# STATISTICAL TABLES

Contents

Z - Table

Areas under the standard normal curve

A z-table, also called the standard normal table, is a mathematical table that allows us to know the percentage of values below (to the left) a z-score in a standard normal distribution (SND).

z	0.09	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01	0.00
-3.4	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
-3.3	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005
-3.2	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007
-3.1	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010
-3.0	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0012	0.0013	0.0013	0.0013
-2.9	0.0014	0.0014	0.0015	0.0015	0.0016	0.0016	0.0017	0.0018	0.0018	0.0019
-2.8	0.0019	0.0020	0.0021	0.0021	0.0022	0.0023	0.0023	0.0024	0.0025	0.0026
-2.7	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0035
-2.6	0.0036	0.0037	0.0038	0.0039	0.0040	0.0041	0.0043	0.0044	0.0045	0.0047
-2.5	0.0048	0.0049	0.0051	0.0052	0.0054	0.0055	0.0057	0.0059	0.0060	0.0062
-2.4	0.0064	0.0066	0.0068	0.0069	0.0071	0.0073	0.0075	0.0078	0.0080	0.0082
-2.3	0.0084	0.0087	0.0089	0.0091	0.0094	0.0096	0.0099	0.0102	0.0104	0.0107
-2.2	0.0110	0.0113	0.0116	0.0119	0.0122	0.0125	0.0129	0.0132	0.0136	0.0139
-2.1	0.0143	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	0.0170	0.0174	0.0179
-2.0	0.0183	0.0188	0.0192	0.0197	0.0202	0.0207	0.0212	0.0217	0.0222	0.0228
-1.9	0.0233	0.0239	0.0244	0.0250	0.0256	0.0262	0.0268	0.0274	0.0281	0.0287
-1.8	0.0294	0.0301	0.0307	0.0314	0.0322	0.0329	0.0336	0.0344	0.0351	0.0359
-1.7	0.0367	0.0375	0.0384	0.0392	0.0401	0.0409	0.0418	0.0427	0.0436	0.0446
-1.6	0.0455	0.0465	0.0475	0.0485	0.0495	0.0505	0.0516	0.0526	0.0537	0.0548
-1.5	0.0559	0.0571	0.0582	0.0594	0.0606	0.0618	0.0630	0.0643	0.0655	0.0668
-1.4	0.0681	0.0694	0.0708	0.0721	0.0735	0.0749	0.0764	0.0778	0.0793	0.0808
-1.3	0.0823	0.0838	0.0853	0.0869	0.0885	0.0901	0.0918	0.0934	0.0951	0.0968
-1.2	0.0985	0.1003	0.1020	0.1038	0.1056	0.1075	0.1093	0.1112	0.1131	0.1151
-1.1	0.1170	0.1190	0.1210	0.1230	0.1251	0.1271	0.1292	0.1314	0.1335	0.1357
-1.0	0.1379	0.1401	0.1423	0.1446	0.1469	0.1492	0.1515	0.1539	0.1562	0.1587
-0.9	0.1611	0.1635	0.1660	0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841
-0.8	0.1867	0.1894	0.1922	0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119
-0.7	0.2148	0.2177	0.2206	0.2236	0.2266	0.2296	0.2327	0.2358	0.2389	0.2420
-0.6	0.2451	0.2483	0.2514	0.2546	0.2578	0.2611	0.2643	0.2676	0.2709	0.2743
-0.5	0.2776	0.2810	0.2843	0.2877	0.2912	0.2946	0.2981	0.3015	0.3050	0.3085
-0.4	0.3121	0.3156	0.3192	0.3228	0.3264	0.3300	0.3336	0.3372	0.3409	0.3446
-0.3	0.3483	0.3520	0.3557	0.3594	0.3632	0.3669	0.3707	0.3745	0.3783	0.3821
-0.2	0.3859	0.3897	0.3936	0.3974	0.4013	0.4052	0.4090	0.4129	0.4168	0.4207
-0.1	0.4247	0.4286	0.4325	0.4364	0.4404	0.4443	0.4483	0.4522	0.4562	0.4602
-0.0	0.4641	0.4681	0.4721	0.4761	0.4801	0.4840	0.4880	0.4920	0.4960	0.5000
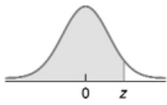
Areas under the standard normal curve

Z - Table

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5754
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7258	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7518	0.7549
0.7	0.7580	0.7612	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7996	0.8023	0.8051	0.8079	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9430	0.9441
1.6	0.9452	0.9463	0.9474	0.9485	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9700	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9762	0.9767
2.0	0.9773	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9865	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9980	0.9980	0.9981
2.9	0.9981	0.9982	0.9983	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	1.0000	1.0000	1.0000
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

SCSSA | UOK

Cumulative Binomial Distribution Table

The cumulative binomial probability table computes the cumulative probability of obtaining x successes in n trials of a binomial experiment with probability of success p.

(i.e. it contains $P[X \leq x] = \sum_{k=0}^{x} \binom{n}{k} \ p^k (1-p)^{n-k}$ Where X~Binomial(n,p))

n	x	p = 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
2	0	0.9025	0.8100	0.7225	0.6400	0.5625	0.4900	0.4225	0.3600	0.3025	0.2500
	1	0.9975	0.9900	0.9775	0.9600	0.9375	0.9100	0.8775	0.8400	0.7975	0.7500
3	0	0.8574	0.7290	0.6141	0.5120	0.4219	0.3430	0.2746	0.2160	0.1664	0.1250
	1	0.9928	0.9720	0.9393	0.8960	0.8438	0.7840	0.7183	0.6480	0.5748	0.5000
	2	0.9999	0.9990	0.9966	0.9920	0.9844	0.9730	0.9571	0.9360	0.9089	0.8750
4	0	0.8145	0.6561	0.5220	0.4096	0.3164	0.2401	0.1785	0.1296	0.0915	0.0625
	1	0.9860	0.9477	0.8905	0.8192	0.7383	0.6517	0.5630	0.4752	0.3910	0.3125
	2	0.9995	0.9963	0.9880	0.9728	0.9492	0.9163	0.8735	0.8208	0.7585	0.6875
	3	1.0000	0.9999	0.9995	0.9984	0.9961	0.9919	0.9850	0.9744	0.9590	0.9375
5	0	0.7738	0.5905	0.4437	0.3277	0.2373	0.1681	0.1160	0.0778	0.0503	0.0313
	1	0.9774	0.9185	0.8352	0.7373	0.6328	0.5282	0.4284	0.3370	0.2562	0.1875
	2	0.9988	0.9914	0.9734	0.9421	0.8965	0.8369	0.7648	0.6826	0.5931	0.5000
	3	1.0000	0.9995	0.9978	0.9933	0.9844	0.9692	0.9460	0.9130	0.8688	0.8125
	4	1.0000	1.0000	0.9999	0.9997	0.9990	0.9976	0.9947	0.9898	0.9815	0.9688
6	0	0.7351	0.5314	0.3771	0.2621	0.1780	0.1176	0.0754	0.0467	0.0277	0.0156
	1	0.9672	0.8857	0.7765	0.6554	0.5339	0.4202	0.3191	0.2333	0.1636	0.1094
	2	0.9978	0.9842	0.9527	0.9011	0.8306	0.7443	0.6471	0.5443	0.4415	0.3438
	3	0.9999	0.9987	0.9941	0.9830	0.9624	0.9295	0.8826	0.8208	0.7447	0.6563
	4	1.0000	0.9999	0.9996	0.9984	0.9954	0.9891	0.9777	0.9590	0.9308	0.8906
	5	1.0000	1.0000	1.0000	0.9999	0.9998	0.9993	0.9982	0.9959	0.9917	0.9844
7	0	0.6983	0.4783	0.3206	0.2097	0.1335	0.0824	0.0490	0.0280	0.0152	0.0078
	1	0.9556	0.8503	0.7166	0.5767	0.4449	0.3294	0.2338	0.1586	0.1024	0.0625
	2	0.9962	0.9743	0.9262	0.8520	0.7564	0.6471	0.5323	0.4199	0.3164	0.2266
	3	0.9998	0.9973	0.9879	0.9667	0.9294	0.8740	0.8002	0.7102	0.6083	0.5000
	4	1.0000	0.9998	0.9988	0.9953	0.9871	0.9712	0.9444	0.9037	0.8471	0.7734
	5	1.0000	1.0000	0.9999	0.9996	0.9987	0.9962	0.9910	0.9812	0.9643	0.9375
	6	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9994	0.9984	0.9963	0.9922
8	0	0.6634	0.4305	0.2725	0.1678	0.1001	0.0576	0.0319	0.0168	0.0084	0.0039
	1	0.9428	0.8131	0.6572	0.5033	0.3671	0.2553	0.1691	0.1064	0.0632	0.0352
	2	0.9942	0.9619	0.8948	0.7969	0.6785	0.5518	0.4278	0.3154	0.2201	0.1445
	3	0.9996	0.9950	0.9786	0.9437	0.8862	0.8059	0.7064	0.5941	0.4770	0.3633
	4	1.0000	0.9996	0.9971	0.9896	0.9727	0.9420	0.8939	0.8263	0.7396	0.6367
	5	1.0000	1.0000	0.9998	0.9988	0.9958	0.9887	0.9747	0.9502	0.9115	0.8555
	6	1.0000	1.0000	1.0000	0.9999	0.9996	0.9987	0.9964	0.9915	0.9819	0.9648
	7	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9993	0.9983	0.9961

Cumulative Binomial Distribution Table

n	x	p = 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
9	0	0.6302	0.3874	0.2316	0.1342	0.0751	0.0404	0.0207	0.0101	0.0046	0.0020
	1	0.9288	0.7748	0.5995	0.4362	0.3003	0.1960	0.1211	0.0705	0.0385	0.0195
	2	0.9916	0.9470	0.8591	0.7382	0.6007	0.4628	0.3373	0.2318	0.1495	0.0898
	3	0.9994	0.9917	0.9661	0.9144	0.8343	0.7297	0.6089	0.4826	0.3614	0.2539
	4	1.0000	0.9991	0.9944	0.9804	0.9511	0.9012	0.8283	0.7334	0.6214	0.5000
	5	1.0000	0.9999	0.9994	0.9969	0.9900	0.9747	0.9464	0.9006	0.8342	0.7461
	6	1.0000	1.0000	1.0000	0.9997	0.9987	0.9957	0.9888	0.9750	0.9502	0.9102
	7	1.0000	1.0000	1.0000	1.0000	0.9999	0.9996	0.9986	0.9962	0.9909	0.9805
	8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9992	0.9980
10	0	0.5987	0.3487	0.1969	0.1074	0.0563	0.0282	0.0135	0.0060	0.0025	0.0010
	1	0.9139	0.7361	0.5443	0.3758	0.2440	0.1493	0.0860	0.0464	0.0233	0.0107
	2	0.9885	0.9298	0.8202	0.6778	0.5256	0.3828	0.2616	0.1673	0.0996	0.0547
	3	0.9990	0.9872	0.9500	0.8791	0.7759	0.6496	0.5138	0.3823	0.2660	0.1719
	4	0.9999	0.9984	0.9901	0.9672	0.9219	0.8497	0.7515	0.6331	0.5044	0.3770
	5	1.0000	0.9999	0.9986	0.9936	0.9803	0.9527	0.9051	0.8338	0.7384	0.6230
	6	1.0000	1.0000	0.9999	0.9991	0.9965	0.9894	0.9740	0.9452	0.8980	0.8281
	7	1.0000	1.0000	1.0000	0.9999	0.9996	0.9984	0.9952	0.9877	0.9726	0.9453
	8	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995	0.9983	0.9955	0.9893
	9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9990
11	0	0.5688	0.3138	0.1673	0.0859	0.0422	0.0198	0.0088	0.0036	0.0014	0.0005
	1	0.8981	0.6974	0.4922	0.3221	0.1971	0.1130	0.0606	0.0302	0.0139	0.0059
	2	0.9848	0.9104	0.7788	0.6174	0.4552	0.3127	0.2001	0.1189	0.0652	0.0327
	3	0.9984	0.9815	0.9306	0.8389	0.7133	0.5696	0.4256	0.2963	0.1911	0.1133
	4	0.9999	0.9972	0.9841	0.9496	0.8854	0.7897	0.6683	0.5328	0.3971	0.2744
	5	1.0000	0.9997	0.9973	0.9883	0.9657	0.9218	0.8513	0.7535	0.6331	0.5000
	6	1.0000	1.0000	0.9997	0.9980	0.9924	0.9784	0.9499	0.9006	0.8262	0.7256
	7	1.0000	1.0000	1.0000	0.9998	0.9988	0.9957	0.9878	0.9707	0.9390	0.8867
	8	1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9980	0.9941	0.9852	0.9673
	9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9993	0.9978	0.9941
	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9995
12	0	0.5404	0.2824	0.1422	0.0687	0.0317	0.0138	0.0057	0.0022	0.0008	0.0002
	1	0.8816	0.6590	0.4435	0.2749	0.1584	0.0850	0.0424	0.0196	0.0083	0.0032
	2	0.9804	0.8891	0.7358	0.5583	0.3907	0.2528	0.1513	0.0834	0.0421	0.0193
	3	0.9978	0.9744	0.9078	0.7946	0.6488	0.4925	0.3467	0.2253	0.1345	0.0730
	4	0.9998	0.9957	0.9761	0.9274	0.8424	0.7237	0.5833	0.4382	0.3044	0.1938
	5	1.0000	0.9995	0.9954	0.9806	0.9456	0.8822	0.7873	0.6652	0.5269	0.3872
	6	1.0000	0.9999	0.9993	0.9961	0.9857	0.9614	0.9154	0.8418	0.7393	0.6128
	7	1.0000	1.0000	0.9999	0.9994	0.9972	0.9905	0.9745	0.9427	0.8883	0.8062
	8	1.0000	1.0000	1.0000	0.9999	0.9996	0.9983	0.9944	0.9847	0.9644	0.9270
	9	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9992	0.9972	0.9921	0.9807
	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9989	0.9968
	11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998

Cumulative Binomial Distribution Table

n	x	p = 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
13	0	0.5133	0.2542	0.1209	0.0550	0.0238	0.0097	0.0037	0.0013	0.0004	0.0001
	1	0.8646	0.6213	0.3983	0.2336	0.1267	0.0637	0.0296	0.0126	0.0049	0.0017
	2	0.9755	0.8661	0.6920	0.5017	0.3326	0.2025	0.1132	0.0579	0.0269	0.0112
	3	0.9969	0.9658	0.8820	0.7473	0.5843	0.4206	0.2783	0.1686	0.0929	0.0461
	4	0.9997	0.9935	0.9658	0.9009	0.7940	0.6543	0.5005	0.3530	0.2279	0.1334
	5	1.0000	0.9991	0.9925	0.9700	0.9198	0.8346	0.7159	0.5744	0.4268	0.2905
	6	1.0000	0.9999	0.9987	0.9930	0.9757	0.9376	0.8705	0.7712	0.6437	0.5000
	7	1.0000	1.0000	0.9998	0.9988	0.9944	0.9818	0.9538	0.9023	0.8212	0.7095
	8	1.0000	1.0000	1.0000	0.9998	0.9990	0.9960	0.9874	0.9679	0.9302	0.8666
	9	1.0000	1.0000	1.0000	1.0000	0.9999	0.9993	0.9975	0.9922	0.9797	0.9539
	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9987	0.9959	0.9888
	11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995	0.9983
	12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
14	0	0.4877	0.2288	0.1028	0.0440	0.0178	0.0068	0.0024	0.0008	0.0002	0.0001
	1	0.8470	0.5846	0.3567	0.1979	0.1010	0.0475	0.0205	0.0081	0.0029	0.0009
	2	0.9699	0.8416	0.6479	0.4481	0.2811	0.1608	0.0839	0.0398	0.0170	0.0065
	3	0.9958	0.9559	0.8535	0.6982	0.5213	0.3552	0.2205	0.1243	0.0632	0.0287
	4	0.9996	0.9908	0.9533	0.8702	0.7415	0.5842	0.4227	0.2793	0.1672	0.0898
	5	1.0000	0.9985	0.9885	0.9561	0.8883	0.7805	0.6405	0.4859	0.3373	0.2120
	6	1.0000	0.9998	0.9978	0.9884	0.9617	0.9067	0.8164	0.6925	0.5461	0.3953
	7	1.0000	1.0000	0.9997	0.9976	0.9897	0.9685	0.9247	0.8499	0.7414	0.6047
	8	1.0000	1.0000	1.0000	0.9996	0.9978	0.9917	0.9757	0.9417	0.8811	0.7880
	9	1.0000	1.0000	1.0000	1.0000	0.9997	0.9983	0.9940	0.9825	0.9574	0.9102
	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9989	0.9961	0.9886	0.9713
	11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9978	0.9935
	12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9991
	13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
15	0	0.4633	0.2059	0.0874	0.0352	0.0134	0.0047	0.0016	0.0005	0.0001	0.0000
	1	0.8290	0.5490	0.3186	0.1671	0.0802	0.0353	0.0142	0.0052	0.0017	0.0005
	2	0.9638	0.8159	0.6042	0.3980	0.2361	0.1268	0.0617	0.0271	0.0107	0.0037
	3	0.9945	0.9444	0.8227	0.6482	0.4613	0.2969	0.1727	0.0905	0.0424	0.0176
	4	0.9994	0.9873	0.9383	0.8358	0.6865	0.5155	0.3519	0.2173	0.1204	0.0592
	5	0.9999	0.9978	0.9832	0.9389	0.8516	0.7216	0.5643	0.4032	0.2608	0.1509
	6	1.0000	0.9997	0.9964	0.9819	0.9434	0.8689	0.7548	0.6098	0.4522	0.3036
	7	1.0000	1.0000	0.9994	0.9958	0.9827	0.9500	0.8868	0.7869	0.6535	0.5000
	8	1.0000	1.0000	0.9999	0.9992	0.9958	0.9848	0.9578	0.9050	0.8182	0.6964
	9	1.0000	1.0000	1.0000	0.9999	0.9992	0.9963	0.9876	0.9662	0.9231	0.8491
	10	1.0000	1.0000	1.0000	1.0000	0.9999	0.9993	0.9972	0.9907	0.9745	0.9408
	11	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995	0.9981	0.9937	0.9824
	12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9989	0.9963
	13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995
	14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Cumulative Binomial Distribution Table

n	x	p = 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
16	0	0.4401	0.1853	0.0743	0.0281	0.0100	0.0033	0.0010	0.0003	0.0001	0.0000
	1	0.8108	0.5147	0.2839	0.1407	0.0635	0.0261	0.0098	0.0033	0.0010	0.0003
	2	0.9571	0.7892	0.5614	0.3518	0.1971	0.0994	0.0451	0.0183	0.0066	0.0021
	3	0.9930	0.9316	0.7899	0.5981	0.4050	0.2459	0.1339	0.0651	0.0281	0.0106
	4	0.9991	0.9830	0.9209	0.7982	0.6302	0.4499	0.2892	0.1666	0.0853	0.0384
	5	0.9999	0.9967	0.9765	0.9183	0.8103	0.6598	0.4900	0.3288	0.1976	0.1051
	6	1.0000	0.9995	0.9944	0.9733	0.9204	0.8247	0.6881	0.5272	0.3660	0.2273
	7	1.0000	0.9999	0.9989	0.9930	0.9729	0.9256	0.8406	0.7161	0.5629	0.4018
	8	1.0000	1.0000	0.9998	0.9985	0.9925	0.9743	0.9329	0.8577	0.7441	0.5982
	9	1.0000	1.0000	1.0000	0.9998	0.9984	0.9929	0.9771	0.9417	0.8759	0.7728
	10	1.0000	1.0000	1.0000	1.0000	0.9997	0.9984	0.9938	0.9809	0.9514	0.8949
	11	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9987	0.9951	0.9851	0.9616
	12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9991	0.9965	0.9894
	13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9979
	14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997
	15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
17	0	0.4181	0.1668	0.0631	0.0225	0.0075	0.0023	0.0007	0.0002	0.0000	0.0000
	1	0.7922	0.4818	0.2525	0.1182	0.0501	0.0193	0.0067	0.0021	0.0006	0.0001
	2	0.9497	0.7618	0.5198	0.3096	0.1637	0.0774	0.0327	0.0123	0.0041	0.0012
	3	0.9912	0.9174	0.7556	0.5489	0.3530	0.2019	0.1028	0.0464	0.0184	0.0064
	4	0.9988	0.9779	0.9013	0.7582	0.5739	0.3887	0.2348	0.1260	0.0596	0.0245
	5	0.9999	0.9953	0.9681	0.8943	0.7653	0.5968	0.4197	0.2639	0.1471	0.0717
	6	1.0000	0.9992	0.9917	0.9623	0.8929	0.7752	0.6188	0.4478	0.2902	0.1662
	7	1.0000	0.9999	0.9983	0.9891	0.9598	0.8954	0.7872	0.6405	0.4743	0.3145
	8	1.0000	1.0000	0.9997	0.9974	0.9876	0.9597	0.9006	0.8011	0.6626	0.5000
	9	1.0000	1.0000	1.0000	0.9995	0.9969	0.9873	0.9617	0.9081	0.8166	0.6855
	10	1.0000	1.0000	1.0000	0.9999	0.9994	0.9968	0.9880	0.9652	0.9174	0.8338
	11	1.0000	1.0000	1.0000	1.0000	0.9999	0.9993	0.9970	0.9894	0.9699	0.9283
	12	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9975	0.9914	0.9755
	13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995	0.9981	0.9936
	14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9988
	15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
	16	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
18	0	0.3972	0.1501	0.0536	0.0180	0.0056	0.0016	0.0004	0.0001	0.0000	0.0000
	1	0.7735	0.4503	0.2241	0.0991	0.0395	0.0142	0.0046	0.0013	0.0003	0.0001
	2	0.9419	0.7338	0.4797	0.2713	0.1353	0.0600	0.0236	0.0082	0.0025	0.0007
	3	0.9891	0.9018	0.7202	0.5010	0.3057	0.1646	0.0783	0.0328	0.0120	0.0038
	4	0.9985	0.9718	0.8794	0.7164	0.5187	0.3327	0.1886	0.0942	0.0411	0.0154
	5	0.9998	0.9936	0.9581	0.8671	0.7175	0.5344	0.3550	0.2088	0.1077	0.0481
	6	1.0000	0.9988	0.9882	0.9487	0.8610	0.7217	0.5491	0.3743	0.2258	0.1189
	7	1.0000	0.9998	0.9973	0.9837	0.9431	0.8593	0.7283	0.5634	0.3915	0.2403
	8	1.0000	1.0000	0.9995	0.9957	0.9807	0.9404	0.8609	0.7368	0.5778	0.4073

Cumulative Binomial Distribution Table

n	x	p = 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
18	9	1.0000	1.0000	0.9999	0.9991	0.9946	0.9790	0.9403	0.8653	0.7473	0.5927
	10	1.0000	1.0000	1.0000	0.9998	0.9988	0.9939	0.9788	0.9424	0.8720	0.7597
	11	1.0000	1.0000	1.0000	1.0000	0.9998	0.9986	0.9938	0.9797	0.9463	0.8811
	12	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9986	0.9942	0.9817	0.9519
	13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9987	0.9951	0.9846
	14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9990	0.9962
	15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9993
	16	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
	17	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
19	0	0.3774	0.1351	0.0456	0.0144	0.0042	0.0011	0.0003	0.0001	0.0000	0.0000
	1	0.7547	0.4203	0.1985	0.0829	0.0310	0.0104	0.0031	0.0008	0.0002	0.0000
	2	0.9335	0.7054	0.4413	0.2369	0.1113	0.0462	0.0170	0.0055	0.0015	0.0004
	3	0.9868	0.8850	0.6841	0.4551	0.2630	0.1332	0.0591	0.0230	0.0077	0.0022
	4	0.9980	0.9648	0.8556	0.6733	0.4654	0.2822	0.1500	0.0696	0.0280	0.0096
	5	0.9998	0.9914	0.9463	0.8369	0.6678	0.4739	0.2968	0.1629	0.0777	0.0318
	6	1.0000	0.9983	0.9837	0.9324	0.8251	0.6655	0.4812	0.3081	0.1727	0.0835
	7	1.0000	0.9997	0.9959	0.9767	0.9225	0.8180	0.6656	0.4878	0.3169	0.1796
	8	1.0000	1.0000	0.9992	0.9933	0.9713	0.9161	0.8145	0.6675	0.4940	0.3238
	9	1.0000	1.0000	0.9999	0.9984	0.9911	0.9674	0.9125	0.8139	0.6710	0.5000
	10	1.0000	1.0000	1.0000	0.9997	0.9977	0.9895	0.9653	0.9115	0.8159	0.6762
	11	1.0000	1.0000	1.0000	1.0000	0.9995	0.9972	0.9886	0.9648	0.9129	0.8204
	12	1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9969	0.9884	0.9658	0.9165
	13	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9993	0.9969	0.9891	0.9682
	14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9972	0.9904
	15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995	0.9978
	16	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9996
	17	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	18	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
20	0	0.3585	0.1216	0.0388	0.0115	0.0032	0.0008	0.0002	0.0000	0.0000	0.0000
	1	0.7358	0.3917	0.1756	0.0692	0.0243	0.0076	0.0021	0.0005	0.0001	0.0000
	2	0.9245	0.6769	0.4049	0.2061	0.0913	0.0355	0.0121	0.0036	0.0009	0.0002
	3	0.9841	0.8670	0.6477	0.4114	0.2252	0.1071	0.0444	0.0160	0.0049	0.0013
	4	0.9974	0.9568	0.8298	0.6296	0.4148	0.2375	0.1182	0.0510	0.0189	0.0059
	5	0.9997	0.9887	0.9327	0.8042	0.6172	0.4164	0.2454	0.1256	0.0553	0.0207
	6	1.0000	0.9976	0.9781	0.9133	0.7858	0.6080	0.4166	0.2500	0.1299	0.0577
	7	1.0000	0.9996	0.9941	0.9679	0.8982	0.7723	0.6010	0.4159	0.2520	0.1316
	8	1.0000	0.9999	0.9987	0.9900	0.9591	0.8867	0.7624	0.5956	0.4143	0.2517
	9	1.0000	1.0000	0.9998	0.9974	0.9861	0.9520	0.8782	0.7553	0.5914	0.4119

Cumulative Binomial Distribution Table

n	x	p = 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
20	10	1.0000	1.0000	1.0000	0.9994	0.9961	0.9829	0.9468	0.8725	0.7507	0.5881
	11	1.0000	1.0000	1.0000	0.9999	0.9991	0.9949	0.9804	0.9435	0.8692	0.7483
	12	1.0000	1.0000	1.0000	1.0000	0.9998	0.9987	0.9940	0.9790	0.9420	0.8684
	13	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9985	0.9935	0.9786	0.9423
	14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9984	0.9936	0.9793
	15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9985	0.9941
	16	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9987
	17	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998
	18	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	19	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Poisson Distribution Table

x \ λ	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.20	0.30
0	0.9802	0.9704	0.9608	0.9512	0.9418	0.9324	0.9231	0.9139	0.9048	0.8187	0.7408
1	0.0196	0.0291	0.0384	0.0476	0.0565	0.0653	0.0738	0.0823	0.0905	0.1637	0.2222
2	0.0002	0.0004	0.0008	0.0012	0.0017	0.0023	0.0030	0.0037	0.0045	0.0164	0.0333
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0011	0.0033
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003

x	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40
0	0.6703	0.6065	0.5488	0.4966	0.4493	0.4066	0.3679	0.3329	0.3012	0.2725	0.2466
1	0.2681	0.3033	0.3293	0.3476	0.3595	0.3659	0.3679	0.3662	0.3614	0.3543	0.3452
2	0.0536	0.0758	0.0988	0.1217	0.1438	0.1647	0.1839	0.2014	0.2169	0.2303	0.2417
3	0.0072	0.0126	0.0198	0.0284	0.0383	0.0494	0.0613	0.0738	0.0867	0.0998	0.1128
4	0.0007	0.0016	0.0030	0.0050	0.0077	0.0111	0.0153	0.0203	0.026	0.0324	0.0395
5	0.0001	0.0002	0.0004	0.0007	0.0012	0.0020	0.0031	0.0045	0.0062	0.0084	0.0111
6	0.0000	0.0000	0.0000	0.0001	0.0002	0.0003	0.0005	0.0008	0.0012	0.0018	0.0026
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0003	0.0005
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001

x	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50
0	0.2231	0.2019	0.1827	0.1653	0.1496	0.1353	0.1225	0.1108	0.1003	0.0907	0.0821
1	0.3347	0.3230	0.3106	0.2975	0.2842	0.2707	0.2572	0.2438	0.2306	0.2177	0.2052
2	0.2510	0.2584	0.2640	0.2678	0.2700	0.2707	0.2700	0.2681	0.2652	0.2613	0.2565
3	0.1255	0.1378	0.1496	0.1607	0.1710	0.1804	0.1890	0.1966	0.2033	0.2090	0.2138
4	0.0471	0.0551	0.0636	0.0723	0.0812	0.0902	0.0992	0.1082	0.1169	0.1254	0.1336
5	0.0141	0.0176	0.0216	0.0260	0.0309	0.0361	0.0417	0.0476	0.0538	0.0602	0.0668
6	0.0035	0.0047	0.0061	0.0078	0.0098	0.0120	0.0146	0.0174	0.0206	0.0241	0.0278
7	0.0008	0.0011	0.0015	0.0020	0.0027	0.0034	0.0044	0.0055	0.0068	0.0083	0.0099
8	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009	0.0011	0.0015	0.0019	0.0025	0.0031
9	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002

x	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60
0	0.0743	0.0672	0.0608	0.0550	0.0498	0.0450	0.0408	0.0369	0.0334	0.0302	0.0273
1	0.1931	0.1815	0.1703	0.1596	0.1494	0.1397	0.1304	0.1217	0.1135	0.1057	0.0984
2	0.2510	0.2450	0.2384	0.2314	0.2240	0.2165	0.2087	0.2008	0.1929	0.1850	0.1771
3	0.2176	0.2205	0.2225	0.2237	0.2240	0.2237	0.2226	0.2209	0.2186	0.2158	0.2125
4	0.1414	0.1488	0.1557	0.1622	0.1680	0.1733	0.1781	0.1823	0.1858	0.1888	0.1912
5	0.0735	0.0804	0.0872	0.0940	0.1008	0.1075	0.1140	0.1203	0.1264	0.1322	0.1377
6	0.0319	0.0362	0.0407	0.0455	0.0504	0.0555	0.0608	0.0662	0.0716	0.0771	0.0826
7	0.0118	0.0139	0.0163	0.0188	0.0216	0.0246	0.0278	0.0312	0.0348	0.0385	0.0425
8	0.0038	0.0047	0.0057	0.0068	0.0081	0.0095	0.0111	0.0129	0.0148	0.0169	0.0191
9	0.0011	0.0014	0.0018	0.0022	0.0027	0.0033	0.0040	0.0047	0.0056	0.0066	0.0076
10	0.0003	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0019	0.0023	0.0028
11	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009
12	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001

Poisson Distribution Table

x \ λ	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70
0	0.0247	0.0224	0.0202	0.0183	0.0166	0.0150	0.0136	0.0123	0.0111	0.0101	0.0091
1	0.0915	0.0850	0.0789	0.0733	0.0679	0.0630	0.0583	0.0540	0.0500	0.0462	0.0427
2	0.1692	0.1615	0.1539	0.1465	0.1393	0.1323	0.1254	0.1188	0.1125	0.1063	0.1005
3	0.2087	0.2046	0.2001	0.1954	0.1904	0.1852	0.1798	0.1743	0.1687	0.1631	0.1574
4	0.1931	0.1944	0.1951	0.1954	0.1951	0.1944	0.1933	0.1917	0.1898	0.1875	0.1849
5	0.1429	0.1477	0.1522	0.1563	0.1600	0.1633	0.1662	0.1687	0.1708	0.1725	0.1738
6	0.0881	0.0936	0.0989	0.1042	0.1093	0.1143	0.1191	0.1237	0.1281	0.1323	0.1362
7	0.0466	0.0508	0.0551	0.0595	0.0640	0.0686	0.0732	0.0778	0.0824	0.0869	0.0914
8	0.0215	0.0241	0.0269	0.0298	0.0328	0.0360	0.0393	0.0428	0.0463	0.0500	0.0537
9	0.0089	0.0102	0.0116	0.0132	0.0150	0.0168	0.0188	0.0209	0.0232	0.0255	0.0281
10	0.0033	0.0039	0.0045	0.0053	0.0061	0.0071	0.0081	0.0092	0.0104	0.0118	0.0132
11	0.0011	0.0013	0.0016	0.0019	0.0023	0.0027	0.0032	0.0037	0.0043	0.0049	0.0056
12	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0022
13	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
14	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003
15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001

x	4.80	4.90	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80
0	0.0082	0.0074	0.0067	0.0061	0.0055	0.0050	0.0045	0.0041	0.0037	0.0033	0.0030
1	0.0395	0.0365	0.0337	0.0311	0.0287	0.0265	0.0244	0.0225	0.0207	0.0191	0.0176
2	0.0948	0.0894	0.0842	0.0793	0.0746	0.0701	0.0659	0.0618	0.0580	0.0544	0.0509
3	0.1517	0.1460	0.1404	0.1348	0.1293	0.1239	0.1185	0.1133	0.1082	0.1033	0.0985
4	0.1820	0.1789	0.1755	0.1719	0.1681	0.1641	0.1600	0.1558	0.1515	0.1472	0.1428
5	0.1747	0.1753	0.1755	0.1753	0.1748	0.1740	0.1728	0.1714	0.1697	0.1678	0.1656
6	0.1398	0.1432	0.1462	0.1490	0.1515	0.1537	0.1555	0.1571	0.1584	0.1594	0.1601
7	0.0959	0.1002	0.1044	0.1086	0.1125	0.1163	0.1200	0.1234	0.1267	0.1298	0.1326
8	0.0575	0.0614	0.0653	0.0692	0.0731	0.0771	0.0810	0.0849	0.0887	0.0925	0.0962
9	0.0307	0.0334	0.0363	0.0392	0.0423	0.0454	0.0486	0.0519	0.0552	0.0586	0.0620
10	0.0147	0.0164	0.0181	0.0200	0.0220	0.0241	0.0262	0.0285	0.0309	0.0334	0.0359
11	0.0064	0.0073	0.0082	0.0093	0.0104	0.0116	0.0129	0.0143	0.0157	0.0173	0.0190
12	0.0026	0.0030	0.0034	0.0039	0.0045	0.0051	0.0058	0.0065	0.0073	0.0082	0.0092
13	0.0009	0.0011	0.0013	0.0015	0.0018	0.0021	0.0024	0.0028	0.0032	0.0036	0.0041
14	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0013	0.0015	0.0017
15	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006	0.0007
16	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001

x	5.90	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90
0	0.0027	0.0025	0.0022	0.0020	0.0018	0.0017	0.0015	0.0014	0.0012	0.0011	0.0010
1	0.0162	0.0149	0.0137	0.0126	0.0116	0.0106	0.0098	0.0090	0.0082	0.0076	0.0070
2	0.0477	0.0446	0.0417	0.0390	0.0364	0.0340	0.0318	0.0296	0.0276	0.0258	0.0240
3	0.0938	0.0892	0.0848	0.0806	0.0765	0.0726	0.0688	0.0652	0.0617	0.0584	0.0552
4	0.1383	0.1339	0.1294	0.1249	0.1205	0.1162	0.1118	0.1078	0.1034	0.0992	0.0952
5	0.1632	0.1606	0.1579	0.1549	0.1519	0.1487	0.1454	0.1420	0.1385	0.1349	0.1314

Poisson Distribution Table

x \ λ	5.90	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90
6	0.1605	0.1606	0.1605	0.1601	0.1595	0.1586	0.1575	0.1562	0.1546	0.1529	0.1511
7	0.1353	0.1377	0.1399	0.1418	0.1435	0.1450	0.1462	0.1472	0.1480	0.1486	0.1489
8	0.0998	0.1033	0.1066	0.1099	0.1130	0.1160	0.1188	0.1215	0.1240	0.1263	0.1284
9	0.0654	0.0688	0.0723	0.0757	0.0791	0.0825	0.0858	0.0891	0.0923	0.0954	0.0985
10	0.0386	0.0413	0.0441	0.0469	0.0498	0.0528	0.0558	0.0588	0.0618	0.0649	0.0679
11	0.0207	0.0225	0.0244	0.0265	0.0285	0.0307	0.0330	0.0353	0.0377	0.0401	0.0426
12	0.0102	0.0113	0.0124	0.0137	0.0150	0.0164	0.0179	0.0194	0.0210	0.0227	0.0245
13	0.0046	0.0052	0.0058	0.0065	0.0073	0.0081	0.0089	0.0099	0.0108	0.0119	0.0130
14	0.0019	0.0022	0.0025	0.0029	0.0033	0.0037	0.0041	0.0046	0.0052	0.0058	0.0064
15	0.0008	0.0009	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0023	0.0026	0.0029
16	0.0003	0.0003	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008	0.0010	0.0011	0.0013
17	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005
18	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001

x	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	8.00
0	0.0009	0.0008	0.0007	0.0007	0.0006	0.0006	0.0005	0.0005	0.0004	0.0004	0.0003
1	0.0064	0.0059	0.0054	0.0049	0.0045	0.0041	0.0038	0.0035	0.0032	0.0029	0.0027
2	0.0223	0.0208	0.0194	0.0180	0.0167	0.0156	0.0145	0.0134	0.0125	0.0116	0.0107
3	0.0521	0.0492	0.0464	0.0438	0.0413	0.0389	0.0366	0.0345	0.0324	0.0305	0.0286
4	0.0912	0.0874	0.0836	0.0799	0.0764	0.0729	0.0696	0.0663	0.0632	0.0602	0.0573
5	0.1277	0.1241	0.1204	0.1167	0.1130	0.1094	0.1057	0.1021	0.0986	0.0951	0.0916
6	0.1490	0.1468	0.1445	0.1420	0.1394	0.1367	0.1339	0.1311	0.1282	0.1252	0.1221
7	0.1490	0.1489	0.1486	0.1481	0.1474	0.1465	0.1454	0.1442	0.1428	0.1413	0.1396
8	0.1304	0.1321	0.1337	0.1351	0.1363	0.1373	0.1381	0.1388	0.1392	0.1395	0.1396
9	0.1014	0.1042	0.1070	0.1096	0.1121	0.1144	0.1167	0.1187	0.1207	0.1224	0.1241
10	0.0710	0.0740	0.0770	0.0800	0.0829	0.0858	0.0887	0.0914	0.0941	0.0967	0.0993
11	0.0452	0.0478	0.0504	0.0531	0.0558	0.0585	0.0613	0.0640	0.0667	0.0695	0.0722
12	0.0263	0.0283	0.0303	0.0323	0.0344	0.0366	0.0388	0.0411	0.0434	0.0457	0.0481
13	0.0142	0.0154	0.0168	0.0181	0.0196	0.0211	0.0227	0.0243	0.0260	0.0278	0.0296
14	0.0071	0.0078	0.0086	0.0095	0.0104	0.0113	0.0123	0.0134	0.0145	0.0157	0.0169
15	0.0033	0.0037	0.0041	0.0046	0.0051	0.0057	0.0062	0.0069	0.0075	0.0083	0.0090
16	0.0014	0.0016	0.0019	0.0021	0.0024	0.0026	0.0030	0.0033	0.0037	0.0041	0.0045
17	0.0006	0.0007	0.0008	0.0009	0.0010	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021
18	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009
19	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004
20	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001

Poisson Distribution Table

x \ λ	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	9.00	9.10
0	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001
1	0.0025	0.0023	0.0021	0.0019	0.0017	0.0016	0.0014	0.0013	0.0012	0.0011	0.0010
2	0.0100	0.0092	0.0086	0.0079	0.0074	0.0068	0.0063	0.0058	0.0054	0.0050	0.0046
3	0.0269	0.0252	0.0237	0.0222	0.0208	0.0195	0.0183	0.0171	0.0160	0.0150	0.0140
4	0.0544	0.0517	0.0491	0.0466	0.0443	0.0420	0.0398	0.0377	0.0357	0.0337	0.0319
5	0.0882	0.0849	0.0816	0.0784	0.0752	0.0722	0.0692	0.0663	0.0635	0.0607	0.0581
6	0.1191	0.1160	0.1128	0.1097	0.1066	0.1034	0.1003	0.0972	0.0941	0.0911	0.0881
7	0.1378	0.1358	0.1338	0.1317	0.1294	0.1271	0.1247	0.1222	0.1197	0.1171	0.1145
8	0.1395	0.1392	0.1388	0.1382	0.1375	0.1366	0.1356	0.1344	0.1332	0.1318	0.1302
9	0.1256	0.1269	0.1280	0.1290	0.1299	0.1306	0.1311	0.1315	0.1317	0.1318	0.1317
10	0.1017	0.1040	0.1063	0.1084	0.1104	0.1123	0.1140	0.1157	0.1172	0.1186	0.1198
11	0.0749	0.0776	0.0802	0.0828	0.0853	0.0878	0.0902	0.0925	0.0948	0.0970	0.0991
12	0.0505	0.0530	0.0555	0.0579	0.0604	0.0629	0.0654	0.0679	0.0703	0.0728	0.0752
13	0.0315	0.0334	0.0354	0.0374	0.0395	0.0416	0.0438	0.0459	0.0481	0.0504	0.0526
14	0.0182	0.0196	0.0210	0.0225	0.0240	0.0256	0.0272	0.0289	0.0306	0.0324	0.0342
15	0.0098	0.0107	0.0116	0.0126	0.0136	0.0147	0.0158	0.0169	0.0182	0.0194	0.0208
16	0.0050	0.0055	0.0060	0.0066	0.0072	0.0079	0.0086	0.0093	0.0101	0.0109	0.0118
17	0.0024	0.0026	0.0029	0.0033	0.0036	0.0040	0.0044	0.0048	0.0053	0.0058	0.0063
18	0.0011	0.0012	0.0014	0.0015	0.0017	0.0019	0.0021	0.0024	0.0026	0.0029	0.0032
19	0.0005	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0014	0.0015
20	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0007
21	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
22	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
x	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	10.00	11.00	12.00
0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000
1	0.0009	0.0009	0.0008	0.0007	0.0007	0.0006	0.0005	0.0005	0.0005	0.0002	0.0001
2	0.0043	0.0040	0.0037	0.0034	0.0031	0.0029	0.0027	0.0025	0.0023	0.0010	0.0004
3	0.0131	0.0123	0.0115	0.0107	0.0100	0.0093	0.0087	0.0081	0.0076	0.0037	0.0018
4	0.0302	0.0285	0.0269	0.0254	0.0240	0.0226	0.0213	0.0201	0.0189	0.0102	0.0053
5	0.0555	0.0530	0.0506	0.0483	0.0460	0.0439	0.0418	0.0398	0.0378	0.0224	0.0127
6	0.0851	0.0822	0.0793	0.0764	0.0736	0.0709	0.0682	0.0656	0.0631	0.0411	0.0255
7	0.1118	0.1091	0.1064	0.1037	0.1010	0.0982	0.0955	0.0928	0.0901	0.0646	0.0437
8	0.1286	0.1269	0.1251	0.1232	0.1212	0.1191	0.1170	0.1148	0.1126	0.0888	0.0655
9	0.1315	0.1311	0.1306	0.1300	0.1293	0.1284	0.1274	0.1263	0.1251	0.1085	0.0874
10	0.1210	0.1219	0.1228	0.1235	0.1241	0.1245	0.1249	0.1250	0.1251	0.1194	0.1048
11	0.1012	0.1031	0.1049	0.1067	0.1083	0.1098	0.1112	0.1125	0.1137	0.1194	0.1144
12	0.0776	0.0799	0.0822	0.0844	0.0866	0.0888	0.0908	0.0928	0.0948	0.1094	0.1144

Poisson Distribution Table

x \ λ	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	10.00	11.00	12.00
13	0.0549	0.0572	0.0594	0.0617	0.0640	0.0662	0.0685	0.0707	0.0729	0.0926	0.1056
14	0.0361	0.0380	0.0399	0.0419	0.0439	0.0459	0.0479	0.0500	0.0521	0.0728	0.0905
15	0.0221	0.0235	0.0250	0.0265	0.0281	0.0297	0.0313	0.0330	0.0347	0.0534	0.0724
16	0.0127	0.0137	0.0147	0.0157	0.0168	0.0180	0.0192	0.0204	0.0217	0.0367	0.0543
17	0.0069	0.0075	0.0081	0.0088	0.0095	0.0103	0.0111	0.0119	0.0128	0.0237	0.0383
18	0.0035	0.0039	0.0042	0.0046	0.0051	0.0055	0.0060	0.0065	0.0071	0.0145	0.0255
19	0.0017	0.0019	0.0021	0.0023	0.0026	0.0028	0.0031	0.0034	0.0037	0.0084	0.0161
20	0.0008	0.0009	0.0010	0.0011	0.0012	0.0014	0.0015	0.0017	0.0019	0.0046	0.0097
21	0.0003	0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009	0.0024	0.0055
22	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0012	0.0030
23	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0006	0.0016
24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0003	0.0008

x	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0008	0.0004	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0027	0.0013	0.0006	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0070	0.0037	0.0019	0.0010	0.0005	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000
6	0.0152	0.0087	0.0048	0.0026	0.0014	0.0007	0.0004	0.0002	0.0001	0.0000	0.0000
7	0.0280	0.0174	0.0104	0.0060	0.0034	0.0019	0.0010	0.0005	0.0003	0.0001	0.0001
8	0.0457	0.0304	0.0194	0.0120	0.0072	0.0042	0.0024	0.0013	0.0007	0.0004	0.0002
9	0.0661	0.0473	0.0324	0.0213	0.0135	0.0083	0.0050	0.0029	0.0017	0.0009	0.0005
10	0.0859	0.0663	0.0486	0.0341	0.0230	0.0150	0.0095	0.0058	0.0035	0.0020	0.0012
11	0.1015	0.0844	0.0663	0.0496	0.0355	0.0245	0.0164	0.0106	0.0067	0.0041	0.0024
12	0.1099	0.0984	0.0829	0.0661	0.0504	0.0368	0.0259	0.0176	0.0116	0.0075	0.0047
13	0.1099	0.1060	0.0956	0.0814	0.0658	0.0509	0.0378	0.0271	0.0188	0.0127	0.0083
14	0.1021	0.1060	0.1024	0.0930	0.0800	0.0655	0.0514	0.0387	0.0282	0.0199	0.0136
15	0.0199	0.0989	0.0989	0.0992	0.0906	0.0786	0.0650	0.0516	0.0395	0.0292	0.0209
16	0.0719	0.0866	0.0960	0.0992	0.0963	0.0884	0.0772	0.0646	0.0518	0.0401	0.0301
17	0.0550	0.0713	0.0847	0.0934	0.0963	0.0936	0.0863	0.0760	0.0640	0.0520	0.0407
18	0.0397	0.0554	0.0706	0.0830	0.0909	0.0936	0.0911	0.0844	0.0747	0.0635	0.0520
19	0.0272	0.0409	0.0557	0.0699	0.0814	0.0887	0.0911	0.0888	0.0826	0.0735	0.0629
20	0.0177	0.0286	0.0418	0.0559	0.0692	0.0798	0.0866	0.0888	0.0867	0.0809	0.0724
21	0.0109	0.0191	0.0299	0.0426	0.0560	0.0684	0.0783	0.0846	0.0867	0.0847	0.0793
22	0.0065	0.0121	0.0204	0.0310	0.0433	0.0560	0.0676	0.0769	0.0828	0.0847	0.0829
23	0.0037	0.0074	0.0133	0.0216	0.0320	0.0438	0.0559	0.0669	0.0756	0.0810	0.0829

Poisson Distribution Table

| x \ λ	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
24	0.0020	0.0043	0.0083	0.0144	0.0226	0.0328	0.0442	0.0557	0.0661	0.0743	0.0794
25	0.001	0.0024	0.005	0.0092	0.0154	0.0237	0.0336	0.0446	0.0555	0.0654	0.0731
26	0.0005	0.0013	0.0029	0.0057	0.0101	0.0164	0.0246	0.0343	0.0449	0.0553	0.0646
27	0.0002	0.0007	0.0016	0.0034	0.0063	0.0109	0.0173	0.0254	0.0349	0.0451	0.0551
28	0.0001	0.0003	0.0009	0.0019	0.0038	0.0070	0.0117	0.0181	0.0262	0.0354	0.0452
29	0.0001	0.0002	0.0004	0.0011	0.0023	0.0044	0.0077	0.0125	0.019	0.0269	0.0359
30	0.0000	0.0001	0.0002	0.0006	0.0013	0.0026	0.0049	0.0083	0.0133	0.0197	0.0275
31	0.0000	0.0000	0.0001	0.0003	0.0007	0.0015	0.0030	0.0054	0.0090	0.0140	0.0204
32	0.0000	0.0000	0.0001	0.0001	0.0004	0.0009	0.0018	0.0034	0.0059	0.0096	0.0147
33	0.0000	0.0000	0.0000	0.0001	0.0002	0.0005	0.0010	0.0020	0.0038	0.0064	0.0102
34	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0006	0.0012	0.0023	0.0041	0.0069
35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0007	0.0014	0.0026	0.0045
36	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0008	0.0016	0.0029
37	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0005	0.0009	0.0018
38	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0005	0.0011
39	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0003	0.0006
40	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004
41	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002
42	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
43	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

Poisson Cumulative Distribution Table

The cumulative Poisson probability table contains the cumulative Poisson probabilities for different λ(Average number of events in a given time interval) values & different numbers of events occurring within a given time interval. (i.e. it contains $P[X \le x] = \sum_{i=0}^{x} \frac{e^{-\lambda}\lambda^i}{i!}$ Where $X \sim Poisson(\lambda)$)

$x=$ \ $\lambda=$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8
0	0.9048	0.8187	0.7408	0.6703	0.6065	0.5488	0.4966	0.4493	0.4066	0.3679	0.3012	0.2466	0.2019	0.1653
1	0.9953	0.9825	0.9631	0.9384	0.9098	0.8781	0.8442	0.8088	0.7725	0.7358	0.6626	0.5918	0.5249	0.4628
2	0.9998	0.9989	0.9964	0.9921	0.9856	0.9769	0.9659	0.9526	0.9371	0.9197	0.8795	0.8335	0.7834	0.7306
3	1.0000	0.9999	0.9997	0.9992	0.9982	0.9966	0.9942	0.9909	0.9865	0.9810	0.9662	0.9463	0.9212	0.8913
4	1.0000	1.0000	1.0000	0.9999	0.9998	0.9996	0.9992	0.9986	0.9977	0.9963	0.9923	0.9857	0.9763	0.9636
5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9994	0.9985	0.9968	0.9940	0.9896
6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9994	0.9987	0.9974
7	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9994
8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

$x=$ \ $\lambda=$	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.5	5.0	5.5
0	0.1353	0.1108	0.0907	0.0743	0.0608	0.0498	0.0408	0.0334	0.0273	0.0224	0.0183	0.0111	0.0067	0.0041
1	0.4060	0.3546	0.3084	0.2674	0.2311	0.1991	0.1712	0.1468	0.1257	0.1074	0.0916	0.0611	0.0404	0.0266
2	0.6767	0.6227	0.5697	0.5184	0.4695	0.4232	0.3799	0.3397	0.3027	0.2689	0.2381	0.1736	0.1247	0.0884
3	0.8571	0.8194	0.7787	0.7360	0.6919	0.6472	0.6025	0.5584	0.5152	0.4735	0.4335	0.3423	0.2650	0.2017
4	0.9473	0.9275	0.9041	0.8774	0.8477	0.8153	0.7806	0.7442	0.7064	0.6678	0.6288	0.5321	0.4405	0.3575
5	0.9834	0.9751	0.9643	0.9510	0.9349	0.9161	0.8946	0.8705	0.8441	0.8156	0.7851	0.7029	0.6160	0.5289
6	0.9955	0.9925	0.9884	0.9828	0.9756	0.9665	0.9554	0.9421	0.9267	0.9091	0.8893	0.8311	0.7622	0.6860
7	0.9989	0.9980	0.9967	0.9947	0.9919	0.9881	0.9832	0.9769	0.9692	0.9599	0.9489	0.9134	0.8666	0.8095
8	0.9998	0.9995	0.9991	0.9985	0.9976	0.9962	0.9943	0.9917	0.9883	0.9840	0.9786	0.9597	0.9319	0.8944
9	1.0000	0.9999	0.9998	0.9996	0.9993	0.9989	0.9982	0.9973	0.9960	0.9942	0.9919	0.9829	0.9682	0.9462
10	1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9995	0.9992	0.9987	0.9981	0.9972	0.9933	0.9863	0.9747
11	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9998	0.9996	0.9994	0.9991	0.9976	0.9945	0.9890
12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9998	0.9997	0.9992	0.9980	0.9955
13	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9997	0.9993	0.9983
14	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9994
15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998
16	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
17	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Poisson Cumulative Distribution Table

$\lambda =$	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	11.0	12.0	13.0	14.0	15.0
$x=0$	0.0025	0.0015	0.0009	0.0006	0.0003	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	0.0174	0.0113	0.0073	0.0047	0.0030	0.0019	0.0012	0.0008	0.0005	0.0002	0.0001	0.0000	0.0000	0.0000
2	0.0620	0.0430	0.0296	0.0203	0.0138	0.0093	0.0062	0.0042	0.0028	0.0012	0.0005	0.0002	0.0001	0.0000
3	0.1512	0.1118	0.0818	0.0591	0.0424	0.0301	0.0212	0.0149	0.0103	0.0049	0.0023	0.0011	0.0005	0.0002
4	0.2851	0.2237	0.1730	0.1321	0.0996	0.0744	0.0550	0.0403	0.0293	0.0151	0.0076	0.0037	0.0018	0.0009
5	0.4457	0.3690	0.3007	0.2414	0.1912	0.1496	0.1157	0.0885	0.0671	0.0375	0.0203	0.0107	0.0055	0.0028
6	0.6063	0.5265	0.4497	0.3782	0.3134	0.2562	0.2068	0.1649	0.1301	0.0786	0.0458	0.0259	0.0142	0.0076
7	0.7440	0.6728	0.5987	0.5246	0.4530	0.3856	0.3239	0.2687	0.2202	0.1432	0.0895	0.0540	0.0316	0.0180
8	0.8472	0.7916	0.7291	0.6620	0.5925	0.5231	0.4557	0.3918	0.3328	0.2320	0.1550	0.0998	0.0621	0.0374
9	0.9161	0.8774	0.8305	0.7764	0.7166	0.6530	0.5874	0.5218	0.4579	0.3405	0.2424	0.1658	0.1094	0.0699
10	0.9574	0.9332	0.9015	0.8622	0.8159	0.7634	0.7060	0.6453	0.5830	0.4599	0.3472	0.2517	0.1757	0.1185
11	0.9799	0.9661	0.9467	0.9208	0.8881	0.8487	0.8030	0.7520	0.6968	0.5793	0.4616	0.3532	0.2600	0.1848
12	0.9912	0.9840	0.9730	0.9573	0.9362	0.9091	0.8758	0.8364	0.7916	0.6887	0.5760	0.4631	0.3585	0.2676
13	0.9964	0.9929	0.9872	0.9784	0.9658	0.9486	0.9261	0.8981	0.8645	0.7813	0.6815	0.5730	0.4644	0.3632
14	0.9986	0.9970	0.9943	0.9897	0.9827	0.9726	0.9585	0.9400	0.9165	0.8540	0.7720	0.6751	0.5704	0.4657
15	0.9995	0.9988	0.9976	0.9954	0.9918	0.9862	0.9780	0.9665	0.9513	0.9074	0.8444	0.7636	0.6694	0.5681
16	0.9998	0.9996	0.9990	0.9980	0.9963	0.9934	0.9889	0.9823	0.9730	0.9441	0.8987	0.8355	0.7559	0.6641
17	0.9999	0.9998	0.9996	0.9992	0.9984	0.9970	0.9947	0.9911	0.9857	0.9678	0.9370	0.8905	0.8272	0.7489
18	1.0000	0.9999	0.9999	0.9997	0.9993	0.9987	0.9976	0.9957	0.9928	0.9823	0.9626	0.9302	0.8826	0.8195
19	1.0000	1.0000	1.0000	0.9999	0.9997	0.9995	0.9989	0.9980	0.9965	0.9907	0.9787	0.9573	0.9235	0.8752
20	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9996	0.9991	0.9984	0.9953	0.9884	0.9750	0.9521	0.9170
21	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998	0.9996	0.9993	0.9977	0.9939	0.9859	0.9712	0.9469
22	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9997	0.9990	0.9970	0.9924	0.9833	0.9673
23	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9995	0.9985	0.9960	0.9907	0.9805
24	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9993	0.9980	0.9950	0.9888
25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9990	0.9974	0.9938
26	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9995	0.9987	0.9967
27	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9994	0.9983
28	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9991
29	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9996
30	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9998
31	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999
32	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Students t Distribution - Table
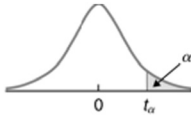
Student's t-distribution (or simply the t-distribution) is any member of a family of continuous probability distributions that arise when estimating the mean of a normally distributed population in situations where the sample size is small, and the population's standard deviation is unknown.

Values of t_α

df	$t_{0.10}$	$t_{0.05}$	$t_{0.025}$	$t_{0.01}$	$t_{0.005}$
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.92	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.44	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.86	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.25
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.35	1.771	2.16	2.65	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.12	2.583	2.921
17	1.333	1.74	2.11	2.567	2.898
18	1.33	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845

1.282	1.645	1.960	2.326	2.576
$Z_{0.10}$	$Z_{0.05}$	$Z_{0.025}$	$Z_{0.01}$	$Z_{0.005}$

Students t Distribution - Table

df	$t_{0.10}$	$t_{0.05}$	$t_{0.025}$	$t_{0.01}$	$t_{0.005}$
21	1.323	1.721	2.08	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.5	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.06	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.31	1.697	2.042	2.457	2.75
31	1.309	1.696	2.04	2.453	2.744
32	1.309	1.694	2.037	2.449	2.738
33	1.308	1.692	2.035	2.445	2.733
34	1.307	1.691	2.032	2.441	2.728
35	1.306	1.69	2.03	2.438	2.724
36	1.306	1.688	2.028	2.434	2.719
37	1.305	1.687	2.026	2.431	2.715
38	1.304	1.686	2.024	2.429	2.712
39	1.304	1.685	2.023	2.426	2.708
40	1.303	1.684	2.021	2.423	2.704
41	1.303	1.683	2.02	2.421	2.701
42	1.302	1.682	2.018	2.418	2.698
43	1.302	1.681	2.017	2.416	2.695
44	1.301	1.68	2.015	2.414	2.692
45	1.301	1.679	2.014	2.412	2.69
46	1.3	1.679	2.013	2.41	2.687
47	1.3	1.678	2.012	2.408	2.685
48	1.299	1.677	2.011	2.407	2.682
49	1.299	1.677	2.01	2.405	2.68

F - Distribution Table
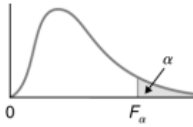
The F-distribution or F-ratio, is a continuous probability distribution that arises frequently as the null distribution of a test statistic, most notably in the analysis of variance (ANOVA) and other F-tests.

dfd	α	1	2	3	4	5	6	7	8	9
	0.10	39.86	49.5	53.59	55.83	57.24	58.2	58.91	59.44	59.86
	0.05	161.45	199.5	215.71	224.58	230.16	233.99	236.77	238.88	240.54
1	0.025	647.79	799.5	864.16	899.58	921.85	937.11	948.22	956.66	963.28
	0.01	4052.2	4999.5	5403.4	5624.6	5763.6	5859	5928.4	5981.1	6022.5
	0.005	16211	20000	21615	22500	23056	23437	23715	23925	24091
	0.10	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38
	0.05	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
2	0.025	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39
	0.01	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39
	0.005	198.50	199.00	199.17	199.25	199.30	199.33	199.36	199.37	199.39
	0.10	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24
	0.05	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
3	0.025	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47
	0.01	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35
	0.005	55.55	49.80	47.47	46.19	45.39	44.84	44.43	44.13	43.88
	0.10	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94
	0.05	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
4	0.025	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90
	0.01	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66
	0.005	31.33	26.28	24.26	23.15	22.46	21.97	21.62	21.35	21.14
	0.10	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32
	0.05	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
5	0.025	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68
	0.01	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16
	0.005	22.78	18.31	16.53	15.56	14.94	14.51	14.20	13.96	13.77
	0.10	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96
	0.05	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
6	0.025	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52
	0.01	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98
	0.005	18.63	14.54	12.92	12.03	11.46	11.07	10.79	10.57	10.39

F - Distribution Table

dfd	α	dfn 1	2	3	4	5	6	7	8	9
7	0.10	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72
	0.05	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
	0.025	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82
	0.01	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72
	0.005	16.24	12.40	10.88	10.05	9.52	9.16	8.89	8.68	8.51
8	0.10	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56
	0.05	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
	0.025	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36
	0.01	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91
	0.005	14.69	11.04	9.60	8.81	8.30	7.95	7.69	7.50	7.34
9	0.10	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44
	0.05	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
	0.025	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03
	0.01	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35
	0.005	13.61	10.11	8.72	7.96	7.47	7.13	6.88	6.69	6.54
10	0.10	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35
	0.05	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
	0.025	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78
	0.01	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
	0.005	12.83	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97
11	0.10	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27
	0.05	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
	0.025	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59
	0.01	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63
	0.005	12.23	8.91	7.60	6.88	6.42	6.10	5.86	5.68	5.54

SCSSA | UOK

F - Distribution Table

dfd	α	dfn 1	2	3	4	5	6	7	8	9
	0.10	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21
	0.05	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
12	0.025	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44
	0.01	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
	0.005	11.75	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20
	0.10	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16
	0.05	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
13	0.025	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31
	0.01	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19
	0.005	11.37	8.19	6.93	6.23	5.79	5.48	5.25	5.08	4.94
	0.10	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12
	0.05	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
14	0.025	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21
	0.01	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03
	0.005	11.06	7.92	6.68	6.00	5.56	5.26	5.03	4.86	4.72
	0.10	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09
	0.05	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
15	0.025	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12
	0.01	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
	0.005	10.80	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54
	0.10	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06
	0.05	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
16	0.025	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05
	0.01	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78
	0.005	10.58	7.51	6.30	5.64	5.21	4.91	4.69	4.52	4.38

Chi - Square Distribution Table
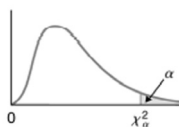
Values of χ_α^2

The chi squared table is used in mainly hypothesis testing to decide whether accept or reject the null hypothesis according to their values. In more general scene is to check whether distribution of categorical variables differ from each other.

d.f.	0.995	0.99	0.975	0.95	0.9	0.1	0.05	0.025	0.01
1	0.00	0.00	0.00	0.00	0.02	2.71	3.84	5.02	6.63
2	0.01	0.02	0.05	0.1	0.21	4.61	5.99	7.38	9.21
3	0.07	0.11	0.22	0.35	0.58	6.25	7.81	9.35	11.34
4	0.21	0.3	0.48	0.71	1.06	7.78	9.49	11.14	13.28
5	0.41	0.55	0.83	1.15	1.61	9.24	11.07	12.83	15.09
6	0.68	0.87	1.24	1.64	2.2	10.64	12.59	14.45	16.81
7	0.99	1.24	1.69	2.17	2.83	12.02	14.07	16.01	18.48
8	1.34	1.65	2.18	2.73	3.49	13.36	15.51	17.53	20.09
9	1.73	2.09	2.7	3.33	4.17	14.68	16.92	19.02	21.67
10	2.16	2.56	3.25	3.94	4.87	15.99	18.31	20.48	23.21
11	2.6	3.05	3.82	4.57	5.58	17.28	19.68	21.92	24.72
12	3.07	3.57	4.4	5.23	6.3	18.55	21.03	23.34	26.22
13	3.57	4.11	5.01	5.89	7.04	19.81	22.36	24.74	27.69
14	4.07	4.66	5.63	6.57	7.79	21.06	23.68	26.12	29.14
15	4.6	5.23	6.26	7.26	8.55	22.31	25	27.49	30.58
16	5.14	5.81	6.91	7.96	9.31	23.54	26.3	28.85	32
17	5.7	6.41	7.56	8.67	10.09	24.77	27.59	30.19	33.41
18	6.26	7.01	8.23	9.39	10.86	25.99	28.87	31.53	34.81
19	6.84	7.63	8.91	10.12	11.65	27.2	30.14	32.85	36.19
20	7.43	8.26	9.59	10.85	12.44	28.41	31.41	34.17	37.57
22	8.64	9.54	10.98	12.34	14.04	30.81	33.92	36.78	40.29

Chi - Square Distribution Table

d.f.	0.995	0.99	0.975	0.95	0.9	0.1	0.05	0.025	0.01
24	9.89	10.86	12.4	13.85	15.66	33.2	36.42	39.36	42.98
26	11.16	12.2	13.84	15.38	17.29	35.56	38.89	41.92	45.64
28	12.46	13.56	15.31	16.93	18.94	37.92	41.34	44.46	48.28
30	13.79	14.95	16.79	18.49	20.6	40.26	43.77	46.98	50.89
32	15.13	16.36	18.29	20.07	22.27	42.58	46.19	49.48	53.49
34	16.5	17.79	19.81	21.66	23.95	44.9	48.6	51.97	56.06
38	19.29	20.69	22.88	24.88	27.34	49.51	53.38	56.9	61.16
42	22.14	23.65	26	28.14	30.77	54.09	58.12	61.78	66.21
46	25.04	26.66	29.16	31.44	34.22	58.64	62.83	66.62	71.2
50	27.99	29.71	32.36	34.76	37.69	63.17	67.5	71.42	76.15
55	31.73	33.57	36.4	38.96	42.06	68.8	73.31	77.38	82.29
60	35.53	37.48	40.48	43.19	46.46	74.4	79.08	83.3	88.38
65	39.38	41.44	44.6	47.45	50.88	79.97	84.82	89.18	94.42
70	43.28	45.44	48.76	51.74	55.33	85.53	90.53	95.02	100.43
75	47.21	49.48	52.94	56.05	59.79	91.06	96.22	100.84	106.39
80	51.17	53.54	57.15	60.39	64.28	96.58	101.88	106.63	112.33
85	55.17	57.63	61.39	64.75	68.78	102.08	107.52	112.39	118.24
90	59.2	61.75	65.65	69.13	73.29	107.57	113.15	118.14	124.12
95	63.25	65.9	69.92	73.52	77.82	113.04	118.75	123.86	129.97
100	67.33	70.06	74.22	77.93	82.36	118.5	124.34	129.56	135.81

SCSSA | UOK

Random Number Table

A random number table is a list of numbers, composed of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. Numbers in the list are arranged so that each digit has no predictable relationship to the digits that preceded it or to the digits that followed it. In short, the digits are arranged randomly.

Line number	Column number									
	00 - 09		10 - 19		20 - 29		30 - 39		40 - 49	
00	15544	80712	97742	21500	97081	42451	50623	56071	28882	28739
01	01011	21285	04729	39986	73150	31548	30168	76189	56996	19210
02	47435	53308	40718	29050	74858	64517	93573	51058	68501	42723
03	91312	75137	86274	59834	69844	19853	06917	17413	44474	86530
04	12775	08768	80791	16298	22934	09630	98862	39746	64623	32768
05	31466	43761	94872	92230	52367	13205	38634	55882	77518	36252
06	09300	43847	40881	51243	97810	18903	53914	31688	06220	40422
07	73582	13810	57784	72454	68997	72229	30340	08844	53924	89630
08	11092	81392	58189	22697	41063	09451	09789	00637	06450	85990
09	93322	98567	00116	35605	66790	52965	62877	21740	56476	49296
10	80134	12484	67089	08674	70753	90959	45842	59844	45214	36505
11	97888	31797	95037	84400	76041	96668	75920	68482	56855	97417
12	92612	27082	59459	69380	98654	20407	88151	56263	27126	63797
13	72744	45586	43279	44218	83638	05422	00995	70217	78925	39097
14	96256	70653	45285	26293	78305	80252	03625	40159	68760	84716
15	07851	47452	66742	83331	54701	06573	98169	37499	67756	68301
16	25594	41552	96475	56151	02089	33748	65289	89956	89559	33687
17	65358	15155	59374	80940	03411	94656	69440	47156	77115	99463
18	09402	31008	53424	21928	02198	61201	02457	87214	59750	51330
19	97424	90765	01634	37328	41243	33564	17884	94747	93650	77668

SCSSA | UOK

Factors for constructing variables control chart

Factors for Constructing Variables Control Charts

Observations in Sample, n	Chart for Averages			Factors for Center Line		Chart for Standard Deviations				Factors for Center Line			Chart for Ranges			
	Factors for Control Limits					Factors for Control Limits							Factors for Control Limits			
	A	A₂	A₃	c₄	1/c₄	B₃	B₄	B₅	B₆	d₂	1/d₂	d₃	D₁	D₂	D₃	D₄
2	2.121	1.880	2.659	0.7979	1.2533	0	3.267	0	2.606	1.128	0.8865	0.853	0	3.686	0	3.267
3	1.732	1.023	1.954	0.8862	1.1284	0	2.568	0	2.276	1.693	0.5907	0.888	0	4.358	0	2.574
4	1.500	0.729	1.628	0.9213	1.0854	0	2.266	0	2.088	2.059	0.4857	0.880	0	4.698	0	2.282
5	1.342	0.577	1.427	0.9400	1.0638	0	2.089	0	1.964	2.326	0.4299	0.864	0	4.918	0	2.114
6	1.225	0.483	1.287	0.9515	1.0510	0.030	1.970	0.029	1.874	2.534	0.3946	0.848	0	5.078	0	2.004
7	1.134	0.419	1.182	0.9594	1.0423	0.118	1.882	0.113	1.806	2.704	0.3698	0.833	0.204	5.204	0.076	1.924
8	1.061	0.373	1.099	0.9650	1.0363	0.185	1.815	0.179	1.751	2.847	0.3512	0.820	0.388	5.306	0.136	1.864
9	1.000	0.337	1.032	0.9693	1.0317	0.239	1.761	0.232	1.707	2.970	0.3367	0.808	0.547	5.393	0.184	1.816
10	0.949	0.308	0.975	0.9727	1.0281	0.284	1.716	0.276	1.669	3.078	0.3249	0.797	0.687	5.469	0.223	1.777
11	0.905	0.285	0.927	0.9754	1.0252	0.321	1.679	0.313	1.637	3.173	0.3152	0.787	0.811	5.535	0.256	1.744
12	0.866	0.266	0.886	0.9776	1.0229	0.354	1.646	0.346	1.610	3.258	0.3069	0.778	0.922	5.594	0.283	1.717
13	0.832	0.249	0.850	0.9794	1.0210	0.382	1.618	0.374	1.585	3.336	0.2998	0.770	1.025	5.647	0.307	1.693
14	0.802	0.235	0.817	0.9810	1.0194	0.406	1.594	0.399	1.563	3.407	0.2935	0.763	1.118	5.696	0.328	1.672
15	0.775	0.223	0.789	0.9823	1.0180	0.428	1.572	0.421	1.544	3.472	0.2880	0.756	1.203	5.741	0.347	1.653
16	0.750	0.212	0.763	0.9835	1.0168	0.448	1.552	0.440	1.526	3.532	0.2831	0.750	1.282	5.782	0.363	1.637
17	0.728	0.203	0.739	0.9845	1.0157	0.466	1.534	0.458	1.511	3.588	0.2787	0.744	1.356	5.820	0.378	1.622
18	0.707	0.194	0.718	0.9854	1.0148	0.482	1.518	0.475	1.496	3.640	0.2747	0.739	1.424	5.856	0.391	1.608
19	0.688	0.187	0.698	0.9862	1.0140	0.497	1.503	0.490	1.483	3.689	0.2711	0.734	1.487	5.891	0.403	1.597
20	0.671	0.180	0.680	0.9869	1.0133	0.510	1.490	0.504	1.470	3.735	0.2677	0.729	1.549	5.921	0.415	1.585
21	0.655	0.173	0.663	0.9876	1.0126	0.523	1.477	0.516	1.459	3.778	0.2647	0.724	1.605	5.951	0.425	1.575
22	0.640	0.167	0.647	0.9882	1.0119	0.534	1.466	0.528	1.448	3.819	0.2618	0.720	1.659	5.979	0.434	1.566
23	0.626	0.162	0.633	0.9887	1.0114	0.545	1.455	0.539	1.438	3.858	0.2592	0.716	1.710	6.006	0.443	1.557
24	0.612	0.157	0.619	0.9892	1.0109	0.555	1.445	0.549	1.429	3.895	0.2567	0.712	1.759	6.031	0.451	1.548
25	0.600	0.153	0.606	0.9896	1.0105	0.565	1.435	0.559	1.420	3.931	0.2544	0.708	1.806	6.056	0.459	1.541

Mann - Whitney Table

The Mann-Whitney test is a non-parametric equivalent of a t test designed to use the data from two separate samples to evaluate the difference between two treatments. Followings are the null and alternative hypotheses & tests statistic for this test.

$\mathcal{H}_0$: *There is no difference between the two treatments*

$\mathcal{H}_1$: *There is difference between the two treatments*

Test statistic= $U = min\{U_1, U_2\}$

$$U_1 = (n_1)(n_2) + \frac{n_1(n_1+1)}{2} - \sum R_1 \quad \& \quad U_2 = (n_1)(n_2) + \frac{n_2(n_2+1)}{2} - \sum R_2$$

Where $n_i = i^{th}$ *sample size* & $\sum R_i = $ *sum of the* i^{th} *sample ranks*

The Mann-Whitney table lists critical value of U for a $\alpha = 0.05$ and $\alpha = 0.01$.

The null hypothesis is rejected when the sample data produce a U that is less than or equal to the table value.

Dashes (- -) in the body of the table indicate that no decision is possible at the stated level of significance and values of n1 and n2.

Mann - Whitney Table

One - Tailed Test

n_2 \ n_1	20 (.01)	20 (.05)	19 (.01)	19 (.05)	18 (.01)	18 (.05)	17 (.01)	17 (.05)	16 (.01)	16 (.05)	15 (.01)	15 (.05)	14 (.01)	14 (.05)	13 (.01)	13 (.05)	12 (.01)	12 (.05)	11 (.01)	11 (.05)	10 (.01)	10 (.05)	9 (.01)	9 (.05)	8 (.01)	8 (.05)	7 (.01)	7 (.05)	6 (.01)	6 (.05)	5 (.01)	5 (.05)	4 (.01)	4 (.05)	3 (.01)	3 (.05)
3	5	11	4	10	4	9	4	9	3	8	3	7	2	7	2	6	2	5	1	5	1	4	1	3	0	3	0	2	—	2	—	1	—	0	—	0
4	10	18	9	17	9	16	8	15	7	14	7	12	6	11	5	10	5	9	4	8	3	7	3	6	2	5	1	4	1	3	0	2	—	1	—	0
5	16	25	15	23	14	22	13	20	12	19	11	18	10	16	9	15	8	13	7	12	6	11	5	9	4	8	3	6	2	5	1	4	0	2	—	1
6	22	32	20	30	19	28	18	26	16	25	15	23	13	21	12	19	11	17	9	16	8	14	7	12	6	10	4	8	3	7	2	5	1	3	—	2
7	28	39	26	37	24	35	23	33	21	30	19	28	17	26	16	24	14	21	12	19	11	17	9	15	7	13	6	11	4	8	3	6	1	4	0	2
8	34	47	32	44	30	41	28	39	26	36	24	33	22	31	20	28	17	26	15	23	13	20	11	18	9	15	7	13	6	10	4	8	2	5	0	3
9	40	54	38	51	36	48	33	45	31	42	28	39	26	36	23	33	21	30	18	27	16	24	14	21	11	18	9	15	7	12	5	9	3	6	1	3
10	47	62	44	58	41	55	38	51	36	48	33	44	30	41	27	37	24	34	22	31	19	27	16	24	13	20	11	17	8	14	6	11	3	7	1	4
11	53	69	50	65	47	61	44	57	41	54	37	50	34	46	31	42	28	38	25	34	22	31	18	27	15	23	12	19	9	16	7	12	4	8	1	5
12	60	77	56	72	53	68	49	64	46	60	42	55	38	51	35	47	31	42	28	38	24	34	21	30	17	26	14	21	11	17	8	13	5	9	2	5
13	67	84	63	80	59	75	55	70	51	65	47	61	43	56	39	51	35	47	31	42	27	37	23	33	20	28	16	24	12	19	9	15	5	10	2	6
14	73	92	69	87	65	82	60	77	56	71	51	66	47	61	43	56	38	51	34	46	30	41	26	36	22	31	17	26	13	21	10	16	6	11	2	7
15	80	100	75	94	70	88	66	83	61	77	56	72	51	66	47	61	42	55	37	50	33	44	28	39	24	33	19	28	15	23	11	18	7	12	3	7
16	87	107	82	101	76	95	71	89	66	83	61	77	56	71	51	65	46	60	41	54	36	48	31	42	26	36	21	30	16	25	12	19	7	14	3	8
17	93	115	88	109	82	102	77	96	71	89	66	83	60	77	55	70	49	64	44	57	38	51	33	45	28	39	23	33	18	26	13	20	8	15	4	9
18	100	123	94	116	88	109	82	102	76	95	70	88	65	82	59	75	53	68	47	61	41	55	36	48	30	41	24	35	19	28	14	22	9	16	4	9
19	107	130	101	123	94	116	88	109	82	101	75	94	69	87	63	80	56	72	50	65	44	58	38	51	32	44	26	37	20	30	15	23	9	17	4	10
20	114	138	107	130	100	123	93	115	87	107	80	100	73	92	67	84	60	77	53	69	47	62	40	54	34	47	28	39	22	32	16	25	10	18	5	11

Mann - Whitney Table

Two - Tailed Test

n_1	α	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	0.05	-	-	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
3	0.01	-	-	-	-	-	-	0	0	0	1	1	1	2	2	2	2	3	3
4	0.05	-	0	1	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14
4	0.01	-	-	-	0	0	1	1	2	2	3	3	4	5	5	6	6	7	8
5	0.05	0	1	2	3	5	6	7	8	9	11	12	13	14	15	17	18	19	20
5	0.01	-	-	0	1	1	2	3	4	5	6	7	7	8	9	10	11	12	13
6	0.05	1	2	3	5	6	8	10	11	13	14	16	17	19	21	22	24	25	27
6	0.01	-	0	1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18
7	0.05	1	3	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
7	0.01	-	0	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24
8	0.05	2	4	6	8	10	13	15	17	19	22	24	26	29	31	34	36	38	41
8	0.01	-	1	2	4	6	7	9	11	13	15	17	18	20	22	24	26	28	30
9	0.05	2	4	7	10	12	15	17	20	23	26	28	31	34	37	39	42	45	48
9	0.01	0	1	3	5	7	9	11	13	16	18	20	22	24	27	29	31	33	36
10	0.05	3	5	8	11	14	17	20	23	26	29	33	36	39	42	45	48	52	55
10	0.01	0	2	4	6	9	11	13	16	18	21	24	26	29	31	34	37	39	42
11	0.05	3	6	9	13	16	19	23	26	30	33	37	40	44	47	51	55	58	62
11	0.01	0	2	5	7	10	13	16	18	21	24	27	30	33	36	39	42	45	48
12	0.05	4	7	11	14	18	22	26	29	33	37	41	45	49	53	57	61	65	69
12	0.01	1	3	6	9	12	15	18	21	24	27	31	34	37	41	44	47	51	54
13	0.05	4	8	12	16	20	24	28	33	37	41	45	50	54	59	63	67	72	76
13	0.01	1	3	7	10	13	17	20	24	27	31	34	38	42	45	49	53	56	60
14	0.05	5	9	13	17	22	26	31	36	40	45	50	55	59	64	67	74	78	83
14	0.01	1	4	7	11	15	18	22	26	30	34	38	42	46	50	54	58	63	67
15	0.05	5	10	14	19	24	29	34	39	44	49	54	59	64	70	75	80	85	90
15	0.01	2	5	8	12	16	20	24	29	33	37	42	46	51	55	60	64	69	73
16	0.05	6	11	15	21	26	31	37	42	47	53	59	64	70	75	81	86	92	98
16	0.01	2	5	9	13	18	22	27	31	36	41	45	50	55	60	65	70	74	79
17	0.05	6	11	17	22	28	34	39	45	51	57	63	67	75	81	87	93	99	105
17	0.01	2	6	10	15	19	24	29	34	39	44	49	54	60	65	70	75	81	86
18	0.05	7	12	18	24	30	36	42	48	55	61	67	74	80	86	93	99	106	112
18	0.01	2	6	11	16	21	26	31	37	42	47	53	58	64	70	75	81	87	92
19	0.05	7	13	19	25	32	38	45	52	58	65	72	78	85	92	99	106	113	119
19	0.01	3	7	12	17	22	28	33	39	45	51	56	63	69	74	81	87	93	99
20	0.05	8	14	20	27	34	41	48	55	62	69	76	83	90	98	105	112	119	127
20	0.01	3	8	13	18	24	30	36	42	48	54	60	67	73	79	86	92	99	105

Critical Values for Runs Test

A run is defined as a series of increasing values or a series of decreasing values. Where runs test can be used to check whether the samples data generated from a random process or not.

m \ r²	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2									≡									
3													3	3	3	3	3	3
													–	–	–	–	–	–
4			2	2		3	3	3	3	3	3	3	3	4	4	4	4	4
			9	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5			2	2	3	3	3	3	4	4	4	4	4	4	4	5	5	5
			9	10	10	11	11	–	–	–	–	–	–	–	–	–	–	–
6			2	3	3	3	3	4	4	4	4	5	5	5	5	5	6	6
			9	10	11	12	12	13	13	13	13	–	–	–	–	–	–	–
7				3	3	3	4	4	5	5	5	5	5	6	6	6	6	6
				11	12	13	13	14	14	14	14	15	15	15	–	–	–	–
8		3	3	3	4	4	5	5	5	6	6	6	6	6	7	7	7	7
		–	11	12	13	14	14	15	15	16	16	16	16	17	17	17	17	17
9		3	3	4	4	5	5	5	6	6	6	7	7	7	7	8	8	8
		–	–	13	14	14	15	16	16	16	17	17	18	18	18	18	18	18
10		3	3	4	5	5	6	6	6	7	7	7	8	8	8	8	9	9
		–	–	13	14	15	16	16	17	17	18	18	18	19	19	19	20	20
11		3	4	4	5	5	6	6	7	7	7	8	8	8	9	9	9	9
		–	–	13	14	15	16	17	17	18	19	19	19	20	20	20	21	21
12		3	4	4	5	6	6	7	7	7	8	8	8	9	9	9	10	10
		–	–	13	14	16	16	17	18	19	20	20	21	21	21	22	22	
13		3	4	5	5	6	6	7	7	8	8	9	9	9	10	10	10	10
		–	–	–	15	16	17	18	19	19	20	20	21	21	22	22	23	23
14		3	4	5	5	6	7	7	8	8	9	9	9	10	10	10	11	11
		–	–	–	15	16	17	18	19	20	20	21	22	22	23	23	23	24
15	3	3	4	5	6	7	7	8	8	9	9	9	10	10	11	11	11	12
	–	–	–	–	15	16	18	18	19	20	21	22	22	23	23	24	24	25
16	3	4	4	5	6	6	7	8	8	9	9	10	10	11	11	11	12	12
	–	–	–	–	–	17	18	19	20	21	21	22	23	23	24	25	25	25
17	3	4	4	5	6	7	7	8	9	9	10	10	11	11	11	12	12	13
	–	–	–	–	–	17	18	19	20	21	22	23	23	24	25	25	26	26
18	3	4	5	5	6	7	8	8	9	9	10	10	11	11	12	12	13	13
	–	–	–	–	–	17	18	19	20	21	22	23	24	25	25	26	26	27
19	3	4	5	6	6	7	8	8	9	10	10	11	11	12	12	13	13	13
	–	–	–	–	–	17	18	20	21	22	23	23	24	25	26	26	27	27
20	3	4	5	6	6	7	8	9	9	10	10	11	12	12	13	13	13	14
	–	–	–	–	–	17	18	20	21	22	23	24	25	25	26	27	27	28

Formula Table

Notations

$n = sample\ size$ $Q_j = jth\ quartile$

$\sigma = population\ stdev$ $p = population\ proportion$

$\bar{x} = sample\ mean$ $N = population\ size$

$d = paired\ difference$ $O = observed\ frequency$

$s = sample\ stdev$ $\mu = population\ mean$

$\hat{p} = sample\ proportion$ $E = expected\ frequency$

Descriptive Measures

Sample mean: $\bar{x} = \sum \frac{x_i}{n}$

Range = Max – Min

Sample standard deviation:

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}} \quad or \quad s = \sqrt{\frac{\sum x_i^2 - (\sum x_i)^2/n}{n-1}}$$

Interquartile range: IQR $= Q_3 - Q_1$

Lower limit $= Q_1 - 1.5 \cdot IQR$ Upper limit $= Q_3 + 1.5 \cdot IQR$

Population mean (mean of a variable): $\mu = \frac{\sum x_i}{N}$

Population standard deviation (Standard deviation of a variable):

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}} \quad or \quad \sigma = \sqrt{\frac{\sum x_i^2}{N} - \mu^2}$$

Formula Table

Standardized variable: $z = \frac{x - \mu}{\sigma}$

Descriptive Methods in Regression and Correlation

S_{xx}, S_{xy}, and S_{yy}:

$$S_{xx} = \sum (x_i - \bar{x})^2 = \sum x_i^2 - \left(\sum x_i \right)^2 / n$$

$$S_{xy} = \sum (x_i - \bar{x})(y_i - \bar{y}) = \sum x_i y_i - \left(\sum x_i \right) \left(\sum y_i \right) / n$$

$$S_{yy} = \sum (y_i - \bar{y})^2 = \sum y_i^2 - \frac{(\sum y_i)^2}{n}$$

Regression equation: $\hat{y} = b_0 + b_1 x$, $where$

$$b_1 = \frac{S_{xy}}{S_{xx}} \ and \ b_0 = \frac{1}{n} \left(\sum y_i - b_1 \sum x_i \right) = \bar{y} - b_1 \bar{x}$$

Total sum of squares: $SST = \sum (y_i - \bar{y})^2 = S_{yy}$

Regression sum of squares: $SSR = \sum (\hat{y_i} - \bar{y})^2 = S_{xy}^2 / S_{xx}$

Error sum of squares: $SSE = \sum (y_i - \hat{y_i})^2 = S_{yy} - \frac{S_{xy}^2}{S_{xx}}$

Regression identity: $SST = SSR + SSE$

Coefficient of determination: $r^2 = \frac{SSR}{SST}$

Linear correlation coefficient:

$$r = \frac{\frac{1}{n-1} \sum (x_i - \bar{x})(y_i - \bar{y})}{s_x s_y} \quad or \ \ r = \frac{S_{xy}}{\sqrt{S_{xx} S_{yy}}}$$

Formula Table

Probability and Random Variables

Probability for equally likely outcomes:

$$P(E) = \frac{f}{N}$$

where f denotes the number of ways event E can occur and N denotes the total number of outcomes possible.

Special addition rule:

$$P(A \text{ or } B \text{ or } C \ldots = P(A) + P(B) + P(C) + \cdots$$

(A, B, C, …. mutually exclusive)

Complementation rule: $P(E) = 1 - P(not\ E)$

General addition rule:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \& B)$$

Mean of a discrete random variable X:

$$\mu = \sum x P(X = x)$$

Standard deviation of a discrete random variable X:

$$\sigma = \sqrt{\sum (x - \mu)^2 P(X = x)} \ \text{ or } \ \sigma = \sqrt{\sum x^2 P(X = x) - \mu^2}$$

Factorial: $k! = k(k - 1) \cdots\cdots 2 \cdot 1$

Binomial coefficient: $\binom{n}{x} p^x (1 - p)^{n-x}$

Mean of a binomial random variable: $\mu = np$

Standard deviation of a binomial random variable:

$$\sigma = \sqrt{np(1 - p)}$$

Formula Table

The Normal Distribution

z-score for an x-value: $z = \frac{x - \mu}{\sigma}$

x-value for z-score: $x = \mu + z \cdot \sigma$

The Sampling Distribution of the Sample Mean

Mean of the variable $\bar{x}$: $\mu_{\bar{x}} = \mu$

Standard deviation of the variable $\bar{x}$: $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

Confidence Intervals for One Population Mean

Standardized version of the variable $\bar{x}$: $z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

z-interval for μ (σ known, normal population or large sample): $\bar{x} \pm z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$

Margin of error for the estimate μ: $E = Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

Sample size for estimating μ: $n = \left(\frac{z_{\alpha/2}}{E}\right)^2$

Studentized version of the variable $\bar{x}$: $t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$

t-interval for μ (σ unknown, normal population or large sample):

$$\bar{x} \pm t_{\alpha/2} \cdot \frac{s}{\sqrt{n}} \qquad \text{with df} = \text{n-1.}$$

SCSSA | UOK

Formula Table

Hypothesis Test for One Population Mean

z-test statistic for $H_0 : \mu = \mu_0$ (σ known, normal population or large sample):

$$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$$

t-test statistic for $H_0 : \mu = \mu_0$ (σ unknown, normal population or large sample):

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} \qquad \text{with df = n -1.}$$

Inferences for Two Population Means

Pooled sample standard deviation: $S_p = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$

Pooled t-test statistic for $H_0 : \mu_1 = \mu_2$ (independent samples, normal populations or large samples and equal population standard deviations):

$$t = \frac{(\bar{x}_1 - \bar{x}_2)}{s_p\sqrt{(1/n_1)+(1/n_2)}}$$

with df = $n_1 + n_2 - 2$.

Pooled t-interval for (independent samples, normal populations or large samples and equal population in standard deviations df = $n_1 + n_2 - 2$):

$$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2}\, S_p\sqrt{(1/n_1) + (1/n_2)}$$

Formula Table

Degrees of freedom for nonpooled t-procedures:

$$\Delta = \frac{[(s_1^2/n_1) + (s_2^2/n_2)]^2}{\dfrac{(s_1^2/n_1)^2}{n_1 - 1} + \dfrac{(s_1^2/n_2)^2}{n_2 - 1}}$$

Nonpooled t test statistic for H$_0$: $\mu_1 = \mu_2$ (independent samples, and normal populations or large samples):

$$t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{(s_1^2/n_1) + (s_2^2/n_2)}}$$

with df = Δ.

Nonpooled t test statistic for H$_0$ (independent samples, and normal populations or large samples):

$$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} \cdot S_p \sqrt{(s_1^2/n_1) + (s_2^2/n_2)}$$

with df= Δ.

Paired t-test statistic for H$_0$: $\mu_1 = \mu_2$ (paired samples, and normal populations or large samples):

$$t = \frac{\bar{d}}{s_d/\sqrt{n}}$$

with df= $n - 1$.

Paired t-interval statistic for $\mu_1 - \mu_2$ (paired samples, and normal populations or large samples):

$$\bar{d} \pm t_{\alpha/2} \frac{s_d}{\sqrt{n}}$$

with df= $n - 1$.

Formula Table

Inferences for Population Proportions

Sample proportion: $\hat{p} = \frac{x}{n}$, where x denoted the number of members in the dample that have the specified attribute.

z-interval for p: $\hat{p} \pm Z_{\alpha/2} \cdot \sqrt{\hat{p}(1-\hat{p})/n}$

(Assumption : Both x and n-x are 5 or greater)

Margin of error for the estimate of p:

$$E = z_{\alpha/2} \cdot \sqrt{\hat{p}(1-\hat{p})/n}$$

Sample size for estimating p:

$$n = 0.25 \left(\frac{Z_{\alpha/2}}{E}\right)^2 \text{ or } n = \hat{p}_g\left(1 - \hat{p}_g\right)\left(\frac{Z_{\alpha/2}}{E}\right)^2$$

(rounded up to the nearest whole number.)
(g = "Educated Guess")

z-test statistic for $H_0 : p = p_0$:

$$z = \frac{\hat{p} - p_0}{\sqrt{p_0(1 - p_0)/n}}$$

(Assumption: Both np_0 and $n(1 - p_0)$ are 5 or greater)

Formula Table

Pooled sample proportion: $\hat{P}_p = \frac{(x_1 + x_2)}{n_1 + n_2}$

z-test statistic for $H_0: p_1 = p_2$:

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{P}_p(1 - \hat{P}_p)}\sqrt{(1/n_1) + (1/n_2)}}$$

(Assumptions: independent samples; $x_1, n_1 - x_1, x_2, n_2 - x_2$ are all 5 or greater)

z – Interval for $p_1 - p_2$:

$$(\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2} \cdot \sqrt{\hat{p}_1(1 - \hat{p}_1)/n_1 + \hat{p}_2(1 - \hat{p}_2)/n_2}$$

(Assumptions: Independent samples: $x_1, n_1 - x_1, x_2, n_2 - x_2$ are all 5 or greater)

Margin of error for the estimate of $p_1 - p_2$:

$$E = z_{\alpha/2} \cdot \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$$

Formula Table

Chi-Square Procedures

Expected frequencies for chi-square goodness-of-fit test:

$$E = np$$

Test statistic for a chi-square goodness-of-fit test:

$$X^2 = \sum (O - E)^2 / E$$

with df = c - 1, where c is the number of possible values for the variable under consideration.

Expected frequencies for a chi-square independence test or a chi-square homogeneity test:

$$E = \frac{R \cdot C}{n}$$

where R = row total and C = column total.

Test statistic for a chi-square independence test:

$$X^2 = \sum (O - E)^2 / E$$

with df = $(r - 1)(c - 1)$, where r and c are the number of possible values for the variable under consideration.

Formula Table

Analysis of Variance (ANOVA)

Notation in one-way ANOVA:

k = number of populations

n = total number of observations

$\bar{x}$ = mean of all n observations

n_j = size of sample from Population j

$\bar{x}_j$ = mean of sample from Population j

$s_j{}^2$ = variance of sample from Population j

T_j = sum of sample data from Population j

Defining formulas for sums of squares in one way ANOVA:

$$SST = \sum(x_i - \bar{x})^2$$

$$SSTR = \sum n_j(\bar{x}_j - \bar{x})^2$$

$$SSE = \sum(n_j - 1)S_j^2$$

One-way ANOVA identity: $SST = SSTR + SSE$

Computing formulas for sums of squares in one way ANOVA:

$$SST = \sum x_i^2 - (\sum x_i)^2/n$$

$$SSTR = \sum(T_j^2/n_j) - (\sum x_i)^2/n$$

$$SSE = SST - SSTR$$

Formula Table

Mean squares in one-way ANOVA:

$$MSTR = \frac{SSTR}{k-1} \qquad MSE = \frac{SSE}{n-k}$$

Test statistic for one way ANOVA (independent samples, normal populations, and equal population standard deviations):

$$F = \frac{MSTR}{MSE}$$

with df $= (k-1, n-k)$.

Inferential Methods in Regression and Correlation

Population regression equation: $y = \beta_0 + \beta_1 x$

Standard error of the estimate: $s_e = \sqrt{\frac{SSE}{n-2}}$

Test statistic for $H_0: \beta_1 = 0$:

$$t = \frac{b_1}{s_e/\sqrt{S_{xx}}} \qquad \text{with df} = n-2.$$

Confidence interval for β_1:

$$b_1 \pm t_{\alpha/2} \cdot \frac{s_e}{\sqrt{S_{xx}}} \qquad \text{with df} = n-2.$$

Formula Table

Confidence interval for the conditional mean of the response variable corresponding to x_p:

$$\hat{y}_p \pm t_{\alpha/2} \cdot s_e \sqrt{\frac{1}{n} + \frac{(x_p - \bar{x})^2}{S_{xx}}} \qquad \text{with df} = n - 2$$

Prediction interval for an observed value of the response variable corresponding to x_p:

$$\hat{y}_p \pm t_{\alpha/2} \cdot s_e \sqrt{1 + \frac{1}{n} + \frac{(x_p - \bar{x})^2}{S_{xx}}} \quad \text{with df} = n - 2$$

Test statistic for $H_0: \rho = 0$:

$$t = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}} \qquad \text{with df} = n - 2$$

Factors for constructing variables control chart

For n >

$$A = \frac{3}{\sqrt{n}} \qquad A_3 = \frac{3}{c_4\sqrt{n}} \qquad c_4 = \frac{4(n-1)}{4n-3}$$

$$B_3 = 1 - \frac{3}{c_4\sqrt{2(n-1)}} \qquad\qquad B_4 = 1 + \frac{3}{c_4\sqrt{2(n-1)}}$$

$$B_5 = c_4 - \frac{3}{\sqrt{2(n-1)}} \qquad\qquad B_6 = c_4 + \frac{3}{\sqrt{2(n-1)}}$$

Table of Common Distributions

Continuous Distributions

Beta (α, β)

pdf $\qquad f(x|\alpha, \beta) = \frac{1}{B(\alpha,\beta)} x^{\alpha-1}(1-x)^{\beta-1}, \ 0 \leq x \leq 1, \ \alpha > 0, \ \beta > 0$

mean and variance $\qquad EX = \dfrac{\alpha}{\alpha+\beta}, \quad Var\,X = \dfrac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$

mgf $\qquad M_X(t) = 1 + \sum_{k=1}^{\infty} \left(\prod_{r=0}^{k-1} \frac{\alpha+r}{\alpha+\beta+r} \right) \frac{t^k}{k!}$

Cauchy (θ, σ)

pdf $\qquad f(x|\theta, \sigma) = \dfrac{1}{\pi\sigma} \dfrac{1}{1+\left(\frac{x-\theta}{\sigma}\right)^2}, \ -\infty < x < \infty; \ -\infty < \theta < \infty, \ \sigma > 0$

mean and variance $\qquad$ do not exist

mgf $\qquad$ does not exist

Chi squared (p)

pdf $\qquad f(x|p) = \dfrac{1}{\Gamma(p/2)2^{p/2}} x^{(p/2)-1} e^{-x/2}; \ 0 \leq x < \infty \ \ p = 1, 2, \dots$

mean and variance $\qquad E(X) = p, \ Var\,X = 2p$

mgf $\qquad M_x(t) = \left(\dfrac{1}{1-2t} \right)^{p/2}, t < \dfrac{1}{2}$

Double exponential (μ, σ)

pdf $\qquad f(x|\mu, \sigma) = \dfrac{1}{2\sigma} e^{-|x-\mu|/\sigma}, \ -\infty < x < \infty, \ -\infty < \mu < \infty, \ \sigma > 0$

mean and variance $\qquad E(X) = \mu, \ Var\,X = 2\sigma^2$

mgf $\qquad M_x(t) = \dfrac{e^{\mu t}}{1-(\sigma t)^2}, \ |t| < \dfrac{1}{\sigma}$

Table of Common Distributions

Exponential(β)

pdf $\quad f(x|\beta) = \frac{1}{\beta}e^{-x/\beta}, \; 0 \le x < \infty, \quad \beta > 0$

mean and variance $\quad E(X) = \beta, \; \text{Var } X = \beta^2$

mgf $\quad M_x(t) = \frac{1}{1-\beta t}, \; t < \frac{1}{\beta}$

F

pdf $\quad f(x|v_1, v_2) = \frac{\Gamma\left(\frac{v_1+v_2}{2}\right)}{\Gamma\left(\frac{v_1}{2}\right)\Gamma\left(\frac{v_2}{2}\right)}\left(\frac{v_1}{v_2}\right)^{v_1/2}\frac{x^{(v_1-2)/2}}{\left(1+\left(\frac{v_1}{v_2}\right)x\right)^{(v_1+v_2)/2}};$

$$0 \le x < \infty; \quad v_1, v_2 = 1, \ldots$$

mean and variance $\quad E(X) = \frac{v_2}{v_2 - 2}, v_2 > 2,$

$$\text{Var } X = 2\left(\frac{v_2}{v_2-2}\right)^2\frac{(v_1+v_2-2)}{v_1(v_2-4)}, v_2 > 4$$

moments (mgf does not exist) $\quad EX^n = \frac{\Gamma\left(\frac{v_1+2n}{2}\right)\Gamma\left(\frac{v_2-2n}{2}\right)}{\Gamma\left(\frac{v_1}{2}\right)\Gamma\left(\frac{v_2}{2}\right)}\left(\frac{v_2}{v_1}\right)^n, n < \frac{v_2}{2}$

Gamma(α,β)

pdf $\quad f(x|\alpha, \beta) = \frac{1}{\Gamma(\alpha)\beta^\alpha}x^{\alpha-1}e^{-x/\beta}, \; 0 \le x < \infty, \; \alpha, \beta > 0$

mean and variance $\quad E(X) = \alpha\beta, \qquad \text{Var } X = \alpha\beta^2$

mgf $\quad M_x(t) = \left(\frac{1}{1-\beta t}\right)^\alpha, t < \frac{1}{\beta}$

Table of Common Distributions

Logistic(μ, β)

pdf $\qquad f(x|\mu, \beta) = \frac{1}{\beta} \frac{e^{-(x-\mu)/\beta}}{\left[1+e^{-(x-\mu)/\beta}\right]^2}$, $-\infty < x < \infty$, $\;-\infty < \mu < \infty, \beta > 0$

mean and variance $\qquad E(X) = \mu, \qquad \text{Var } X = \frac{\pi^2 \beta^2}{3}$

mgf $\qquad M_X(t) = e^{\mu t}\, \Gamma(1 - \beta t)\Gamma(1 + \beta t), |t| < \frac{1}{\beta}$

Lognormal(μ, σ^2)

pdf $\qquad f(x|\mu, \sigma^2) = \frac{1}{\sqrt{2\pi}\sigma} \frac{e^{-(\log x - \mu)^2/(2\sigma^2)}}{x}, \; 0 \leq x < \infty, -\infty < \mu < \infty, \sigma > 0$

mean and variance $\qquad E(X) = e^{\mu+(\sigma^2/2)}, \qquad \text{Var } X = e^{2(\mu+\sigma^2)} - e^{2\mu+\sigma^2}$

moments (mgf does not exist) $\qquad EX^n = e^{n\mu + n^2\sigma^2/2}$

Normal(μ, σ^2)

pdf $\qquad f(x|\mu, \sigma^2) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/(2\sigma^2)}, \; \infty < x < \infty, -\infty < \mu < \infty$

mean and variance $\qquad E(X) = \mu, \qquad \text{Var } X = \sigma^2$

mgf $\qquad M_X(t) = e^{\mu t + \sigma^2 t^2/2}$

Pareto(α, β)

pdf $\qquad f(x|\alpha, \beta) = \frac{\beta \alpha^\beta}{x^{\beta+1}}, \; a < x < \infty, \alpha > 0, \beta > 0$

mean and variance $\qquad E(X) = \frac{\beta\alpha}{\beta - 1}, \qquad \beta > 1, \text{Var } X = \frac{\beta\alpha^2}{(\beta-1)^2(\beta-2)}, \beta > 2$

mgf $\qquad$ does not exist

Table of Common Distributions

t

pdf $\qquad f(x|v) = \dfrac{\Gamma\left(\frac{v+1}{2}\right)}{\Gamma\left(\frac{v}{2}\right)} \dfrac{1}{\sqrt{v\pi}} \dfrac{1}{\left(1+\left(\frac{x^2}{v}\right)\right)^{(v+1)/2}}, \ \infty < x < \infty, v = 1, \ldots$

mean and variance $\qquad E(X) = 0, \quad v > 1, \text{Var } X = \dfrac{v}{v-2}, v > 2$

moments (mgf does not exist)

$$EX^n = \dfrac{\Gamma\left(\frac{n+1}{2}\right)\Gamma\left(\frac{v-n}{2}\right)}{\sqrt{\pi}\Gamma\left(\frac{v}{2}\right)} v^{n/2} \text{ if } n < v \text{ and even,}$$

$$EX^n = 0 \text{ if } n < v \text{ and odd.}$$

Uniform(a,b)

pdf $\qquad f(x|a,b) = \dfrac{1}{b-a}, \ a \leq x \leq b$

mean and variance $\qquad E(X) = \dfrac{b+a}{2}, \quad \text{Var } X = \dfrac{(b-a)^2}{12}$

mgf $\qquad M_X(t) = \dfrac{e^{bt}-e^{at}}{(b-a)t}$

Weibull(Υ,β)

pdf $\qquad f(x|\gamma, \beta) = \dfrac{\gamma}{\beta}x^{\gamma-1}e^{-x^\gamma/\beta}, \ 0 \leq x < \infty, \ \gamma > 0, \ \beta > 0$

mean and variance $\qquad E(X) = \beta^{1/\gamma}\Gamma\left(1+\dfrac{1}{\gamma}\right), \quad \text{Var } X$

$$= \beta^{2/\gamma}\left[\Gamma\left(1+\dfrac{2}{\gamma}\right) - \Gamma^2\left(1+\dfrac{1}{\gamma}\right)\right]$$

moments $\qquad EX^n = \beta^{n/\gamma}\Gamma\left(1+\dfrac{n}{\gamma}\right)$

End.