U.S. AIR FORCE Project RAND

OFFSET CIRCLE PROBABILITIES

Numerical Analysis Department

March 14, 1952

R-234

The RAND Corporation
1500 FOURTH ST. • SANTA MONICA • CALIFORNIA

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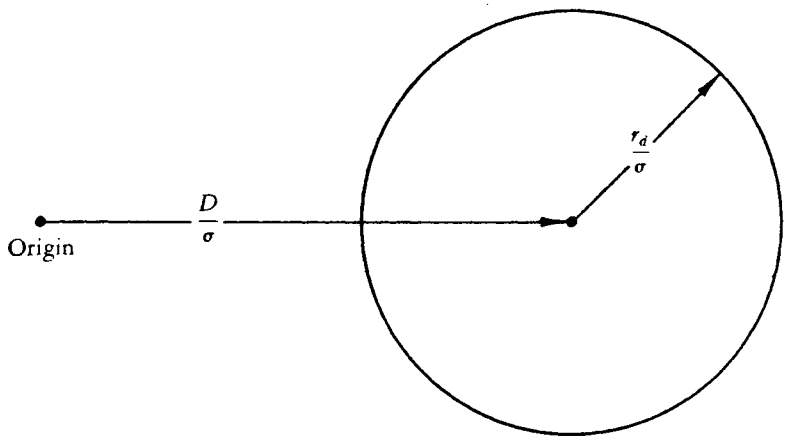
The probabilities of missing (or hitting) an offset circular target are contained in the table on pages 3 through 18. Geometrically speaking, numerical values are given for the volume under the radially symmetrical surface

$$\frac{1}{2\pi} \exp\left[-\frac{1}{2} (\xi^2 + \eta^2) \right],$$

excluding the region above a circle of radius r_d/σ whose center is distant D/σ from the origin.



The total volume under the surface is, of course, unity, and so if p denotes the volume under the surface above the circular region, then $q = 1 - p$ is the tabulated quantity. As a matter of convenience, q is tabulated as a function of $(r_d - D)/\sigma$ and D/σ.

The letters D and r_d denote distances expressed in terms of some convenient unit of length, such as the foot. The letter σ then denotes the accuracy of aim parameter in the bivariate Gaussian distribution

$$\frac{1}{2\pi\sigma^2} \exp\left[-\frac{1}{2} \left(\frac{\xi^2}{\sigma^2} + \frac{\eta^2}{\sigma^2} \right) \right]$$

measured in terms of the same physical unit of length as D and r_d. The letter σ thus denotes the common value of the component standard deviations σ_ξ and σ_η.

* * *

Problem. A single bomb is aimed at a point 120 ft from the center of a circular target of radius 40 ft. The accuracy of aim is described by a radially symmetric Gaussian distribution with $\sigma_\xi = \sigma_\eta = 80$ ft. What is the probability p of hitting the target?

Solution. We first compute

$$\frac{r_d - D}{\sigma} = \frac{40 \text{ ft} - 120 \text{ ft}}{80 \text{ ft}} = -1,$$

$$\frac{D}{\sigma} = \frac{120 \text{ ft}}{80 \text{ ft}} = 1.5,$$

and then enter the table to obtain $q = 0.959$, which is the probability of missing the target. Consequently, $p = 0.041$ is the answer.

CONCERNING THE TABLE

For brevity we write $R = r_d/\sigma$ and $x = D/\sigma$. The unabridged table of $q(R, x)$, from which the present table is derived, contains $6D$ function values for $R = 0.1(0.1)20.0$ and for $x \geq 0$ at an interval of 0.05 over the sensible range of variation of the function.

All values of $q(R, x)$ for $R < 6.0$ were computed by The Institute for Numerical Analysis, National Bureau of Standards. The values for $R \geq 6.0$ were computed on RAND IBM equipment by numerical integration of

$$q(R, x) = \exp\left(-\frac{1}{2}R^2\right) + \int_0^x \exp\left(-\frac{1}{2}R^2 - \frac{1}{2}t^2\right) I_1(Rt) R\, dt. \qquad (1)$$

For each fixed value of R, a string of ordinates was computed for equally spaced values of t, and these ordinates were indefinitely integrated to yield a string of $q(R, x)$ values.

The integral form (1) is but one of several ways in which the $q(R, x)$ function may be expressed. We note several interesting properties of the function below:

$$q(R, R) = \frac{1}{2}\{1 + \exp[-R^2] I_0(R^2)\}, \qquad (2)$$

$$q(R, x) + q(x, R) = 1 + \exp\left[-\frac{1}{2}(R^2 + x^2)\right] I_0(Rx). \qquad (3)$$

Card copies or printed listings of the unabridged $q(R, x)$ table may be obtained by writing to:

The RAND Corporation
1500 Fourth Street
Santa Monica, California

$(r_d - D)/\sigma$

$\frac{D}{\sigma}$	-3.9	-3.8	-3.7	-3.6	-3.5	-3.4	-3.3	-3.2	-3.1	-3.0
.0										
.1										
.2										
.3										
.4										
.5										
.6										
.7										
.8										
.9										
1.0										
1.1										
1.2										
1.3										
1.4										
1.5										
1.6										
1.7										
1.8										
1.9										
2.0										
2.1										
2.2										
2.3										
2.4										
2.5										
2.6										
2.7										
2.8										
2.9										
3.0										1.000
3.1									1.000	1.000
3.2								1.000	1.000	1.000
3.3							1.000	1.000	1.000	1.000
3.4						1.000	1.000	1.000	1.000	1.000
3.5					1.000	1.000	1.000	1.000	1.000	1.000
3.6				1.000	1.000	1.000	1.000	1.000	1.000	1.000
3.7			1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
3.8		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
3.9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999

$(r_d - D)/\sigma$

D/σ	-2.9	-2.8	-2.7	-2.6	-2.5	-2.4	-2.3	-2.2	-2.1	-2.0
.0										
.1										
.2										
.3										
.4										
.5										
.6										
.7										
.8										
.9										
1.0										
1.1										
1.2										
1.3										
1.4										
1.5										
1.6										
1.7										
1.8										
1.9										
2.0										1.000
2.1									1.000	.999
2.2								1.000	1.000	.998
2.3							1.000	1.000	.999	.997
2.4						1.000	1.000	.999	.997	.995
2.5					1.000	1.000	.999	.998	.996	.994
2.6				1.000	1.000	.999	.998	.997	.995	.993
2.7			1.000	1.000	.999	.999	.998	.996	.994	.992
2.8		1.000	1.000	1.000	.999	.998	.997	.995	.993	.991
2.9	1.000	1.000	1.000	.999	.999	.998	.997	.995	.993	.990
3.0	1.000	1.000	.999	.999	.998	.997	.996	.994	.992	.989
3.1	1.000	1.000	.999	.999	.998	.997	.996	.994	.992	.989
3.2	1.000	.999	.999	.999	.998	.997	.995	.993	.991	.988
3.3	1.000	.999	.999	.998	.998	.996	.995	.993	.991	.988
3.4	.999	.999	.999	.998	.997	.996	.995	.993	.990	.987
3.5	.999	.999	.999	.998	.997	.996	.995	.993	.990	.987
3.6	.999	.999	.999	.998	.997	.996	.994	.992	.990	.986
3.7	.999	.999	.998	.998	.997	.996	.994	.992	.989	.986
3.8	.999	.999	.998	.998	.997	.996	.994	.992	.989	.986
3.9	.999	.999	.998	.998	.997	.995	.994	.992	.989	.986

$(r_d - D) / \sigma$

$\frac{D}{\sigma}$	-1.9	-1.8	-1.7	-1.6	-1.5	-1.4	-1.3	-1.2	-1.1	-1.0
.0										
.1										
.2										
.3										
.4										
.5										
.6										
.7										
.8										
.9										
1.0										1.000
1.1									1.000	.997
1.2								1.000	.998	.990
1.3							1.000	.998	.991	.981
1.4						1.000	.998	.992	.983	.970
1.5					1.000	.998	.993	.985	.974	.959
1.6				1.000	.999	.994	.987	.978	.965	.949
1.7			1.000	.999	.995	.989	.981	.970	.956	.940
1.8		1.000	.999	.996	.991	.984	.974	.963	.948	.931
1.9	1.000	.999	.997	.992	.986	.978	.968	.956	.941	.924
2.0	.999	.997	.994	.989	.982	.974	.963	.950	.936	.918
2.1	.998	.995	.991	.985	.978	.969	.959	.946	.930	.913
2.2	.996	.992	.988	.982	.975	.966	.955	.941	.926	.908
2.3	.994	.990	.985	.979	.972	.962	.951	.938	.922	.904
2.4	.992	.988	.983	.977	.969	.960	.948	.935	.919	.901
2.5	.991	.986	.981	.975	.967	.957	.946	.932	.916	.898
2.6	.989	.985	.980	.973	.965	.955	.943	.930	.914	.895
2.7	.988	.984	.978	.971	.963	.953	.941	.928	.911	.893
2.8	.987	.983	.977	.970	.962	.952	.940	.926	.909	.891
2.9	.986	.982	.976	.969	.960	.950	.938	.924	.907	.889
3.0	.985	.981	.975	.968	.959	.949	.937	.922	.906	.887
3.1	.985	.980	.974	.967	.958	.948	.935	.921	.904	.885
3.2	.984	.979	.973	.966	.957	.947	.934	.920	.903	.883
3.3	.984	.979	.973	.965	.956	.946	.933	.918	.901	.882
3.4	.983	.978	.972	.964	.955	.945	.932	.917	.900	.881
3.5	.983	.978	.971	.964	.955	.944	.931	.916	.899	.879
3.6	.982	.977	.971	.963	.954	.943	.930	.915	.898	.878
3.7	.982	.977	.970	.963	.953	.942	.929	.914	.897	.877
3.8	.982	.976	.970	.962	.953	.941	.928	.913	.896	.876
3.9	.981	.976	.969	.962	.952	.941	.928	.912	.895	.875

$(r_d - D)/\sigma$

D/σ	-.9	-.8	-.7	-.6	-.5	-.4	-.3	-.2	-.1	0
.0										1.000
.1									1.000	.995
.2								1.000	.995	.981
.3							1.000	.995	.981	.958
.4						1.000	.995	.982	.959	.929
.5					1.000	.996	.983	.961	.932	.896
.6				1.000	.996	.983	.963	.935	.901	.860
.7			1.000	.996	.984	.965	.939	.907	.868	.825
.8		1.000	.996	.986	.968	.943	.913	.877	.836	.791
.9	1.000	.997	.987	.970	.948	.920	.886	.848	.806	.760
1.0	.997	.988	.973	.952	.927	.896	.860	.821	.778	.733
1.1	.989	.976	.957	.933	.905	.873	.836	.797	.754	.709
1.2	.978	.962	.940	.915	.885	.852	.815	.775	.733	.688
1.3	.966	.947	.924	.897	.867	.833	.796	.756	.715	.671
1.4	.953	.933	.909	.881	.850	.816	.780	.741	.699	.656
1.5	.941	.920	.895	.867	.836	.802	.766	.727	.686	.644
1.6	.930	.908	.883	.855	.824	.790	.754	.716	.675	.633
1.7	.920	.898	.873	.845	.814	.780	.744	.706	.666	.624
1.8	.912	.889	.864	.836	.805	.771	.736	.697	.658	.616
1.9	.904	.882	.856	.828	.797	.764	.728	.690	.651	.610
2.0	.898	.875	.850	.822	.791	.757	.722	.684	.644	.604
2.1	.893	.870	.844	.816	.785	.752	.716	.678	.639	.598
2.2	.888	.865	.839	.811	.780	.747	.711	.673	.634	.593
2.3	.884	.861	.835	.807	.776	.742	.706	.669	.630	.589
2.4	.880	.857	.831	.803	.771	.738	.702	.665	.626	.585
2.5	.877	.854	.828	.799	.768	.734	.699	.661	.622	.582
2.6	.874	.851	.825	.796	.765	.731	.695	.658	.619	.578
2.7	.872	.848	.822	.793	.762	.728	.692	.655	.615	.575
2.8	.869	.846	.819	.790	.759	.725	.689	.652	.613	.572
2.9	.867	.843	.817	.788	.756	.722	.687	.649	.610	.570
3.0	.865	.841	.815	.785	.754	.720	.684	.647	.608	.567
3.1	.863	.839	.813	.783	.752	.718	.682	.644	.605	.565
3.2	.862	.837	.811	.781	.750	.716	.680	.642	.603	.563
3.3	.860	.836	.809	.780	.748	.714	.678	.640	.601	.561
3.4	.859	.834	.807	.778	.746	.712	.676	.638	.599	.559
3.5	.857	.833	.806	.776	.744	.710	.674	.637	.598	.558
3.6	.856	.831	.804	.775	.743	.709	.673	.635	.596	.556
3.7	.855	.830	.803	.773	.741	.707	.671	.633	.594	.554
3.8	.854	.829	.802	.772	.740	.706	.670	.632	.593	.553
3.9	.853	.828	.800	.771	.739	.704	.668	.631	.591	.552

$(r_d - D)/\sigma$

$\frac{D}{\sigma}$	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.995	.980	.956	.923	.882	.835	.783	.726	.667	.607
.1	.980	.956	.923	.883	.836	.784	.727	.668	.608	.548
.2	.957	.925	.885	.838	.787	.731	.672	.613	.553	.494
.3	.926	.887	.842	.791	.736	.679	.620	.561	.502	.446
.4	.891	.847	.798	.744	.688	.630	.572	.514	.458	.404
.5	.853	.805	.754	.699	.643	.586	.529	.473	.420	.369
.6	.815	.765	.712	.658	.602	.546	.492	.439	.388	.340
.7	.778	.727	.674	.620	.566	.512	.460	.409	.361	.316
.8	.743	.693	.641	.588	.536	.484	.434	.385	.340	.297
.9	.712	.663	.612	.560	.510	.460	.412	.366	.322	.282
1.0	.685	.636	.587	.537	.488	.440	.394	.350	.308	.269
1.1	.662	.614	.566	.518	.470	.424	.379	.336	.296	.259
1.2	.642	.596	.549	.502	.455	.410	.367	.326	.287	.250
1.3	.626	.580	.534	.488	.443	.399	.357	.316	.279	.243
1.4	.612	.567	.522	.477	.433	.390	.348	.309	.272	.237
1.5	.600	.556	.511	.467	.424	.381	.341	.302	.266	.232
1.6	.590	.546	.502	.459	.416	.375	.335	.297	.261	.228
1.7	.581	.538	.495	.452	.410	.369	.329	.292	.256	.224
1.8	.574	.531	.488	.446	.404	.363	.324	.287	.253	.220
1.9	.567	.525	.482	.440	.399	.359	.320	.283	.249	.217
2.0	.562	.519	.477	.435	.394	.354	.316	.280	.246	.214
2.1	.557	.514	.472	.431	.390	.351	.313	.277	.243	.212
2.2	.552	.510	.468	.427	.386	.347	.310	.274	.241	.210
2.3	.548	.506	.464	.423	.383	.344	.307	.271	.238	.207
2.4	.544	.502	.461	.420	.380	.341	.304	.269	.236	.205
2.5	.540	.499	.458	.417	.377	.338	.302	.267	.234	.204
2.6	.537	.496	.455	.414	.374	.336	.299	.265	.232	.202
2.7	.534	.493	.452	.412	.372	.334	.297	.263	.230	.201
2.8	.532	.490	.450	.409	.370	.332	.295	.261	.229	.199
2.9	.529	.488	.447	.407	.368	.330	.294	.259	.227	.198
3.0	.527	.486	.445	.405	.366	.328	.292	.258	.226	.197
3.1	.525	.484	.443	.403	.364	.326	.290	.256	.225	.195
3.2	.522	.482	.441	.401	.362	.325	.289	.255	.223	.194
3.3	.521	.480	.439	.399	.361	.323	.287	.254	.222	.193
3.4	.519	.478	.438	.398	.359	.322	.286	.253	.221	.192
3.5	.517	.476	.436	.396	.358	.320	.285	.251	.220	.191
3.6	.515	.475	.434	.395	.356	.319	.284	.250	.219	.190
3.7	.514	.473	.433	.393	.355	.318	.283	.249	.218	.190
3.8	.513	.472	.432	.392	.354	.317	.282	.248	.217	.189
3.9	.511	.471	.430	.391	.353	.316	.281	.248	.217	.188

$(r_d - D)/\sigma$

D/σ	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
.0	.546	.487	.430	.375	.325	.278	.236	.198	.164	.135
.1	.489	.431	.377	.326	.280	.237	.200	.166	.137	.111
.2	.437	.383	.332	.285	.243	.204	.170	.141	.115	.093
.3	.392	.341	.294	.251	.212	.178	.148	.121	.099	.080
.4	.353	.306	.263	.223	.188	.157	.130	.106	.086	.069
.5	.322	.278	.237	.201	.169	.141	.116	.095	.077	.062
.6	.296	.255	.217	.184	.154	.128	.106	.086	.070	.056
.7	.274	.236	.201	.170	.143	.119	.098	.080	.064	.052
.8	.258	.221	.189	.160	.134	.111	.091	.075	.060	.048
.9	.244	.210	.179	.151	.127	.105	.087	.071	.057	.046
1.0	.233	.200	.171	.144	.121	.100	.083	.067	.055	.044
1.1	.224	.193	.164	.139	.116	.096	.079	.065	.052	.042
1.2	.217	.186	.159	.134	.112	.093	.077	.063	.051	.041
1.3	.211	.181	.154	.130	.109	.091	.075	.061	.049	.039
1.4	.205	.176	.150	.127	.106	.088	.073	.059	.048	.038
1.5	.201	.173	.147	.124	.104	.086	.071	.058	.047	.037
1.6	.197	.169	.144	.122	.102	.084	.069	.057	.046	.037
1.7	.194	.166	.141	.119	.100	.083	.068	.055	.045	.036
1.8	.191	.163	.139	.117	.098	.081	.067	.055	.044	.035
1.9	.188	.161	.137	.116	.097	.080	.066	.054	.043	.035
2.0	.185	.159	.135	.114	.095	.079	.065	.053	.043	.034
2.1	.183	.157	.133	.112	.094	.078	.064	.052	.042	.034
2.2	.181	.155	.132	.111	.093	.077	.063	.051	.042	.033
2.3	.179	.154	.130	.110	.092	.076	.062	.051	.041	.033
2.4	.177	.152	.129	.109	.091	.075	.062	.050	.041	.032
2.5	.176	.151	.128	.108	.090	.075	.061	.050	.040	.032
2.6	.174	.149	.127	.107	.089	.074	.061	.049	.040	.032
2.7	.173	.148	.126	.106	.088	.073	.060	.049	.039	.031
2.8	.172	.147	.125	.105	.088	.073	.060	.048	.039	.031
2.9	.171	.146	.124	.104	.087	.072	.059	.048	.039	.031
3.0	.170	.145	.123	.104	.086	.071	.059	.048	.038	.031
3.1	.168	.144	.122	.103	.086	.071	.058	.047	.038	.030
3.2	.168	.143	.122	.102	.085	.071	.058	.047	.038	.030
3.3	.167	.142	.121	.102	.085	.070	.057	.047	.038	.030
3.4	.166	.142	.120	.101	.084	.070	.057	.046	.037	.030
3.5	.165	.141	.120	.101	.084	.069	.057	.046	.037	.030
3.6	.164	.140	.119	.100	.083	.069	.056	.046	.037	.029
3.7	.163	.140	.118	.100	.083	.069	.056	.046	.037	.029
3.8	.163	.139	.118	.099	.083	.068	.056	.045	.037	.029
3.9	.162	.138	.117	.099	.082	.068	.056	.045	.036	.029

$(r_d - D)/\sigma$

$\frac{D}{\sigma}$	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
.0	.110	.089	.071	.056	.044	.034	.026	.020	.015	.011
.1	.090	.072	.057	.045	.035	.027	.020	.015	.011	.008
.2	.075	.059	.047	.036	.028	.021	.016	.012	.009	.007
.3	.063	.050	.039	.030	.023	.018	.013	.010	.007	.005
.4	.055	.044	.034	.026	.020	.015	.012	.009	.006	.005
.5	.049	.039	.030	.023	.018	.014	.010	.008	.006	.004
.6	.044	.035	.027	.021	.016	.012	.009	.007	.005	.004
.7	.041	.032	.025	.019	.015	.011	.009	.006	.005	.003
.8	.038	.030	.024	.018	.014	.011	.008	.006	.004	.003
.9	.036	.029	.022	.017	.013	.010	.008	.006	.004	.003
1.0	.035	.027	.021	.016	.013	.010	.007	.005	.004	.003
1.1	.033	.026	.020	.016	.012	.009	.007	.005	.004	.003
1.2	.032	.025	.020	.015	.012	.009	.007	.005	.004	.003
1.3	.031	.025	.019	.015	.011	.009	.006	.005	.004	.003
1.4	.030	.024	.019	.014	.011	.008	.006	.005	.003	.003
1.5	.030	.023	.018	.014	.011	.008	.006	.005	.003	.002
1.6	.029	.023	.018	.014	.011	.008	.006	.004	.003	.002
1.7	.028	.022	.017	.013	.010	.008	.006	.004	.003	.002
1.8	.028	.022	.017	.013	.010	.008	.006	.004	.003	.002
1.9	.027	.022	.017	.013	.010	.008	.006	.004	.003	.002
2.0	.027	.021	.017	.013	.010	.007	.006	.004	.003	.002
2.1	.027	.021	.016	.013	.010	.007	.005	.004	.003	.002
2.2	.026	.021	.016	.012	.009	.007	.005	.004	.003	.002
2.3	.026	.020	.016	.012	.009	.007	.005	.004	.003	.002
2.4	.026	.020	.016	.012	.009	.007	.005	.004	.003	.002
2.5	.025	.020	.016	.012	.009	.007	.005	.004	.003	.002
2.6	.025	.020	.015	.012	.009	.007	.005	.004	.003	.002
2.7	.025	.020	.015	.012	.009	.007	.005	.004	.003	.002
2.8	.025	.019	.015	.012	.009	.007	.005	.004	.003	.002
2.9	.024	.019	.015	.012	.009	.007	.005	.004	.003	.002
3.0	.024	.019	.015	.011	.009	.007	.005	.004	.003	.002
3.1	.024	.019	.015	.011	.009	.007	.005	.004	.003	.002
3.2	.024	.019	.015	.011	.009	.006	.005	.004	.003	.002
3.3	.024	.019	.014	.011	.009	.006	.005	.004	.003	.002
3.4	.024	.019	.014	.011	.008	.006	.005	.004	.003	.002
3.5	.023	.018	.014	.011	.008	.006	.005	.004	.003	.002
3.6	.023	.018	.014	.011	.008	.006	.005	.004	.003	.002
3.7	.023	.018	.014	.011	.008	.006	.005	.003	.003	.002
3.8	.023	.018	.014	.011	.008	.006	.005	.003	.003	.002
3.9	.023	.018	.014	.011	.008	.006	.005	.003	.003	.002

$(r_d - D)/\sigma$

D/σ	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
.0	.008	.006	.004	.003	.002	.002	.001	.001	.000	.000
.1	.006	.004	.003	.002	.002	.001	.001	.001	.000	.000
.2	.005	.003	.002	.002	.001	.001	.001	.000	.000	.000
.3	.004	.003	.002	.001	.001	.001	.000	.000	.000	.000
.4	.003	.002	.002	.001	.001	.001	.000	.000	.000	.000
.5	.003	.002	.002	.001	.001	.001	.000	.000	.000	.000
.6	.003	.002	.001	.001	.001	.000	.000	.000	.000	.000
.7	.002	.002	.001	.001	.001	.000	.000	.000	.000	.000
.8	.002	.002	.001	.001	.001	.000	.000	.000	.000	.000
.9	.002	.002	.001	.001	.001	.000	.000	.000	.000	.000
1.0	.002	.002	.001	.001	.001	.000	.000	.000	.000	.000
1.1	.002	.001	.001	.001	.001	.000	.000	.000	.000	.000
1.2	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.3	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.4	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.5	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.6	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.7	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.8	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
1.9	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.0	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.1	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.2	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.3	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.4	.002	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.5	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.6	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.7	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.8	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
2.9	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
3.0	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
3.1	.001	.001	.001	.001	.000	.000	.000	.000	.000	.000
3.2	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.3	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.4	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.6	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.7	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.8	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
3.9	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000

$(r_d - D)/\sigma$

D/σ	-3.9	-3.8	-3.7	-3.6	-3.5	-3.4	-3.3	-3.2	-3.1	-3.0
4.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
4.1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
4.2	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
4.3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
4.4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
4.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999
4.6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
4.7	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
4.8	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
4.9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.2	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.7	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.8	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
5.9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
6.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
6.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
7.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999
7.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
8.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
8.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
9.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
9.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
10.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
11.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
12.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
13.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
14.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
15.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
16.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
17.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
18.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
19.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
20.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999
∞	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.999	.999

$(r_d - D)/\sigma$

$\frac{D}{\sigma}$	-2.9	-2.8	-2.7	-2.6	-2.5	-2.4	-2.3	-2.2	-2.1	-2.0
4.0	.999	.999	.998	.998	.997	.995	.994	.991	.989	.985
4.1	.999	.999	.998	.997	.996	.995	.993	.991	.989	.985
4.2	.999	.999	.998	.997	.996	.995	.993	.991	.988	.985
4.3	.999	.999	.998	.997	.996	.995	.993	.991	.988	.985
4.4	.999	.999	.998	.997	.996	.995	.993	.991	.988	.984
4.5	.999	.999	.998	.997	.996	.995	.993	.991	.988	.984
4.6	.999	.999	.998	.997	.996	.995	.993	.991	.988	.984
4.7	.999	.998	.998	.997	.996	.995	.993	.991	.988	.984
4.8	.999	.998	.998	.997	.996	.995	.993	.990	.987	.984
4.9	.999	.998	.998	.997	.996	.994	.993	.990	.987	.984
5.0	.999	.998	.998	.997	.996	.994	.993	.990	.987	.983
5.1	.999	.998	.998	.997	.996	.994	.992	.990	.987	.983
5.2	.999	.998	.998	.997	.996	.994	.992	.990	.987	.983
5.3	.999	.998	.998	.997	.996	.994	.992	.990	.987	.983
5.4	.999	.998	.998	.997	.996	.994	.992	.990	.987	.983
5.5	.999	.998	.998	.997	.996	.994	.992	.990	.987	.983
5.6	.999	.998	.998	.997	.996	.994	.992	.990	.987	.983
5.7	.999	.998	.998	.997	.996	.994	.992	.990	.986	.983
5.8	.999	.998	.998	.997	.996	.994	.992	.990	.986	.982
5.9	.999	.998	.998	.997	.995	.994	.992	.989	.986	.982
6.0	.999	.998	.998	.997	.995	.994	.992	.989	.986	.982
6.5	.999	.998	.997	.997	.995	.994	.992	.989	.986	.982
7.0	.999	.998	.997	.996	.995	.994	.992	.989	.986	.981
7.5	.999	.998	.997	.996	.995	.993	.991	.989	.985	.981
8.0	.999	.998	.997	.996	.995	.993	.991	.988	.985	.981
8.5	.999	.998	.997	.996	.995	.993	.991	.988	.985	.981
9.0	.998	.998	.997	.996	.995	.993	.991	.988	.985	.980
9.5	.998	.998	.997	.996	.995	.993	.991	.988	.985	.980
10.0	.998	.998	.997	.996	.995	.993	.991	.988	.984	.980
11.0	.998	.998	.997	.996	.995	.993	.991	.988	.984	.980
12.0	.998	.998	.997	.996	.995	.993	.991	.988	.984	.980
13.0	.998	.998	.997	.996	.995	.993	.990	.988	.984	.979
14.0	.998	.998	.997	.996	.994	.993	.990	.987	.984	.979
15.0	.998	.998	.997	.996	.994	.993	.990	.987	.984	.979
16.0	.998	.998	.997	.996	.994	.993	.990	.987	.984	.979
17.0	.998	.998	.997	.996	.994	.992	.990	.987	.983	.979
18.0	.998	.998	.997	.996	.994	.992	.990	.987	.983	.979
19.0	.998	.998	.997	.996	.994	.992	.990	.987	.983	.979
20.0	.998	.998	.997	.996	.994	.992	.990	.987	.983	.979
∞	.998	.997	.997	.995	.994	.992	.989	.986	.982	.977

$(r_d - D)/\sigma$

D/σ	-1.9	-1.8	-1.7	-1.6	-1.5	-1.4	-1.3	-1.2	-1.1	-1.0
4.0	.981	.976	.969	.961	.952	.940	.927	.912	.894	.874
4.1	.981	.975	.969	.961	.951	.940	.926	.911	.893	.873
4.2	.980	.975	.968	.960	.950	.939	.926	.910	.893	.872
4.3	.980	.975	.968	.960	.950	.939	.925	.910	.892	.872
4.4	.980	.974	.968	.959	.950	.938	.925	.909	.891	.871
4.5	.980	.974	.967	.959	.949	.938	.924	.908	.890	.870
4.6	.979	.974	.967	.959	.949	.937	.924	.908	.890	.869
4.7	.979	.974	.967	.958	.948	.937	.923	.907	.889	.869
4.8	.979	.973	.966	.958	.948	.936	.923	.907	.889	.868
4.9	.979	.973	.966	.958	.948	.936	.922	.906	.888	.868
5.0	.979	.973	.966	.957	.947	.936	.922	.906	.888	.867
5.1	.979	.973	.966	.957	.947	.935	.921	.905	.887	.867
5.2	.978	.973	.965	.957	.947	.935	.921	.905	.887	.866
5.3	.978	.972	.965	.957	.947	.935	.921	.905	.886	.865
5.4	.978	.972	.965	.956	.946	.934	.920	.904	.886	.865
5.5	.978	.972	.965	.956	.946	.934	.920	.904	.885	.865
5.6	.978	.972	.965	.956	.946	.934	.920	.903	.885	.864
5.7	.978	.972	.964	.956	.945	.933	.919	.903	.885	.864
5.8	.978	.972	.964	.956	.945	.933	.919	.903	.884	.863
5.9	.977	.971	.964	.955	.945	.933	.919	.902	.884	.863
6.0	.977	.971	.964	.955	.945	.933	.918	.902	.883	.863
6.5	.977	.971	.963	.954	.944	.932	.917	.901	.882	.861
7.0	.976	.970	.963	.954	.943	.931	.916	.899	.881	.859
7.5	.976	.970	.962	.953	.942	.930	.915	.898	.879	.858
8.0	.976	.969	.962	.953	.942	.929	.914	.898	.878	.857
8.5	.975	.969	.961	.952	.941	.928	.914	.897	.878	.856
9.0	.975	.969	.961	.952	.941	.928	.913	.896	.877	.855
9.5	.975	.968	.961	.951	.940	.927	.913	.896	.876	.854
10.0	.975	.968	.960	.951	.940	.927	.912	.895	.876	.854
11.0	.974	.968	.960	.950	.939	.926	.911	.894	.875	.853
12.0	.974	.967	.960	.950	.939	.926	.911	.893	.874	.852
13.0	.974	.967	.959	.950	.938	.925	.910	.893	.873	.851
14.0	.974	.967	.959	.949	.938	.925	.909	.892	.872	.850
15.0	.974	.967	.959	.949	.938	.924	.909	.892	.872	.850
16.0	.973	.967	.958	.949	.937	.924	.909	.891	.871	.849
17.0	.973	.966	.958	.949	.937	.924	.908	.891	.871	.849
18.0	.973	.966	.958	.948	.937	.923	.908	.890	.870	.848
19.0	.973	.966	.958	.948	.937	.923	.908	.890	.870	.848
20.0	.973	.966	.958	.948	.936	.923	.908	.890	.870	.847
∞	.971	.964	.955	.945	.933	.919	.903	.885	.864	.841

$(r_d - D)/\sigma$

D/σ	-.9	-.8	-.7	-.6	-.5	-.4	-.3	-.2	-.1	0
4.0	.852	.827	.799	.769	.737	.703	.667	.629	.590	.550
4.1	.851	.826	.798	.768	.736	.702	.666	.628	.589	.549
4.2	.850	.825	.797	.767	.735	.701	.665	.627	.588	.548
4.3	.849	.824	.796	.766	.734	.700	.663	.626	.587	.547
4.4	.848	.823	.795	.765	.733	.699	.662	.625	.586	.546
4.5	.847	.822	.794	.764	.732	.698	.661	.623	.584	.545
4.6	.847	.821	.794	.763	.731	.697	.660	.623	.583	.544
4.7	.846	.821	.793	.763	.730	.696	.659	.622	.583	.543
4.8	.845	.820	.792	.762	.729	.695	.659	.621	.582	.542
4.9	.845	.819	.791	.761	.729	.694	.658	.620	.581	.541
5.0	.844	.819	.791	.760	.728	.693	.657	.619	.580	.540
5.1	.843	.818	.790	.760	.727	.692	.656	.618	.579	.539
5.2	.843	.817	.789	.759	.726	.692	.655	.617	.578	.539
5.3	.842	.817	.789	.758	.726	.691	.655	.617	.578	.538
5.4	.842	.816	.788	.758	.725	.690	.654	.616	.577	.537
5.5	.841	.816	.788	.757	.724	.690	.653	.615	.576	.536
5.6	.841	.815	.787	.756	.724	.689	.653	.615	.576	.536
5.7	.840	.815	.786	.756	.723	.688	.652	.614	.575	.535
5.8	.840	.814	.786	.755	.723	.688	.651	.613	.574	.535
5.9	.840	.814	.785	.755	.722	.687	.651	.613	.574	.534
6.0	.839	.813	.785	.754	.722	.687	.650	.612	.573	.533
6.5	.837	.811	.783	.752	.719	.684	.648	.610	.571	.531
7.0	.836	.810	.781	.750	.717	.682	.646	.607	.568	.529
7.5	.834	.808	.779	.748	.715	.680	.644	.606	.566	.527
8.0	.833	.807	.778	.747	.714	.679	.642	.604	.565	.525
8.5	.832	.806	.777	.746	.713	.677	.641	.602	.563	.524
9.0	.831	.805	.776	.745	.711	.676	.639	.601	.562	.522
9.5	.830	.804	.775	.744	.710	.675	.638	.600	.561	.521
10.0	.830	.803	.774	.743	.709	.674	.637	.599	.560	.520
11.0	.828	.802	.772	.741	.708	.672	.635	.597	.558	.518
12.0	.827	.800	.771	.740	.706	.671	.634	.596	.556	.517
13.0	.826	.799	.770	.739	.705	.670	.633	.594	.555	.515
14.0	.826	.799	.769	.738	.704	.669	.632	.593	.554	.514
15.0	.825	.798	.769	.737	.703	.668	.631	.592	.553	.513
16.0	.824	.797	.768	.736	.703	.667	.630	.592	.552	.512
17.0	.824	.797	.767	.736	.702	.666	.629	.591	.552	.512
18.0	.823	.796	.767	.735	.701	.666	.629	.590	.551	.511
19.0	.823	.796	.766	.735	.701	.665	.628	.590	.550	.511
20.0	.823	.795	.766	.734	.700	.665	.627	.589	.550	.510
∞	.816	.788	.758	.726	.691	.655	.618	.579	.540	.500

$(r_d - D)/\sigma$

D/σ	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
4.0	.510	.469	.429	.390	.352	.315	.280	.247	.216	.187
4.1	.509	.468	.428	.389	.351	.314	.279	.246	.215	.187
4.2	.507	.467	.427	.388	.350	.313	.278	.245	.214	.186
4.3	.506	.466	.426	.387	.349	.312	.277	.244	.214	.185
4.4	.505	.465	.425	.386	.348	.311	.276	.244	.213	.185
4.5	.504	.464	.424	.385	.347	.310	.276	.243	.212	.184
4.6	.503	.463	.423	.384	.346	.310	.275	.242	.212	.184
4.7	.502	.462	.422	.383	.345	.309	.274	.242	.211	.183
4.8	.502	.461	.421	.382	.344	.308	.274	.241	.211	.183
4.9	.501	.460	.421	.382	.344	.307	.273	.240	.210	.182
5.0	.500	.460	.420	.381	.343	.307	.272	.240	.210	.182
5.1	.499	.459	.419	.380	.342	.306	.272	.239	.209	.181
5.2	.498	.458	.418	.379	.342	.306	.271	.239	.209	.181
5.3	.498	.457	.418	.379	.341	.305	.271	.238	.208	.181
5.4	.497	.457	.417	.378	.341	.304	.270	.238	.208	.180
5.5	.496	.456	.416	.378	.340	.304	.270	.237	.207	.180
5.6	.496	.455	.416	.377	.339	.303	.269	.237	.207	.179
5.7	.495	.455	.415	.376	.339	.303	.269	.237	.207	.179
5.8	.494	.454	.415	.376	.338	.302	.268	.236	.206	.179
5.9	.494	.454	.414	.375	.338	.302	.268	.236	.206	.178
6.0	.493	.453	.414	.375	.337	.301	.267	.235	.206	.178
6.5	.491	.451	.411	.373	.335	.299	.265	.234	.204	.177
7.0	.488	.449	.409	.371	.333	.298	.264	.232	.203	.175
7.5	.487	.447	.407	.369	.332	.296	.262	.231	.201	.174
8.0	.485	.445	.406	.367	.330	.295	.261	.230	.200	.173
8.5	.483	.444	.404	.366	.329	.294	.260	.229	.199	.173
9.0	.482	.442	.403	.365	.328	.292	.259	.228	.199	.172
9.5	.481	.441	.402	.364	.327	.292	.258	.227	.198	.171
10.0	.480	.440	.401	.363	.326	.291	.257	.226	.197	.170
11.0	.478	.438	.399	.361	.324	.289	.256	.225	.196	.169
12.0	.477	.437	.398	.360	.323	.288	.255	.224	.195	.169
13.0	.475	.436	.397	.359	.322	.287	.254	.223	.194	.168
14.0	.474	.435	.396	.358	.321	.286	.253	.222	.193	.167
15.0	.473	.434	.395	.357	.320	.285	.252	.221	.193	.167
16.0	.473	.433	.394	.356	.319	.285	.252	.221	.192	.166
17.0	.472	.432	.393	.355	.319	.284	.251	.220	.192	.166
18.0	.471	.432	.393	.355	.318	.283	.251	.220	.191	.165
19.0	.471	.431	.392	.354	.318	.283	.250	.219	.191	.165
20.0	.470	.430	.392	.354	.317	.283	.250	.219	.191	.165
∞	.460	.421	.382	.345	.309	.274	.242	.212	.184	.159

$(r_d - D)/\sigma$

$\frac{D}{\sigma}$	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
4.0	.161	.138	.117	.098	.082	.068	.055	.045	.036	.029
4.1	.161	.137	.116	.098	.081	.067	.055	.045	.036	.029
4.2	.160	.137	.116	.097	.081	.067	.055	.045	.036	.029
4.3	.160	.136	.116	.097	.081	.067	.055	.044	.036	.028
4.4	.159	.136	.115	.097	.081	.066	.054	.044	.036	.028
4.5	.159	.135	.115	.096	.080	.066	.054	.044	.035	.028
4.6	.158	.135	.114	.096	.080	.066	.054	.044	.035	.028
4.7	.158	.135	.114	.096	.080	.066	.054	.044	.035	.028
4.8	.157	.134	.114	.095	.079	.066	.054	.044	.035	.028
4.9	.157	.134	.113	.095	.079	.065	.053	.043	.035	.028
5.0	.156	.134	.113	.095	.079	.065	.053	.043	.035	.028
5.1	.156	.133	.113	.095	.079	.065	.053	.043	.035	.028
5.2	.156	.133	.112	.094	.079	.065	.053	.043	.035	.028
5.3	.155	.133	.112	.094	.078	.065	.053	.043	.034	.027
5.4	.155	.132	.112	.094	.078	.064	.053	.043	.034	.027
5.5	.155	.132	.112	.094	.078	.064	.053	.043	.034	.027
5.6	.154	.132	.111	.093	.078	.064	.052	.043	.034	.027
5.7	.154	.131	.111	.093	.078	.064	.052	.042	.034	.027
5.8	.154	.131	.111	.093	.077	.064	.052	.042	.034	.027
5.9	.153	.131	.111	.093	.077	.064	.052	.042	.034	.027
6.0	.153	.131	.110	.093	.077	.064	.052	.042	.034	.027
6.5	.152	.129	.109	.092	.076	.063	.051	.042	.033	.027
7.0	.151	.128	.109	.091	.076	.062	.051	.041	.033	.026
7.5	.150	.128	.108	.090	.075	.062	.051	.041	.033	.026
8.0	.149	.127	.107	.090	.075	.061	.050	.041	.033	.026
8.5	.148	.126	.107	.089	.074	.061	.050	.040	.032	.026
9.0	.147	.126	.106	.089	.074	.061	.050	.040	.032	.026
9.5	.147	.125	.106	.088	.073	.060	.049	.040	.032	.025
10.0	.146	.125	.105	.088	.073	.060	.049	.040	.032	.025
11.0	.145	.124	.104	.087	.073	.060	.049	.039	.032	.025
12.0	.145	.123	.104	.087	.072	.059	.048	.039	.031	.025
13.0	.144	.122	.103	.086	.072	.059	.048	.039	.031	.025
14.0	.143	.122	.103	.086	.071	.059	.048	.039	.031	.025
15.0	.143	.121	.102	.086	.071	.058	.048	.038	.031	.024
16.0	.142	.121	.102	.085	.071	.058	.047	.038	.031	.024
17.0	.142	.121	.102	.085	.071	.058	.047	.038	.031	.024
18.0	.142	.120	.101	.085	.070	.058	.047	.038	.030	.024
19.0	.141	.120	.101	.085	.070	.058	.047	.038	.030	.024
20.0	.141	.120	.101	.084	.070	.058	.047	.038	.030	.024
∞	.136	.115	.097	.081	.067	.055	.045	.036	.029	.023

$(r_d - D)/\sigma$

D/b	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
4.0	.023	.018	.014	.011	.008	.006	.005	.003	.003	.002
4.1	.023	.018	.014	.011	.008	.006	.005	.003	.002	.002
4.2	.023	.018	.014	.011	.008	.006	.005	.003	.002	.002
4.3	.022	.018	.014	.011	.008	.006	.005	.003	.002	.002
4.4	.022	.018	.014	.010	.008	.006	.005	.003	.002	.002
4.5	.022	.017	.014	.010	.008	.006	.004	.003	.002	.002
4.6	.022	.017	.014	.010	.008	.006	.004	.003	.002	.002
4.7	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
4.8	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
4.9	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.0	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.1	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.2	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.3	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.4	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.5	.022	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.6	.021	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.7	.021	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.8	.021	.017	.013	.010	.008	.006	.004	.003	.002	.002
5.9	.021	.017	.013	.010	.008	.006	.004	.003	.002	.002
6.0	.021	.017	.013	.010	.008	.006	.004	.003	.002	.002
6.5	.021	.016	.013	.010	.007	.006	.004	.003	.002	.002
7.0	.021	.016	.013	.010	.007	.006	.004	.003	.002	.002
7.5	.021	.016	.012	.010	.007	.006	.004	.003	.002	.002
8.0	.020	.016	.012	.010	.007	.005	.004	.003	.002	.002
8.5	.020	.016	.012	.009	.007	.005	.004	.003	.002	.002
9.0	.020	.016	.012	.009	.007	.005	.004	.003	.002	.002
9.5	.020	.016	.012	.009	.007	.005	.004	.003	.002	.002
10.0	.020	.016	.012	.009	.007	.005	.004	.003	.002	.002
11.0	.020	.015	.012	.009	.007	.005	.004	.003	.002	.002
12.0	.020	.015	.012	.009	.007	.005	.004	.003	.002	.002
13.0	.019	.015	.012	.009	.007	.005	.004	.003	.002	.002
14.0	.019	.015	.012	.009	.007	.005	.004	.003	.002	.002
15.0	.019	.015	.012	.009	.007	.005	.004	.003	.002	.001
16.0	.019	.015	.012	.009	.007	.005	.004	.003	.002	.001
17.0	.019	.015	.012	.009	.007	.005	.004	.003	.002	.001
18.0	.019	.015	.011	.009	.007	.005	.004	.003	.002	.001
19.0	.019	.015	.011	.009	.007	.005	.004	.003	.002	.001
20.0	.019	.015	.011	.009	.007	.005	.004	.003	.002	.001
∞	.018	.014	.011	.008	.006	.005	.003	.003	.002	.001

$(r_d - D)/\sigma$

d/b	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
4.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.1	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.2	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.3	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.4	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.6	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.7	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.8	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
4.9	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.1	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.2	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.3	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.4	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.6	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.7	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.8	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
5.9	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
6.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
6.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
7.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
7.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
8.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
8.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
9.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
9.5	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
10.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
11.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
12.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
13.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
14.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
15.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
16.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
17.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
18.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
19.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
20.0	.001	.001	.001	.000	.000	.000	.000	.000	.000	.000
∞	.001	.001	.000	.000	.000	.000	.000	.000	.000	.000