	73.68	76.97	84.04
<b>50</b>	24.67	27.99	29.71	32.36	34.76	37.69	63.17	67.50	71.42	76.15	79.49	86.66
<b>55</b>	28.17	31.73	33.57	36.40	38.96	42.06	68.80	73.31	77.38	82.29	85.75	93.17
<b>60</b>	31.74	35.53	37.48	40.48	43.19	46.46	74.40	79.08	83.30	88.38	91.95	99.61
<b>65</b>	35.36	39.38	41.44	44.60	47.45	50.88	79.97	84.82	89.18	94.42	98.10	105.99
<b>70</b>	39.04	43.28	45.44	48.76	51.74	55.33	85.53	90.53	95.02	100.43	104.21	112.32
<b>75</b>	42.76	47.21	49.48	52.94	56.05	59.79	91.06	96.22	100.84	106.39	110.29	118.60
<b>80</b>	46.52	51.17	53.54	57.15	60.39	64.28	96.58	101.88	106.63	112.33	116.32	124.84
<b>85</b>	50.32	55.17	57.63	61.39	64.75	68.78	102.08	107.52	112.39	118.24	122.32	131.04
<b>90</b>	54.16	59.20	61.75	65.65	69.13	73.29	107.57	113.15	118.14	124.12	128.30	137.21
<b>95</b>	58.02	63.25	65.90	69.92	73.52	77.82	113.04	118.75	123.86	129.97	134.25	143.34
<b>100</b>	61.92	67.33	70.06	74.22	77.93	82.36	118.50	124.34	129.56	135.81	140.17	149.45

## Values of t for a Specified Right Tail Area

مقادیر t برای دنباله سمت راست توزیع

(نقاط درصدی توزیع t) Percentage Points of the t Distribution



v	Level of Significance $\alpha$ (سطح معنی داری)									
	0.4	0.25	0.1	0.05	0.025	0.01	0.005	0.0025	0.001	0.0005
1	0.325	1.000	3.078	6.314	12.706	31.821	63.656	127.321	318.289	636.578
2	0.289	0.816	1.886	2.920	4.303	6.965	9.925	14.089	22.328	31.600
3	0.277	0.765	1.638	2.353	3.182	4.541	5.841	7.453	10.214	12.924
4	0.271	0.741	1.533	2.132	2.776	3.747	4.604	5.598	7.173	8.610
5	0.267	0.727	1.476	2.015	2.571	3.365	4.032	4.773	5.894	6.869
6	0.265	0.718	1.440	1.943	2.447	3.143	3.707	4.317	5.208	5.959
7	0.263	0.711	1.415	1.895	2.365	2.998	3.499	4.029	4.785	5.408
8	0.262	0.706	1.397	1.860	2.306	2.896	3.355	3.833	4.501	5.041
9	0.261	0.703	1.383	1.833	2.262	2.821	3.250	3.690	4.297	4.781
10	0.260	0.700	1.372	1.812	2.228	2.764	3.169	3.581	4.144	4.587
11	0.260	0.697	1.363	1.796	2.201	2.718	3.106	3.497	4.025	4.437
12	0.259	0.695	1.356	1.782	2.179	2.681	3.055	3.428	3.930	4.318
13	0.259	0.694	1.350	1.771	2.160	2.650	3.012	3.372	3.852	4.221
14	0.258	0.692	1.345	1.761	2.145	2.624	2.977	3.326	3.787	4.140
15	0.258	0.691	1.341	1.753	2.131	2.602	2.947	3.286	3.733	4.073
16	0.258	0.690	1.337	1.746	2.120	2.583	2.921	3.252	3.686	4.015
17	0.257	0.689	1.333	1.740	2.110	2.567	2.898	3.222	3.646	3.965
18	0.257	0.688	1.330	1.734	2.101	2.552	2.878	3.197	3.610	3.922
19	0.257	0.688	1.328	1.729	2.093	2.539	2.861	3.174	3.579	3.883
20	0.257	0.687	1.325	1.725	2.086	2.528	2.845	3.153	3.552	3.850
21	0.257	0.686	1.323	1.721	2.080	2.518	2.831	3.135	3.527	3.819
22	0.256	0.686	1.321	1.717	2.074	2.508	2.819	3.119	3.505	3.792
23	0.256	0.685	1.319	1.714	2.069	2.500	2.807	3.104	3.485	3.768
24	0.256	0.685	1.318	1.711	2.064	2.492	2.797	3.091	3.467	3.745
25	0.256	0.684	1.316	1.708	2.060	2.485	2.787	3.078	3.450	3.725
26	0.256	0.684	1.315	1.706	2.056	2.479	2.779	3.067	3.435	3.707
27	0.256	0.684	1.314	1.703	2.052	2.473	2.771	3.057	3.421	3.689
28	0.256	0.683	1.313	1.701	2.048	2.467	2.763	3.047	3.408	3.674

<b>29</b>	0.256	0.683	1.311	1.699	2.045	2.462	2.756	3.038	3.396	3.660
<b>30</b>	0.256	0.683	1.310	1.697	2.042	2.457	2.750	3.030	3.385	3.646
<b>40</b>	0.255	0.681	1.303	1.684	2.021	2.423	2.704	2.971	3.307	3.551
<b>60</b>	0.254	0.679	1.296	1.671	2.000	2.390	2.660	2.915	3.232	3.460
<b>120</b>	0.254	0.677	1.289	1.658	1.980	2.358	2.617	2.860	3.160	3.373
	0.253	0.674	1.282	1.645	1.960	2.326	2.576	2.807	3.090	3.291

## Values of F For a Specified Right Tail Area $F_{0.01, v_1, v_2}$

مقادیر F برای دنباله سمت راست توزیع

$$F_{0.01, v_1, v_2} \quad F_{0.025, v_1, v_2} \quad F_{0.05, v_1, v_2} \quad F_{0.10, v_1, v_2} \quad F_{0.25, v_1, v_2}$$

( $v_2$  درجه آزادی مخرج)  $v_2$  DOF for Denominator

$(v_2)$	Degrees of Freedom for Numerator ( $v_1$ ) (مقادیر مختلف درجه آزادی $v_1$ )																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	4052	4999	5404	5624	5764	5859	5928	5981	6022	6056	6107	6157	6209	6234	6260	6286	6313	6340	6366
2	98.5	99.0	99.2	99.3	99.3	99.3	99.4	99.4	99.4	99.4	99.4	99.4	99.4	99.5	99.5	99.5	99.5	99.5	99.5
3	34.1	30.8	29.5	28.7	28.2	27.9	27.7	27.5	27.3	27.2	27.1	26.9	26.7	26.6	26.5	26.4	26.3	26.2	26.1
4	21.2	18.0	16.7	16.0	15.5	15.2	15.0	14.8	14.7	14.5	14.4	14.2	14.0	13.9	13.8	13.7	13.7	13.6	13.5
5	16.3	13.3	12.1	11.4	11.0	10.7	10.5	10.3	10.2	10.1	9.89	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.02
6	13.7	10.9	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88
7	12.2	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.47	6.31	6.16	6.07	5.99	5.91	5.82	5.74	5.65
8	11.3	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86
9	10.6	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31
10	10.0	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.96	3.82	3.66	3.59	3.51	3.43	3.34	3.25	3.17
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.67	3.52	3.37	3.29	3.21	3.13	3.05	2.96	2.87
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.84	2.75
17	8.40	6.11	5.19	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.23	3.09	2.94	2.86	2.78	2.69	2.61	2.52	2.42
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35	3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18	3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13
27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15	3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12	3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09	3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.03
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.50	2.35	2.20	2.12	2.03	1.94	1.84	1.73	1.60
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38
$\infty$	6.64	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00

## Values of F For a Specified Right Tail Area $F_{0.025, v_1, v_2}$

مقادیر F برای دنباله سمت راست توزیع

( $v_2$  درجه آزادی مخرج)  $v_2$  DOF for Denominator

		Degrees of Freedom for Numerator ( $v_1$ )																	
( $v_2$ )	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	648	799	864	900	922	937	948	957	963	969	977	985	993	997	1001	1006	1010	1014	1018
2	38.5	39.0	39.2	39.2	39.3	39.3	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.5	39.5	39.5	39.5	39.5	39.5
3	17.4	16.0	15.4	15.1	14.9	14.7	14.6	14.5	14.5	14.4	14.3	14.3	14.2	14.1	14.1	14.0	14.0	13.9	13.9
4	12.2	10.6	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.75	8.66	8.56	8.51	8.46	8.41	8.36	8.31	8.26
5	10.0	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68	6.62	6.52	6.43	6.33	6.28	6.23	6.18	6.12	6.07	6.02
6	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.37	5.27	5.17	5.12	5.07	5.01	4.96	4.90	4.85
7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.67	4.57	4.47	4.41	4.36	4.31	4.25	4.20	4.14
8	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.20	4.10	4.00	3.95	3.89	3.84	3.78	3.73	3.67
9	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.87	3.77	3.67	3.61	3.56	3.51	3.45	3.39	3.33
10	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.62	3.52	3.42	3.37	3.31	3.26	3.20	3.14	3.08
11	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.43	3.33	3.23	3.17	3.12	3.06	3.00	2.94	2.88
12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.28	3.18	3.07	3.02	2.96	2.91	2.85	2.79	2.73
13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.15	3.05	2.95	2.89	2.84	2.78	2.72	2.66	2.60
14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.05	2.95	2.84	2.79	2.73	2.67	2.61	2.55	2.49
15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	2.96	2.86	2.76	2.70	2.64	2.59	2.52	2.46	2.40
16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.89	2.79	2.68	2.63	2.57	2.51	2.45	2.38	2.32
17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.82	2.72	2.62	2.56	2.50	2.44	2.38	2.32	2.25
18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.77	2.67	2.56	2.50	2.44	2.38	2.32	2.26	2.19
19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.72	2.62	2.51	2.45	2.39	2.33	2.27	2.20	2.13
20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.68	2.57	2.46	2.41	2.35	2.29	2.22	2.16	2.09
21	5.83	4.42	3.82	3.48	3.25	3.09	2.97	2.87	2.80	2.73	2.64	2.53	2.42	2.37	2.31	2.25	2.18	2.11	2.04
22	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76	2.70	2.60	2.50	2.39	2.33	2.27	2.21	2.14	2.08	2.00
23	5.75	4.35	3.75	3.41	3.18	3.02	2.90	2.81	2.73	2.67	2.57	2.47	2.36	2.30	2.24	2.18	2.11	2.04	1.97
24	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70	2.64	2.54	2.44	2.33	2.27	2.21	2.15	2.08	2.01	1.94
25	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68	2.61	2.51	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91
26	5.66	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65	2.59	2.49	2.39	2.28	2.22	2.16	2.09	2.03	1.95	1.88
27	5.63	4.24	3.65	3.31	3.08	2.92	2.80	2.71	2.63	2.57	2.47	2.36	2.25	2.19	2.13	2.07	2.00	1.93	1.85
28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	2.69	2.61	2.55	2.45	2.34	2.23	2.17	2.11	2.05	1.98	1.91	1.83
29	5.59	4.20	3.61	3.27	3.04	2.88	2.76	2.67	2.59	2.53	2.43	2.32	2.21	2.15	2.09	2.03	1.96	1.89	1.81
30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.41	2.31	2.20	2.14	2.07	2.01	1.94	1.87	1.79
40	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.29	2.18	2.07	2.01	1.94	1.88	1.80	1.72	1.64
60	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.17	2.06	1.94	1.88	1.82	1.74	1.67	1.58	1.48
$\infty$	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.94	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00



## Values of F For a Specified Right Tail Area $F_{0.05, v_1, v_2}$

مقادیر F برای دنباله سمت راست توزیع

$v_2$  DOF for Denominator (  $v_2$  درجه آزادی مخرج )

$(v_2)$	Degrees of Freedom for Numerator ( $v_1$ ) (مقادیر مختلف درجه آزادی $v_1$ )																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	161	199	216	225	230	234	237	239	241	242	244	246	248	249	250	251	252	253	254
2	18.5	19.0	19.2	19.2	19.3	19.3	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.5	19.5	19.5	19.5	19.5	19.5
3	10.1	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.37
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
$\infty$	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00

## Values of F For a Specified Right Tail Area $F_{0.10, v_1, v_2}$

مقادیر F برای دنباله سمت راست توزیع

$v_2$  DOF for Denominator (درجه آزادی مخرج)

$(v_2)$	Degrees of Freedom for Numerator ( $v_1$ ) (مقادیر مختلف درجه آزادی)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	39.9	49.5	53.6	55.8	57.2	58.2	58.9	59.4	59.9	60.2	60.7	61.2	61.7	62.0	62.3	62.5	62.8	63.1	63.3
2	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38	9.39	9.41	9.42	9.44	9.45	9.46	9.47	9.47	9.48	9.49
3	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24	5.23	5.22	5.20	5.18	5.18	5.17	5.16	5.15	5.14	5.13
4	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94	3.92	3.90	3.87	3.84	3.83	3.82	3.80	3.79	3.78	3.76
5	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32	3.30	3.27	3.24	3.21	3.19	3.17	3.16	3.14	3.12	3.11
6	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96	2.94	2.90	2.87	2.84	2.82	2.80	2.78	2.76	2.74	2.72
7	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72	2.70	2.67	2.63	2.59	2.58	2.56	2.54	2.51	2.49	2.47
8	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56	2.54	2.50	2.46	2.42	2.40	2.38	2.36	2.34	2.32	2.29
9	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44	2.42	2.38	2.34	2.30	2.28	2.25	2.23	2.21	2.18	2.16
10	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35	2.32	2.28	2.24	2.20	2.18	2.16	2.13	2.11	2.08	2.06
11	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27	2.25	2.21	2.17	2.12	2.10	2.08	2.05	2.03	2.00	1.97
12	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21	2.19	2.15	2.10	2.06	2.04	2.01	1.99	1.96	1.93	1.90
13	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16	2.14	2.10	2.05	2.01	1.98	1.96	1.93	1.90	1.88	1.85
14	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12	2.10	2.05	2.01	1.96	1.94	1.91	1.89	1.86	1.83	1.80
15	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09	2.06	2.02	1.97	1.92	1.90	1.87	1.85	1.82	1.79	1.76
16	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06	2.03	1.99	1.94	1.89	1.87	1.84	1.81	1.78	1.75	1.72
17	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03	2.00	1.96	1.91	1.86	1.84	1.81	1.78	1.75	1.72	1.69
18	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00	1.98	1.93	1.89	1.84	1.81	1.78	1.75	1.72	1.69	1.66
19	2.99	2.61	2.40	2.27	2.18	2.11	2.06	2.02	1.98	1.96	1.91	1.86	1.81	1.79	1.76	1.73	1.70	1.67	1.63
20	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96	1.94	1.89	1.84	1.79	1.77	1.74	1.71	1.68	1.64	1.61
21	2.96	2.57	2.36	2.23	2.14	2.08	2.02	1.98	1.95	1.92	1.87	1.83	1.78	1.75	1.72	1.69	1.66	1.62	1.59
22	2.95	2.56	2.35	2.22	2.13	2.06	2.01	1.97	1.93	1.90	1.86	1.81	1.76	1.73	1.70	1.67	1.64	1.60	1.57
23	2.94	2.55	2.34	2.21	2.11	2.05	1.99	1.95	1.92	1.89	1.84	1.80	1.74	1.72	1.69	1.66	1.62	1.59	1.55
24	2.93	2.54	2.33	2.19	2.10	2.04	1.98	1.94	1.91	1.88	1.83	1.78	1.73	1.70	1.67	1.64	1.61	1.57	1.53
25	2.92	2.53	2.32	2.18	2.09	2.02	1.97	1.93	1.89	1.87	1.82	1.77	1.72	1.69	1.66	1.63	1.59	1.56	1.52
26	2.91	2.52	2.31	2.17	2.08	2.01	1.96	1.92	1.88	1.86	1.81	1.76	1.71	1.68	1.65	1.61	1.58	1.54	1.50
27	2.90	2.51	2.30	2.17	2.07	2.00	1.95	1.91	1.87	1.85	1.80	1.75	1.70	1.67	1.64	1.60	1.57	1.53	1.49
28	2.89	2.50	2.29	2.16	2.06	2.00	1.94	1.90	1.87	1.84	1.79	1.74	1.69	1.66	1.63	1.59	1.56	1.52	1.48
29	2.89	2.50	2.28	2.15	2.06	1.99	1.93	1.89	1.86	1.83	1.78	1.73	1.68	1.65	1.62	1.58	1.55	1.51	1.47
30	2.88	2.49	2.28	2.14	2.05	1.98	1.93	1.88	1.85	1.82	1.77	1.72	1.67	1.64	1.61	1.57	1.54	1.50	1.46
40	2.84	2.44	2.23	2.09	2.00	1.93	1.87	1.83	1.79	1.76	1.71	1.66	1.61	1.57	1.54	1.51	1.47	1.42	1.38
60	2.79	2.39	2.18	2.04	1.95	1.87	1.82	1.77	1.74	1.71	1.66	1.60	1.54	1.51	1.48	1.44	1.40	1.35	1.29
120	2.75	2.35	2.13	1.99	1.90	1.82	1.77	1.72	1.68	1.65	1.60	1.55	1.48	1.45	1.41	1.37	1.32	1.26	1.19
$\infty$	2.71	2.30	2.08	1.94	1.85	1.77	1.72	1.67	1.63	1.60	1.55	1.49	1.42	1.38	1.34	1.30	1.24	1.17	1.00

## Values of F For a Specified Right Tail Area $F_{0.25, v_1, v_2}$

مقادیر F برای دنباله سمت راست توزیع

$v_2$  DOF for Denominator (درجه آزادی مخرج  $v_2$ )

$(v_2)$	Degrees of Freedom for Numerator ( $v_1$ ) (مقادیر مختلف درجه آزادی $v_1$ )																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	5.83	7.50	8.20	8.58	8.82	8.98	9.10	9.19	9.26	9.32	9.41	9.49	9.58	9.63	9.67	9.71	9.76	9.80	9.85
2	2.57	3.00	3.15	3.23	3.28	3.31	3.34	3.35	3.37	3.38	3.39	3.41	3.43	3.43	3.44	3.45	3.46	3.47	3.48
3	2.02	2.28	2.36	2.39	2.41	2.42	2.43	2.44	2.44	2.44	2.45	2.46	2.46	2.46	2.47	2.47	2.47	2.47	2.47
4	1.81	2.00	2.05	2.06	2.07	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08
5	1.69	1.85	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.88	1.88	1.88	1.87	1.87	1.87
6	1.62	1.76	1.78	1.79	1.79	1.78	1.78	1.78	1.77	1.77	1.77	1.76	1.76	1.75	1.75	1.75	1.74	1.74	1.74
7	1.57	1.70	1.72	1.72	1.71	1.71	1.70	1.70	1.69	1.69	1.68	1.68	1.67	1.67	1.66	1.66	1.65	1.65	1.65
8	1.54	1.66	1.67	1.66	1.66	1.65	1.64	1.64	1.63	1.63	1.62	1.62	1.61	1.60	1.60	1.59	1.59	1.58	1.58
9	1.51	1.62	1.63	1.63	1.62	1.61	1.60	1.60	1.59	1.59	1.58	1.57	1.56	1.56	1.55	1.54	1.54	1.53	1.53
10	1.49	1.60	1.60	1.59	1.59	1.58	1.57	1.56	1.56	1.55	1.54	1.53	1.52	1.52	1.51	1.51	1.50	1.49	1.48
11	1.47	1.58	1.58	1.57	1.56	1.55	1.54	1.53	1.53	1.52	1.51	1.50	1.49	1.49	1.48	1.47	1.47	1.46	1.45
12	1.46	1.56	1.56	1.55	1.54	1.53	1.52	1.51	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.45	1.44	1.43	1.42
13	1.45	1.55	1.55	1.53	1.52	1.51	1.50	1.49	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.42	1.41	1.40
14	1.44	1.53	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.41	1.40	1.39	1.38
15	1.43	1.52	1.52	1.51	1.49	1.48	1.47	1.46	1.46	1.45	1.44	1.43	1.41	1.41	1.40	1.39	1.38	1.37	1.36
16	1.42	1.51	1.51	1.50	1.48	1.47	1.46	1.45	1.44	1.44	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34
17	1.42	1.51	1.50	1.49	1.47	1.46	1.45	1.44	1.43	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33
18	1.41	1.50	1.49	1.48	1.46	1.45	1.44	1.43	1.42	1.42	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32
19	1.41	1.49	1.49	1.47	1.46	1.44	1.43	1.42	1.41	1.41	1.40	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.30
20	1.40	1.49	1.48	1.47	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.29
21	1.40	1.48	1.48	1.46	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.35	1.34	1.33	1.32	1.31	1.30	1.28
22	1.40	1.48	1.47	1.45	1.44	1.42	1.41	1.40	1.39	1.39	1.37	1.36	1.34	1.33	1.32	1.31	1.30	1.29	1.28
23	1.39	1.47	1.47	1.45	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.35	1.34	1.33	1.32	1.31	1.30	1.28	1.27
24	1.39	1.47	1.46	1.44	1.43	1.41	1.40	1.39	1.38	1.38	1.36	1.35	1.33	1.32	1.31	1.30	1.29	1.28	1.26
25	1.39	1.47	1.46	1.44	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.34	1.33	1.32	1.31	1.29	1.28	1.27	1.25
26	1.38	1.46	1.45	1.44	1.42	1.41	1.39	1.38	1.37	1.37	1.35	1.34	1.32	1.31	1.30	1.29	1.28	1.26	1.25
27	1.38	1.46	1.45	1.43	1.42	1.40	1.39	1.38	1.37	1.36	1.35	1.33	1.32	1.31	1.30	1.28	1.27	1.26	1.24
28	1.38	1.46	1.45	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.34	1.33	1.31	1.30	1.29	1.28	1.27	1.25	1.24
29	1.38	1.45	1.45	1.43	1.41	1.40	1.38	1.37	1.36	1.35	1.34	1.32	1.31	1.30	1.29	1.27	1.26	1.25	1.23
30	1.38	1.45	1.44	1.42	1.41	1.39	1.38	1.37	1.36	1.35	1.34	1.32	1.30	1.29	1.28	1.27	1.26	1.24	1.23
40	1.36	1.44	1.42	1.40	1.39	1.37	1.36	1.35	1.34	1.33	1.31	1.30	1.28	1.26	1.25	1.24	1.22	1.21	1.19
60	1.35	1.42	1.41	1.38	1.37	1.35	1.33	1.32	1.31	1.30	1.29	1.27	1.25	1.24	1.22	1.21	1.19	1.17	1.15
120	1.34	1.40	1.39	1.37	1.35	1.33	1.31	1.30	1.29	1.28	1.26	1.24	1.22	1.21	1.19	1.18	1.16	1.13	1.10
$\infty$	1.32	1.39	1.37	1.35	1.33	1.31	1.29	1.28	1.27	1.25	1.24	1.22	1.19	1.18	1.16	1.14	1.12	1.08	1.00

## TABLE OF RANDOM NUMBERS جدول اعداد تصادفی

39634 62349 74088 65564 16379 19713 39153 69459 17986 24537  
14595 35050 40469 27478 44526 67331 93365 54526 22356 93208  
30734 71571 83722 79712 25775 65178 07763 82928 31131 30196  
64628 89126 91254 24090 25752 03091 39411 73146 06089 15630  
42831 95113 43511 42082 15140 34733 68076 18292 69486 80468

80583 70361 41047 26792 78466 03395 17635 09697 82447 31405  
00209 90404 99457 72570 42194 49043 24330 14939 09865 45906  
05409 20830 01911 60767 55248 79253 12317 84120 77772 50103  
95836 22530 91785 80210 34361 52228 33869 94332 83868 61672  
65358 70469 87149 89509 72176 18103 55169 79954 72002 20582

72249 04037 36192 40221 14918 53437 60571 40995 55006 10694  
41692 40581 93050 48734 34652 41577 04631 49184 39295 81776  
61885 50796 96822 82002 07973 52925 75467 86013 98072 91942  
48917 48129 48624 48248 91465 54898 61220 18721 67387 66575  
88378 84299 12193 03785 49314 39761 99132 28775 45276 91816

77800 25734 09801 92087 02955 12872 89848 48579 06028 13827  
24028 03405 01178 06316 81916 40170 53665 87202 88638 47121  
86558 84750 43994 01760 96205 27937 45416 71964 52261 30781  
78545 49201 05329 14182 10971 90472 44682 39304 19819 55799  
14969 64623 82780 35686 30941 14622 04126 25498 95452 63937

58697 31973 06303 94202 62287 56164 79157 98375 24558 99241  
38449 46438 91579 01907 72146 05764 22400 94490 49833 09258  
62134 87244 73348 80114 78490 64735 31010 66975 28652 36166  
72749 13347 65030 26128 49067 27904 49953 74674 94617 13317  
81638 36566 42709 33717 59943 12027 46547 61303 46699 76243

46574 79670 10342 89543 75030 23428 29541 32501 89422 87474  
11873 57196 32209 67663 07990 12288 59245 83638 23642 61715  
13862 72778 09949 23096 01791 19472 14634 31690 36602 62943  
08312 27886 82321 28666 72998 22514 51054 22940 31842 54245  
11071 44430 94664 91294 35163 05494 32882 23904 41340 61185

82509 11842 86963 50307 07510 32545 90717 46856 86079 13769  
07426 67341 80314 58910 93948 85738 69444 09370 58194 28207  
57696 25592 91221 95386 15857 84645 89659 80535 93233 82798  
08074 89810 48521 90740 02687 83117 74920 25954 99629 78978  
20128 53721 01518 40699 20849 04710 38989 91322 56057 58573

00190 27157 83208 79446 92987 61357 38752 55424 94518 45205  
23798 55425 32454 34611 39605 39981 74691 40836 30812 38563  
85306 57995 68222 39055 43890 36956 84861 63624 04961 55439  
99719 36036 74274 53901 34643 06157 89500 57514 93977 42403

Table : Logarithms at Base 10

جدول لگاریتم های مبنای ۱۰

N	0	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609
29	4624	4639	4645	4669	4683	4698	4713	4728	4742	4757
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396
N	0	1	2	3	4	5	6	7	8	9

N	0	1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996
N	0	1	2	3	4	5	6	7	8	9