

## A.1 Standardized Normal Distribution

$$\begin{cases} F(z) = \int_{-\infty}^z f(x) dx \\ f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}} \end{cases}$$

z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.50000	0.50399	0.50798	0.51197	0.51595	0.51994	0.52392	0.52790	0.53188	0.53586
0.1	0.53983	0.54380	0.54776	0.55172	0.55567	0.55962	0.56356	0.56749	0.57142	0.57535
0.2	0.57926	0.58317	0.58706	0.59095	0.59483	0.59871	0.60257	0.60642	0.61026	0.61409
0.3	0.61791	0.62172	0.62552	0.62930	0.63307	0.63683	0.64058	0.64431	0.64803	0.65173
0.4	0.65542	0.65910	0.66276	0.66640	0.67003	0.67364	0.67724	0.68082	0.68439	0.68793
0.5	0.69146	0.69497	0.69847	0.70194	0.70540	0.70884	0.71226	0.71566	0.71904	0.72240
0.6	0.72575	0.72907	0.73237	0.73565	0.73891	0.74215	0.74537	0.74857	0.75175	0.75490
0.7	0.75804	0.76115	0.76424	0.76730	0.77035	0.77337	0.77637	0.77935	0.78230	0.78524
0.8	0.78814	0.79103	0.79389	0.79673	0.79955	0.80234	0.80511	0.80785	0.81057	0.81327
0.9	0.81594	0.81859	0.82121	0.82381	0.82639	0.82894	0.83147	0.83398	0.83646	0.83891
1.0	0.84134	0.84375	0.84614	0.84850	0.85083	0.85314	0.85543	0.85769	0.85993	0.86214
1.1	0.86433	0.86650	0.86864	0.87076	0.87286	0.87493	0.87698	0.87900	0.88100	0.88298
1.2	0.88493	0.88686	0.88877	0.89065	0.89251	0.89435	0.89617	0.89796	0.89973	0.90147
1.3	0.90320	0.90490	0.90658	0.90824	0.90988	0.91149	0.91309	0.91466	0.91621	0.91774
1.4	0.91924	0.92073	0.92220	0.92364	0.92507	0.92647	0.92786	0.92922	0.93056	0.93189
1.5	0.93319	0.93448	0.93574	0.93699	0.93822	0.93943	0.94062	0.94179	0.94295	0.94408
1.6	0.94520	0.94630	0.94738	0.94845	0.94950	0.95053	0.95154	0.95254	0.95352	0.95449
1.7	0.95543	0.95637	0.95728	0.95818	0.95907	0.95994	0.96080	0.96164	0.96246	0.96327
1.8	0.96407	0.96485	0.96562	0.96638	0.96712	0.96784	0.96856	0.96926	0.96995	0.97062
1.9	0.97128	0.97193	0.97257	0.97320	0.97381	0.97441	0.97500	0.97558	0.97615	0.97670
2.0	0.97725	0.97778	0.97831	0.97882	0.97932	0.97982	0.98030	0.98077	0.98124	0.98169
2.1	0.98214	0.98257	0.98300	0.98341	0.98382	0.98422	0.98461	0.98500	0.98537	0.98574
2.2	0.98610	0.98645	0.98679	0.98713	0.98745	0.98778	0.98809	0.98840	0.98870	0.98899
2.3	0.98928	0.98956	0.98983	0.99010	0.99036	0.99061	0.99086	0.99111	0.99134	0.99158
2.4	0.99180	0.99202	0.99224	0.99245	0.99266	0.99286	0.99305	0.99324	0.99343	0.99361
2.5	0.99379	0.99396	0.99413	0.99430	0.99446	0.99461	0.99477	0.99492	0.99506	0.99520
2.6	0.99534	0.99547	0.99560	0.99573	0.99585	0.99598	0.99609	0.99621	0.99632	0.99643
2.7	0.99653	0.99664	0.99674	0.99683	0.99693	0.99702	0.99711	0.99720	0.99728	0.99736
2.8	0.99744	0.99752	0.99760	0.99767	0.99774	0.99781	0.99788	0.99795	0.99801	0.99807
2.9	0.99813	0.99819	0.99825	0.99831	0.99836	0.99841	0.99846	0.99851	0.99856	0.99861
3.0	0.99865	0.99869	0.99874	0.99878	0.99882	0.99886	0.99889	0.99893	0.99897	0.99900
3.1	0.99903	0.99906	0.99910	0.99913	0.99916	0.99918	0.99921	0.99924	0.99926	0.99929
3.2	0.99931	0.99934	0.99936	0.99938	0.99940	0.99942	0.99944	0.99946	0.99948	0.99950
3.3	0.99952	0.99953	0.99957	0.99957	0.99958	0.99960	0.99961	0.99962	0.99964	0.99965
3.4	0.99966	0.99968	0.99969	0.99970	0.99971	0.99972	0.99973	0.99974	0.99975	0.99976

## A.2 Control Chart Constants

$n$	$D_3$	$D_4$	$B_3$	$B_4$	$A_2$	$A_3$	$d_2$	$c_4$
2	0	3.267	0	3.267	1.880	2.659	1.128	0.7979
3	0	2.574	0	2.568	1.023	1.954	1.693	0.8862
4	0	2.282	0	2.266	0.729	1.628	2.059	0.9213
5	0	2.114	0	2.089	0.577	1.427	2.326	0.9400
6	0	2.004	0.030	1.970	0.483	1.287	2.534	0.9515
7	0.076	1.924	0.118	1.882	0.419	1.182	2.704	0.9594
8	0.136	1.864	0.185	1.815	0.373	1.099	2.847	0.9650
9	0.184	1.816	0.239	1.761	0.337	1.032	2.970	0.9693
10	0.223	1.777	0.284	1.716	0.308	0.975	3.078	0.9727
11	0.256	1.744	0.321	1.679	0.285	0.927	3.173	0.9754
12	0.283	1.717	0.354	1.646	0.266	0.886	3.258	0.9776
13	0.307	1.693	0.382	1.618	0.249	0.850	3.336	0.9794
14	0.328	1.672	0.406	1.594	0.235	0.817	3.407	0.9810
15	0.347	1.653	0.428	1.572	0.223	0.789	3.472	0.9823
16	0.363	1.637	0.448	1.552	0.212	0.763	3.532	0.9835
17	0.378	1.622	0.466	1.534	0.203	0.739	3.588	0.9845
18	0.391	1.608	0.482	1.518	0.194	0.718	3.640	0.9854
19	0.403	1.579	0.497	1.503	0.187	0.698	3.689	0.9862
20	0.415	1.585	0.510	1.490	0.180	0.680	3.735	0.9869
21	0.425	1.575	0.523	1.477	0.173	0.663	3.778	0.9876
22	0.434	1.566	0.534	1.466	0.167	0.647	3.819	0.9882
23	0.443	1.557	0.545	1.455	0.162	0.633	3.858	0.9887
24	0.451	1.548	0.555	1.445	0.157	0.619	3.895	0.9892
25	0.459	1.541	0.565	1.435	0.153	0.606	3.931	0.9896

### A.3 Critical Values of Student's Distribution with $\nu$ Degree of Freedom

$\nu$	$\alpha$			
	0.2	0.1	0.05	0.01
1	1.376	3.078	6.314	31.821
2	1.061	1.886	2.920	6.965
3	0.978	1.638	2.353	4.541
4	0.941	1.533	2.132	3.747
5	0.920	1.476	2.015	3.365
6	0.906	1.440	1.943	3.143
7	0.896	1.415	1.895	2.998
8	0.889	1.397	1.860	2.896
9	0.883	1.383	1.833	2.821
10	0.879	1.372	1.812	2.764
11	0.876	1.363	1.796	2.718
12	0.873	1.356	1.782	2.681
13	0.870	1.350	1.771	2.650
14	0.868	1.345	1.761	2.624
15	0.866	1.341	1.753	2.602
16	0.865	1.337	1.746	2.583
17	0.863	1.333	1.740	2.567
18	0.862	1.330	1.734	2.552
19	0.861	1.328	1.729	2.539
20	0.860	1.325	1.725	2.528
21	0.859	1.323	1.721	2.518
22	0.858	1.321	1.717	2.508
23	0.858	1.319	1.714	2.500
24	0.857	1.318	1.711	2.492
25	0.856	1.316	1.708	2.485
26	0.856	1.315	1.706	2.479
27	0.855	1.314	1.703	2.473
28	0.855	1.313	1.701	2.467
29	0.854	1.311	1.699	2.462
30	0.854	1.310	1.697	2.457

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