

# Tolerance Factors for Normal Distribution

1- $\gamma$  = confidence  
1- $\alpha$  = proportion of population

## Two-Sided Intervals

n	$\gamma = 0.05$			$\gamma = 0.01$		
	1- $\alpha$			1- $\alpha$		
	0.90	0.95	0.99	0.90	0.95	0.99
2	32.02	37.67	48.43	160.2	188.5	242.3
3	8.380	9.916	12.86	18.93	22.40	29.1
4	5.369	6.370	8.299	9.398	11.15	14.5
5	4.275	5.079	6.634	6.612	7.855	10.3
6	3.712	4.414	5.775	5.337	6.345	8.301
7	3.369	4.007	5.248	4.613	5.488	7.187
8	3.136	3.732	4.891	4.125	4.936	6.468
9	2.967	3.532	4.631	3.822	4.550	5.966
10	2.839	3.379	4.433	3.582	4.265	5.594
11	2.737	3.259	4.277	3.397	4.045	5.308
12	2.655	3.162	4.150	3.250	3.870	5.079
13	2.587	3.081	4.044	3.130	3.727	4.893
14	2.529	3.012	3.955	3.029	3.608	4.737
15	2.480	2.954	3.878	2.945	3.507	4.605
16	2.437	2.903	3.812	2.872	3.421	4.492
17	2.400	2.858	3.754	2.808	3.345	4.393
18	2.366	2.819	3.702	2.753	3.279	4.307
19	2.337	2.784	3.656	2.703	3.221	4.230
20	2.310	2.752	3.615	2.659	3.168	4.161
25	2.208	2.631	3.457	2.494	2.972	3.904
30	2.140	2.549	3.350	2.385	2.841	3.733
35	2.090	2.490	3.272	2.306	2.748	3.611
40	2.052	2.445	3.213	2.247	2.677	3.518
45	2.021	2.408	3.165	2.200	2.621	3.444
50	1.996	2.379	3.126	2.162	2.576	3.385
60	1.958	2.333	3.066	2.103	2.506	3.293
70	1.929	2.299	3.021	2.060	2.454	3.225
80	1.907	2.272	2.986	2.026	2.414	3.173
90	1.889	2.251	2.958	1.999	2.382	3.130
100	1.874	2.233	2.934	1.977	2.355	3.096
150	1.825	2.175	2.859	1.905	2.270	2.983
200	1.798	2.143	2.816	1.865	2.222	2.921
250	1.780	2.121	2.788	1.839	2.191	2.880
300	1.767	2.106	2.767	1.820	2.169	2.850
999	1.645	1.960	2.576	1.645	1.960	2.576

## One-Sided Intervals

n	$\gamma = 0.05$			$\gamma = 0.01$		
	1- $\alpha$			1- $\alpha$		
	0.90	0.95	0.99	0.90	0.95	0.99
2	20.58	26.26	37.09	103.0	131.4	185.6
3	6.156	7.656	10.55	14.00	17.17	23.90
4	4.162	5.144	7.042	7.380	9.083	12.39
5	3.407	4.203	5.741	5.362	6.578	8.939
6	3.006	3.708	5.062	4.411	5.406	7.335
7	2.756	3.400	4.642	3.859	4.728	6.412
8	2.582	3.187	4.354	3.497	4.285	5.812
9	2.454	3.031	4.143	3.241	3.972	5.389
10	2.355	2.911	3.981	3.048	3.738	5.074
11	2.275	2.815	3.852	2.898	3.556	4.829
12	2.210	2.736	3.747	2.777	3.410	4.633
13	2.155	2.671	3.659	2.677	3.290	4.472
14	2.109	2.615	3.585	2.593	3.189	4.337
15	2.068	2.566	3.520	2.522	3.102	4.222
16	2.033	2.524	3.464	2.460	3.028	4.123
17	2.002	2.486	3.414	2.405	2.963	4.037
18	1.974	2.453	3.370	2.357	2.905	3.960
19	1.949	2.423	3.331	2.314	2.854	3.892
20	1.926	2.396	3.295	2.276	2.808	3.832
25	1.838	2.292	3.158	2.129	2.633	3.001
30	1.777	2.220	3.064	2.030	2.516	3.447
35	1.732	2.167	2.995	1.957	2.430	3.334
40	1.697	2.126	2.941	1.902	2.364	3.249
45	1.669	2.092	2.898	1.857	2.312	3.180
50	1.646	2.065	2.863	1.821	2.269	3.125
60	1.609	2.022	2.807	1.764	2.202	3.038
70	1.581	1.990	2.765	1.722	2.153	2.974
80	1.559	1.965	2.733	1.688	2.114	2.924
90	1.542	1.944	2.706	1.661	2.082	2.883
100	1.527	1.927	2.684	1.639	2.056	2.850
150	1.478	1.870	2.611	1.566	1.971	2.741
200	1.450	1.837	2.570	1.524	1.923	2.679
250	1.431	1.815	2.542	1.496	1.891	2.638
300	1.417	1.800	2.522	1.476	1.868	2.608
999	1.282	1.645	2.326	1.282	1.645	2.326