

Table 9.3

BESSEL FUNCTIONS—ORDERS 10, 11, 20 AND 21

x	$10^{10}x^{-10}J_{10}(x)$	$10^{11}x^{-11}J_{11}(x)$	$10^{-9}x^{10}Y_{10}(x)$	$10^{25}x^{-20}J_{20}(x)$	$10^{27}x^{-21}J_{21}(x)$	$10^{-23}x^{20}Y_{20}(x)$
0.0	2.69114 446	1.22324 748	-0.11828 049	3.91990	9.33311	-0.406017
0.1	2.69053 290	1.22299 266	-0.11831 335	3.91944	9.33205	-0.406071
0.2	2.68869 898	1.22222 850	-0.11841 200	3.91804	9.32886	-0.406231
0.3	2.68564 500	1.22095 588	-0.11857 661	3.91571	9.32357	-0.406499
0.4	2.68137 477	1.21917 626	-0.11880 750	3.91244	9.31615	-0.406873
0.5	2.67589 362	1.21689 169	-0.11910 510	3.90825	9.30663	-0.407355
0.6	2.66920 838	1.21410 481	-0.11946 998	3.90314	9.29500	-0.407945
0.7	2.66132 738	1.21081 883	-0.11990 282	3.89710	9.28128	-0.408644
0.8	2.65226 043	1.20703 750	-0.12040 444	3.89015	9.26546	-0.409452
0.9	2.64201 878	1.20276 518	-0.12097 581	3.88228	9.24758	-0.410369
1.0	2.63061 512	1.19800 675	-0.12161 801	3.87350	9.22762	-0.411397
1.1	2.61806 358	1.19276 764	-0.12233 229	3.86383	9.20562	-0.412536
1.2	2.60437 963	1.18705 385	-0.12312 002	3.85325	9.18157	-0.413788
1.3	2.58958 012	1.18087 185	-0.12398 273	3.84179	9.15550	-0.415153
1.4	2.57368 323	1.17422 867	-0.12492 212	3.82945	9.12743	-0.416632
1.5	2.55670 842	1.16713 182	-0.12594 004	3.81624	9.09737	-0.418228
1.6	2.53867 639	1.15958 931	-0.12703 852	3.80216	9.06534	-0.419940
1.7	2.51960 907	1.15160 961	-0.12821 977	3.78723	9.03137	-0.421771
1.8	2.49952 955	1.14320 168	-0.12948 616	3.77146	8.99546	-0.423722
1.9	2.47846 207	1.13437 488	-0.13084 030	3.75485	8.95766	-0.425795
2.0	2.45643 192	1.12513 904	-0.13228 497	3.73742	8.91797	-0.427992
2.1	2.43346 545	1.11550 438	-0.13382 319	3.71918	8.87643	-0.430315
2.2	2.40959 000	1.10548 152	-0.13545 821	3.70015	8.83306	-0.432764
2.3	2.38483 384	1.09508 144	-0.13719 351	3.68032	8.78790	-0.435344
2.4	2.35922 612	1.08431 551	-0.13903 284	3.65973	8.74096	-0.438056
2.5	2.33279 682	1.07319 540	-0.14098 022	3.63837	8.69228	-0.440902
2.6	2.30557 673	1.06173 312	-0.14303 997	3.61627	8.64189	-0.443885
2.7	2.27759 732	1.04994 098	-0.14521 672	3.59344	8.58981	-0.447007
2.8	2.24889 074	1.03783 155	-0.14751 543	3.56989	8.53609	-0.450272
2.9	2.21948 976	1.02541 767	-0.14994 141	3.54564	8.48076	-0.453682
3.0	2.18942 770	1.01271 242	-0.15250 037	3.52071	8.42385	-0.457241
3.1	2.15873 836	0.99972 906	-0.15519 840	3.49510	8.36539	-0.460951
3.2	2.12745 598	0.98648 108	-0.15804 206	3.46885	8.30542	-0.464816
3.3	2.09561 517	0.97298 213	-0.16103 836	3.44195	8.24397	-0.468840
3.4	2.06325 085	0.95924 599	-0.16419 482	3.41444	8.18110	-0.473027
3.5	2.03039 820	0.94528 659	-0.16751 951	3.38633	8.11682	-0.477379
3.6	1.99709 260	0.93111 794	-0.17102 110	3.35763	8.05119	-0.481902
3.7	1.96336 956	0.91675 415	-0.17470 889	3.32837	7.98424	-0.486600
3.8	1.92926 467	0.90220 939	-0.17859 286	3.29855	7.91600	-0.491476
3.9	1.89481 352	0.88749 785	-0.18268 376	3.26821	7.84653	-0.496537
4.0	1.86005 168	0.87263 375	-0.18699 314	3.23736	7.77586	-0.501786
4.1	1.82501 462	0.85763 130	-0.19153 346	3.20601	7.70403	-0.507229
4.2	1.78973 765	0.84250 469	-0.19631 812	3.17419	7.63108	-0.512872
4.3	1.75425 588	0.82726 806	-0.20136 159	3.14192	7.55707	-0.518719
4.4	1.71860 416	0.81193 548	-0.20667 950	3.10921	7.48202	-0.524777
4.5	1.68281 701	0.79652 093	-0.21228 873	3.07608	7.40598	-0.531051
4.6	1.64692 860	0.78103 829	-0.21820 757	3.04256	7.32900	-0.537549
4.7	1.61097 267	0.76550 130	-0.22445 582	3.00866	7.25112	-0.544276
4.8	1.57498 249	0.74992 357	-0.23105 498	2.97440	7.17238	-0.551240
4.9	1.53899 084	0.73431 852	-0.23802 840	2.93981	7.09282	-0.558448
5.0	1.50302 991	0.71869 942	-0.24540 147	2.90490	7.01250	-0.565907
	$\begin{bmatrix} (-4)2 \\ 5 \end{bmatrix}$	$\begin{bmatrix} (-5)6 \\ 5 \end{bmatrix}$	$\begin{bmatrix} (-5)5 \\ 5 \end{bmatrix}$	$\begin{bmatrix} (-4)1 \\ 3 \end{bmatrix}$	$\begin{bmatrix} (-4)3 \\ 3 \end{bmatrix}$	$\begin{bmatrix} (-5)3 \\ 3 \end{bmatrix}$

$$J_{n+1}(x) = \frac{2n}{x} J_n(x) - J_{n-1}(x)$$

$$Y_{n+1}(x) = \frac{2n}{x} Y_n(x) - Y_{n-1}(x)$$

Compiled from British Association for the Advancement of Science, Bessel functions, Part II. Functions of positive integer order, Mathematical Tables, vol. X (Cambridge Univ. Press, Cambridge, England, 1952), L. Fox, A short table for Bessel functions of integer orders and large arguments. Royal Society Shorter Mathematical Tables No. 3 (Cambridge Univ. Press, Cambridge, England, 1954), and Mathematical Tables Project, Table of $f_n(x) = n!(\frac{1}{2}x)^{-n}J_n(x)$. J. Math. Phys. 23, 45-60 (1944) (with permission).

BESSEL FUNCTIONS—ORDERS 10, 11, 20 AND 21

Table 9.3

x	$10^{10}x^{-10}J_{10}(x)$	$10^{11}x^{-11}J_{11}(x)$	$10^{-9}x^{10}Y_{10}(x)$	$10^{25}x^{-20}J_{20}(x)$	$10^{27}x^{-21}J_{21}(x)$	$10^{-23}x^{20}Y_{20}(x)$
5.0	1.50302 991	0.71869 942	-0.24540 147	2.90490	7.01250	-0.565907
5.1	1.46713 132	0.70307 931	-0.25320 186	2.86969	6.93145	-0.573626
5.2	1.43132 603	0.68747 104	-0.26145 975	2.83421	6.84971	-0.581612
5.3	1.39564 431	0.67188 722	-0.27020 813	2.79846	6.76734	-0.589875
5.4	1.36011 571	0.65634 019	-0.27948 304	2.76248	6.68437	-0.598423
5.5	1.32476 904	0.64084 205	-0.28932 400	2.72628	6.60085	-0.607266
5.6	1.28963 229	0.62540 463	-0.29977 431	2.68988	6.51682	-0.616414
5.7	1.25473 264	0.61003 945	-0.31088 154	2.65330	6.43233	-0.625876
5.8	1.22009 642	0.59475 774	-0.32269 795	2.61656	6.34742	-0.635663
5.9	1.18574 907	0.57957 041	-0.33528 105	2.57967	6.26213	-0.645788
6.0	1.15171 513	0.56448 805	-0.34869 413	2.54267	6.17651	-0.656261
6.1	1.11801 822	0.54952 091	-0.36300 693	2.50556	6.09059	-0.667094
6.2	1.08468 098	0.53467 890	-0.37829 631	2.46837	6.00443	-0.678301
6.3	1.05172 510	0.51997 158	-0.39464 698	2.43111	5.91806	-0.689895
6.4	1.01917 129	0.50540 814	-0.41215 232	2.39381	5.83152	-0.701890
6.5	0.98703 926	0.49099 740	-0.43091 524	2.35647	5.74485	-0.714300
6.6	0.95534 769	0.47674 781	-0.45104 907	2.31913	5.65810	-0.727140
6.7	0.92411 427	0.46266 745	-0.47267 855	2.28179	5.57131	-0.740427
6.8	0.89335 563	0.44876 400	-0.49594 084	2.24448	5.48451	-0.754178
6.9	0.86308 740	0.43504 477	-0.52098 648	2.20721	5.39775	-0.768410
7.0	0.83332 414	0.42151 665	-0.54798 051	2.17000	5.31106	-0.783140
7.1	0.80407 941	0.40818 616	-0.57710 346	2.13286	5.22448	-0.798389
7.2	0.77536 570	0.39505 943	-0.60855 234	2.09582	5.13805	-0.814177
7.3	0.74719 450	0.38214 216	-0.64254 159	2.05888	5.05181	-0.830524
7.4	0.71957 626	0.36943 970	-0.67930 390	2.02206	4.96579	-0.847452
7.5	0.69252 040	0.35695 696	-0.71909 088	1.98539	4.88002	-0.864985
7.6	0.66603 536	0.34469 850	-0.76217 356	1.94887	4.79455	-0.883147
7.7	0.64012 854	0.33266 845	-0.80884 258	1.91252	4.70940	-0.901963
7.8	0.61480 640	0.32087 058	-0.85940 807	1.87635	4.62461	-0.921460
7.9	0.59007 439	0.30930 826	-0.91419 914	1.84038	4.54021	-0.941665
8.0	0.56593 704	0.29798 448	-0.97356 279	1.80462	4.45624	-0.962608
8.1	0.54239 791	0.28690 187	-1.03786 231	1.76908	4.37272	-0.984319
8.2	0.51945 967	0.27606 265	-1.10747 485	1.73378	4.28968	-1.006831
8.3	0.49712 408	0.26546 873	-1.18278 826	1.69874	4.20716	-1.030178
8.4	0.47539 201	0.25512 162	-1.26419 685	1.66395	4.12518	-1.054394
8.5	0.45426 352	0.24502 250	-1.35209 608	1.62944	4.04377	-1.079518
8.6	0.43373 779	0.23517 220	-1.44687 598	1.59521	3.96296	-1.105589
8.7	0.41381 323	0.22557 121	-1.54891 312	1.56128	3.88277	-1.132647
8.8	0.39448 748	0.21621 969	-1.65856 097	1.52765	3.80323	-1.160736
8.9	0.37575 740	0.20711 750	-1.77613 854	1.49434	3.72436	-1.189902
9.0	0.35761 917	0.19826 418	-1.90191 706	1.46136	3.64619	-1.220192
9.1	0.34006 823	0.18965 897	-2.03610 452	1.42872	3.56873	-1.251657
9.2	0.32309 939	0.18130 082	-2.17882 801	1.39641	3.49201	-1.284351
9.3	0.30670 683	0.17318 839	-2.33011 366	1.36447	3.41606	-1.318328
9.4	0.29088 411	0.16532 010	-2.48986 396	1.33288	3.34088	-1.353647
9.5	0.27562 422	0.15769 409	-2.65783 251	1.30166	3.26651	-1.390372
9.6	0.26091 963	0.15030 825	-2.83359 602	1.27082	3.19294	-1.428567
9.7	0.24676 227	0.14316 025	-3.01652 353	1.24036	3.12022	-1.468301
9.8	0.23314 362	0.13624 751	-3.20574 283	1.21029	3.04834	-1.509646
9.9	0.22005 470	0.12956 726	-3.40010 421	1.18061	2.97733	-1.552680
10.0	0.20748 611	0.12311 653	-3.59814 152	1.15134	2.90720	-1.597484
	$\begin{bmatrix} (-5)8 \\ 5 \end{bmatrix}$	$\begin{bmatrix} (-5)3 \\ 5 \end{bmatrix}$	$\begin{bmatrix} (-3)1 \\ 7 \end{bmatrix}$	$\begin{bmatrix} (-5)5 \\ 3 \end{bmatrix}$	$\begin{bmatrix} (-4)1 \\ 3 \end{bmatrix}$	$\begin{bmatrix} (-4)2 \\ 4 \end{bmatrix}$

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BESSEL FUNCTIONS—ORDERS 10, 11, 20 AND 21

x	$J_{10}(x)$	$J_{11}(x)$	$Y_{10}(x)$	$10^{25}x^{-20}J_{20}(x)$	$10^{27}x^{-21}J_{21}(x)$	$10^{-23}x^{20}Y_{20}(x)$
10.0	0.20748 611	0.12311 653	-0.35981 415	1.151337	2.907199	-1.59748
10.1	0.21587 417	0.13041 285	-0.34383 078	1.122469	2.837961	-1.64414
10.2	0.22413 707	0.13787 866	-0.32793 809	1.094012	2.769629	-1.69275
10.3	0.23223 256	0.14549 509	-0.31207 433	1.065970	2.702215	-1.74339
10.4	0.24011 699	0.15324 123	-0.29618 615	1.038347	2.635729	-1.79618
10.5	0.24774 554	0.16109 407	-0.28022 819	1.011148	2.570182	-1.85121
10.6	0.25507 240	0.16902 861	-0.26416 276	0.984374	2.505582	-1.90861
10.7	0.26205 109	0.17701 780	-0.24795 949	0.958030	2.441939	-1.96848
10.8	0.26863 466	0.18503 266	-0.23159 513	0.932118	2.379259	-2.03097
10.9	0.27477 603	0.19304 230	-0.21505 324	0.906639	2.317550	-2.09619
11.0	0.28042 823	0.20101 401	-0.19832 403	0.881596	2.256817	-2.16430
11.1	0.28554 479	0.20891 340	-0.18140 409	0.856989	2.197065	-2.23544
11.2	0.29007 999	0.21670 446	-0.16429 620	0.832821	2.138299	-2.30977
11.3	0.29398 925	0.22434 974	-0.14700 917	0.809092	2.080523	-2.38746
11.4	0.29722 944	0.23181 048	-0.12955 753	0.785801	2.023738	-2.46870
11.5	0.29975 923	0.23904 680	-0.11196 142	0.762950	1.967947	-2.55367
11.6	0.30153 946	0.24601 789	-0.09424 628	0.740539	1.913152	-2.64257
11.7	0.30253 345	0.25268 218	-0.07644 263	0.718565	1.859352	-2.73563
11.8	0.30270 737	0.25899 761	-0.05858 580	0.697029	1.806548	-2.83307
11.9	0.30203 061	0.26492 183	-0.04071 566	0.675930	1.754740	-2.93513
12.0	0.30047 604	0.27041 248	-0.02287 631	0.655266	1.703925	-3.04208
12.1	0.29802 036	0.27542 744	-0.00511 577	0.635035	1.654102	-3.15419
12.2	0.29464 445	0.27992 508	+0.01251 441	0.615236	1.605267	-3.27175
12.3	0.29033 357	0.28386 459	0.02995 946	0.595866	1.557418	-3.39509
12.4	0.28507 771	0.28720 623	0.04716 182	0.576923	1.510551	-3.52453
12.5	0.27887 175	0.28991 166	0.06406 154	0.558403	1.464660	-3.66044
12.6	0.27171 575	0.29194 422	0.08059 668	0.540305	1.419743	-3.80321
12.7	0.26361 509	0.29326 923	0.09670 381	0.522625	1.375791	-3.95323
12.8	0.25458 064	0.29385 431	0.11231 845	0.505359	1.332800	-4.11095
12.9	0.24462 889	0.29366 968	0.12737 554	0.488504	1.290762	-4.27684
13.0	0.23378 201	0.29268 843	0.14180 995	0.472056	1.249671	-4.45140
13.1	0.22206 793	0.29088 684	0.15555 698	0.456011	1.209520	-4.63518
13.2	0.20952 032	0.28824 464	0.16855 286	0.440365	1.170299	-4.82874
13.3	0.19617 859	0.28474 526	0.18073 529	0.425114	1.132001	-5.03272
13.4	0.18208 776	0.28037 612	0.19204 392	0.410252	1.094617	-5.24778
13.5	0.16729 840	0.27512 884	0.20242 090	0.395776	1.058137	-5.47464
13.6	0.15186 646	0.26899 942	0.21181 137	0.381681	1.022552	-5.71407
13.7	0.13585 302	0.26198 851	0.22016 393	0.367961	0.987853	-5.96691
13.8	0.11932 411	0.25410 149	0.22743 118	0.354612	0.954028	-6.23405
13.9	0.10235 036	0.24534 866	0.23357 014	0.341628	0.921067	-6.51646
14.0	0.08500 671	0.23574 535	0.23854 273	0.329005	0.888960	-6.81520
14.1	0.06737 200	0.22531 197	0.24231 614	0.316736	0.857694	-7.13138
14.2	0.04952 862	0.21407 407	0.24486 329	0.304816	0.827260	-7.46624
14.3	0.03156 199	0.20206 238	0.24616 313	0.293240	0.797644	-7.82110
14.4	+0.01356 013	0.18931 275	0.24620 100	0.282001	0.768835	-8.19739
14.5	-0.00438 689	0.17586 611	0.24496 888	0.271095	0.740821	-8.59667
14.6	-0.02218 745	0.16176 836	0.24246 568	0.260516	0.713590	-9.02062
14.7	-0.03974 898	0.14707 028	0.23869 741	0.250257	0.687129	-9.47109
14.8	-0.05697 854	0.13182 729	0.23367 730	0.240312	0.661426	-9.95006
14.9	-0.07378 344	0.11609 931	0.22742 597	0.230676	0.636467	-10.45971
15.0	-0.09007 181 $\left[\begin{smallmatrix} (-4)1 \\ 6 \end{smallmatrix} \right]$	0.09995 048 $\left[\begin{smallmatrix} (-4)1 \\ 5 \end{smallmatrix} \right]$	0.21997 141 $\left[\begin{smallmatrix} (-4)2 \\ 6 \end{smallmatrix} \right]$	0.221343 $\left[\begin{smallmatrix} (-5)6 \\ 3 \end{smallmatrix} \right]$	0.612240 $\left[\begin{smallmatrix} (-4)1 \\ 4 \end{smallmatrix} \right]$	-11.00239 $\left[\begin{smallmatrix} (-3)4 \\ 4 \end{smallmatrix} \right]$

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x	$J_{10}(x)$	$J_{11}(x)$	$Y_{10}(x)$	$10^{25}x^{-20}J_{20}(x)$	$10^{27}x^{-21}J_{21}(x)$	$10^{-23}x^{20}Y_{20}(x)$
15.0	-0.09007 181	0.09995 048	0.21997 141	0.22134 33	0.61224 04	- 11.0024
15.1	-0.10575 330	0.08344 886	0.21134 904	0.21230 71	0.58873 25	- 11.5807
15.2	-0.12073 964	0.06666 618	0.20160 159	0.20356 16	0.56593 06	- 12.1974
15.3	-0.13494 535	0.04967 738	0.19077 902	0.19510 08	0.54382 12	- 12.8555
15.4	-0.14828 828	0.03256 035	0.17893 834	0.18691 87	0.52239 14	- 13.5585
15.5	-0.16069 032	+0.01539 539	0.16614 338	0.17900 91	0.50162 76	- 14.3098
15.6	-0.17207 791	-0.00173 513	0.15246 453	0.17136 62	0.48151 66	- 15.1136
15.7	-0.18238 269	-0.01874 731	0.13797 838	0.16398 38	0.46204 52	- 15.9742
15.8	-0.19154 204	-0.03555 621	0.12276 733	0.15685 60	0.44319 99	- 16.8962
15.9	-0.19949 958	-0.05207 632	0.10691 918	0.14997 67	0.42496 74	- 17.8849
16.0	-0.20620 569	-0.06822 215	0.09052 660	0.14334 00	0.40733 43	- 18.9460
16.1	-0.21161 797	-0.08390 874	0.07368 666	0.13694 00	0.39028 75	- 20.0855
16.2	-0.21570 160	-0.09905 224	0.05650 016	0.13077 08	0.37381 35	- 21.3104
16.3	-0.21842 977	-0.11357 046	0.03907 110	0.12482 65	0.35789 93	- 22.6279
16.4	-0.21978 394	-0.12738 344	0.02150 600	0.11910 14	0.34253 16	- 24.0462
16.5	-0.21975 411	-0.14041 403	+0.00391 319	0.11358 96	0.32769 75	- 25.5740
16.6	-0.21833 905	-0.15258 841	-0.01359 786	0.10828 55	0.31338 39	- 27.2209
16.7	-0.21554 637	-0.16383 668	-0.03091 729	0.10318 34	0.29957 78	- 28.9975
16.8	-0.21139 267	-0.17409 338	-0.04793 557	0.09827 77	0.28626 66	- 30.9150
16.9	-0.20590 350	-0.18329 797	-0.06454 431	0.09356 30	0.27343 76	- 32.9859
17.0	-0.19911 332	-0.19139 539	-0.08063 696	0.08903 37	0.26107 81	- 35.2237
17.1	-0.19106 538	-0.19833 646	-0.09610 960	0.08468 45	0.24917 57	- 37.6429
17.2	-0.18181 155	-0.20407 831	-0.11086 170	0.08051 02	0.23771 82	- 40.2594
17.3	-0.17141 203	-0.20858 485	-0.12479 683	0.07650 53	0.22669 32	- 43.0904
17.4	-0.15993 505	-0.21182 701	-0.13782 343	0.07266 49	0.21608 89	- 46.1543
17.5	-0.14745 649	-0.21378 318	-0.14985 544	0.06898 37	0.20589 33	- 49.4711
17.6	-0.13405 943	-0.21443 935	-0.16081 304	0.06545 69	0.19609 48	- 53.0622
17.7	-0.11983 363	-0.21378 944	-0.17062 321	0.06207 96	0.18668 17	- 56.9506
17.8	-0.10487 499	-0.21183 538	-0.17922 038	0.05884 68	0.17764 27	- 61.1611
17.9	-0.08928 492	-0.20858 727	-0.18654 691	0.05575 39	0.16896 66	- 65.7197
18.0	-0.07316 966	-0.20406 341	-0.19255 365	0.05279 63	0.16064 24	- 70.6543
18.1	-0.05663 961	-0.19829 032	-0.19720 030	0.04996 93	0.15265 91	- 75.9946
18.2	-0.03980 852	-0.19130 265	-0.20045 582	0.04726 85	0.14500 62	- 81.7717
18.3	-0.02279 278	-0.18314 307	-0.20229 875	0.04468 96	0.13767 32	- 88.0182
18.4	-0.00571 052	-0.17386 213	-0.20271 742	0.04222 83	0.13064 97	- 94.7683
18.5	+0.01131 917	-0.16351 793	-0.20171 011	0.03988 04	0.12392 57	-102.0574
18.6	0.02817 711	-0.15217 591	-0.19928 520	0.03764 17	0.11749 14	-109.9219
18.7	0.04474 490	-0.13990 845	-0.19546 113	0.03550 84	0.11133 69	-118.3992
18.8	0.06090 579	-0.12679 446	-0.19026 637	0.03347 64	0.10545 28	-127.5270
18.9	0.07654 556	-0.11291 893	-0.18373 930	0.03154 21	0.09982 98	-137.3432
19.0	0.09155 333	-0.09837 240	-0.17592 797	0.02970 16	0.09445 89	-147.8850
19.1	0.10582 247	-0.08325 039	-0.16688 985	0.02795 15	0.08933 10	-159.1885
19.2	0.11925 134	-0.06765 283	-0.15669 143	0.02628 80	0.08443 76	-171.2882
19.3	0.13174 416	-0.05168 334	-0.14540 785	0.02470 79	0.07977 01	-184.2155
19.4	0.14321 168	-0.03544 863	-0.13312 231	0.02320 78	0.07532 03	-197.9980
19.5	0.15357 193	-0.01905 771	-0.11992 566	0.02178 44	0.07108 01	-212.6582
19.6	0.16275 089	-0.00262 120	-0.10591 538	0.02043 46	0.06704 16	-228.2122
19.7	0.17068 305	+0.01374 948	-0.09119 555	0.01915 54	0.06319 71	-244.6678
19.8	0.17731 198	0.02994 285	-0.07587 548	0.01794 37	0.05953 92	-262.0226
19.9	0.18259 079	0.04584 818	-0.06006 922	0.01679 67	0.05606 06	-280.2622
20.0	0.18648 256	0.06135 630	-0.04389 465	0.01571 16	0.05275 42	-299.3574
	$\begin{bmatrix} (-4)2 \\ 6 \end{bmatrix}$	$\begin{bmatrix} (-4)2 \\ 6 \end{bmatrix}$	$\begin{bmatrix} (-4)2 \\ 6 \end{bmatrix}$	$\begin{bmatrix} (-5)4 \\ 4 \end{bmatrix}$	$\begin{bmatrix} (-5)9 \\ 4 \end{bmatrix}$	$\begin{bmatrix} (-1)1 \\ 5 \end{bmatrix}$

Table 9.3

BESSEL FUNCTIONS—MODULUS AND PHASE OF ORDERS 10, 11, 20 AND 21

$J_n(x) = M_n(x) \cos \theta_n(x)$			$Y_n(x) = M_n(x) \sin \theta_n(x)$		
x^{-1}	$x^{\frac{1}{2}} M_{10}(x)$	$\theta_{10}(x) - x$	$x^{\frac{1}{2}} M_{11}(x)$	$\theta_{11}(x) - x$	$\langle x \rangle$
0.050	0.85676 701	-13.94798 864	0.87222 790	-14.96758 686	20
0.048	0.85136 682	-14.05389 581	0.86513 271	-15.09771 672	21
0.046	0.84633 336	-14.15926 984	0.85857 314	-15.22701 466	22
0.044	0.84164 245	-14.26413 968	0.85250 587	-15.35552 901	23
0.042	0.83727 251	-14.36853 333	0.84689 281	-15.48330 635	24
0.040	0.83320 419	-14.47247 807	0.84170 044	-15.61039 144	25
0.038	0.82942 012	-14.57600 035	0.83689 917	-15.73682 771	26
0.036	0.82590 472	-14.67912 589	0.83246 283	-15.86265 679	28
0.034	0.82264 403	-14.78187 967	0.82836 826	-15.98791 896	29
0.032	0.81962 546	-14.88428 611	0.82459 496	-16.11265 291	31
0.030	0.81683 775	-14.98636 880	0.82112 469	-16.23689 620	33
0.028	0.81427 076	-15.08815 085	0.81794 133	-16.36068 504	36
0.026	0.81191 546	-15.18965 477	0.81503 056	-16.48405 469	38
0.024	0.80976 370	-15.29090 253	0.81237 970	-16.60703 912	42
0.022	0.80780 825	-15.39191 569	0.80997 751	-16.72967 149	45
0.020	0.80604 267	-15.49271 527	0.80781 410	-16.85198 406	50
0.018	0.80446 127	-15.59332 192	0.80588 079	-16.97400 835	56
0.016	0.80305 902	-15.69375 598	0.80416 997	-17.09577 505	63
0.014	0.80183 156	-15.79403 741	0.80267 505	-17.21731 438	71
0.012	0.80077 512	-15.89418 589	0.80139 036	-17.33865 590	83
0.010	0.79988 647	-15.99422 093	0.80031 114	-17.45982 880	100
0.008	0.79916 297	-16.09416 168	0.79943 341	-17.58086 166	125
0.006	0.79860 244	-16.19402 726	0.79875 398	-17.70178 301	167
0.004	0.79820 323	-16.29383 652	0.79827 039	-17.82262 084	250
0.002	0.79796 417	-16.39360 832	0.79798 093	-17.94340 316	500
0.000	0.79788 456 $\left[\begin{smallmatrix} (-5)5 \\ 5 \end{smallmatrix} \right]$	-16.49336 143 $\left[\begin{smallmatrix} (-5)7 \\ 5 \end{smallmatrix} \right]$	0.79788 456 $\left[\begin{smallmatrix} (-5)7 \\ 6 \end{smallmatrix} \right]$	-18.06415 776 $\left[\begin{smallmatrix} (-4)1 \\ 6 \end{smallmatrix} \right]$	∞
x^{-1}	$x^{\frac{1}{2}} M_{20}(x)$	$\theta_{20}(x) - x$	$x^{\frac{1}{2}} M_{21}(x)$	$\theta_{21}(x) - x$	$\langle x \rangle$
0.050	1.474083	-21.047407	1.791133	-21.290925	20
0.048	1.320938	-21.606130	1.525581	-21.927545	21
0.046	1.211667	-22.149524	1.347435	-22.550082	22
0.044	1.131459	-22.676802	1.224460	-23.154248	23
0.042	1.070845	-23.188535	1.136653	-23.738936	24
0.040	1.023762	-23.685951	1.071741	-24.304948	25
0.038	0.986284	-24.170500	1.022171	-24.853951	26
0.036	0.955823	-24.643620	0.983229	-25.387848	28
0.034	0.930635	-25.106640	0.951902	-25.908478	29
0.032	0.909513	-25.560748	0.926211	-26.417500	31
0.030	0.891605	-26.006988	0.904821	-26.916369	33
0.028	0.876293	-26.446280	0.886799	-27.406346	36
0.026	0.863121	-26.879433	0.871483	-27.888527	38
0.024	0.851743	-27.307159	0.858385	-28.363869	42
0.022	0.841895	-27.730098	0.847145	-28.833211	45
0.020	0.833375	-28.148822	0.837487	-29.297299	50
0.018	0.826019	-28.563847	0.829198	-29.756800	56
0.016	0.819702	-28.975650	0.822114	-30.212318	63
0.014	0.814321	-29.384666	0.816105	-30.664405	71
0.012	0.809796	-29.791303	0.811069	-31.113569	83
0.010	0.806062	-30.195941	0.806925	-31.560285	100
0.008	0.803071	-30.598942	0.803612	-32.005000	125
0.006	0.800781	-31.000652	0.801081	-32.448139	167
0.004	0.799165	-31.401404	0.799297	-32.890109	250
0.002	0.798204	-31.801522	0.798237	-33.331307	500
0.000	0.797885 $\left[\begin{smallmatrix} (-3)5 \\ 7 \end{smallmatrix} \right]$	-32.201325 $\left[\begin{smallmatrix} (-3)2 \\ 7 \end{smallmatrix} \right]$	0.797885 $\left[\begin{smallmatrix} (-2)1 \\ 8 \end{smallmatrix} \right]$	-33.772121 $\left[\begin{smallmatrix} (-3)2 \\ 7 \end{smallmatrix} \right]$	∞

 $\langle x \rangle$ = nearest integer to x .

Compiled from L. Fox, A short table for Bessel functions of integer orders and large arguments. Royal Society Shorter Mathematical Tables No. 3 (Cambridge Univ. Press, Cambridge, England, 1954) (with permission).