

**A.3 COMMONLY USED NORMAL QUANTILES**

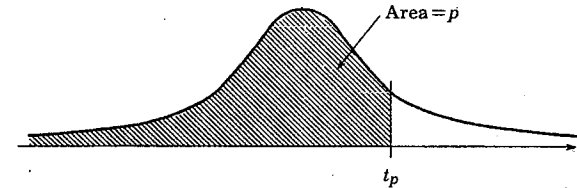
Table A.3 lists commonly used normal quantiles. The confidence levels listed in the first column are for a two-sided confidence intervals. For example, for a two-sided confidence interval at 99%,  $\alpha = 0.01$ ,  $\alpha/2 = 0.005$  and  $z_{0.995} = 2.576$ . For a one-sided confidence interval at 99%,  $\alpha = 0.01$ , and  $z_{1-\alpha} = 2.326$ .

**TABLE A.3 Commonly Used Normal Quantiles**

Confidence Level (%)	$\alpha$	$\alpha/2$	$z_{1-\alpha/2}$
20	0.8	0.4	0.253
40	0.6	0.3	0.524
60	0.4	0.2	0.842
68.26	0.3174	0.1587	1.000
80	0.2	0.1	1.282
90	0.1	0.05	1.645
95	0.05	0.025	1.960
95.46	0.0454	0.0228	2.000
98	0.02	0.01	2.326
99	0.01	0.005	2.576
99.74	0.0026	0.0013	3.000
99.8	0.002	0.001	3.090
99.9	0.001	0.0005	3.29
99.98	0.0002	0.0001	3.72

**A.4 QUANTILES OF THE  $t$  DISTRIBUTION**

Table A.4 lists  $t_{[p;n]}$ . For example, the  $t_{[0.95;13]}$  required for a two-sided 90% confidence interval of the mean of a sample of 14 observation is 1.771.



**TABLE A.4 Quantiles of the  $t$  Distribution**

$n$	$p$							
	0.6000	0.7000	0.8000	0.9000	0.9500	0.9750	0.9950	0.9995
1	0.325	0.727	1.377	3.078	6.314	12.706	63.657	636.619
2	0.289	0.617	1.061	1.886	2.920	4.303	9.925	31.599
3	0.277	0.584	0.978	1.638	2.353	3.182	5.841	12.924
4	0.271	0.569	0.941	1.533	2.132	2.776	4.604	8.610
5	0.267	0.559	0.920	1.476	2.015	2.571	4.032	6.869
6	0.265	0.553	0.906	1.440	1.943	2.447	3.707	5.959
7	0.263	0.549	0.896	1.415	1.895	2.365	3.499	5.408
8	0.262	0.546	0.889	1.397	1.860	2.306	3.355	5.041
9	0.261	0.543	0.883	1.383	1.833	2.262	3.250	4.781
10	0.260	0.542	0.879	1.372	1.812	2.228	3.169	4.587
11	0.260	0.540	0.876	1.363	1.796	2.201	3.106	4.437
12	0.259	0.539	0.873	1.356	1.782	2.179	3.055	4.318
13	0.259	0.538	0.870	1.350	1.771	2.160	3.012	4.221
14	0.258	0.537	0.868	1.345	1.761	2.145	2.977	4.140
15	0.258	0.536	0.866	1.341	1.753	2.131	2.947	4.073
16	0.258	0.535	0.865	1.337	1.746	2.120	2.921	4.015
17	0.257	0.534	0.863	1.333	1.740	2.110	2.898	3.965
18	0.257	0.534	0.862	1.330	1.734	2.101	2.878	3.922
19	0.257	0.533	0.861	1.328	1.729	2.093	2.861	3.883
20	0.257	0.533	0.860	1.325	1.725	2.086	2.845	3.850
21	0.257	0.532	0.859	1.323	1.721	2.080	2.831	3.819
22	0.256	0.532	0.858	1.321	1.717	2.074	2.819	3.792
23	0.256	0.532	0.858	1.319	1.714	2.069	2.807	3.768
24	0.256	0.531	0.857	1.318	1.711	2.064	2.797	3.745
25	0.256	0.531	0.856	1.316	1.708	2.060	2.787	3.725
26	0.256	0.531	0.856	1.315	1.706	2.056	2.779	3.707
27	0.256	0.531	0.855	1.314	1.703	2.052	2.771	3.690
28	0.256	0.530	0.855	1.313	1.701	2.048	2.763	3.674
29	0.256	0.530	0.854	1.311	1.699	2.045	2.756	3.659
30	0.256	0.530	0.854	1.310	1.697	2.042	2.750	3.646
60	0.254	0.527	0.848	1.296	1.671	2.000	2.660	3.460
90	0.254	0.526	0.846	1.291	1.662	1.987	2.632	3.402
120	0.254	0.526	0.845	1.289	1.658	1.980	2.617	3.373