

Table 8.1 LEGENDRE FUNCTION—FIRST KIND $P_n(x)$

x	$\arccos x$	$P_0(x)$	$P_1(x)$	$P_2(x)$	$P_3(x)$	$P_4(x)$	$P_{10}(x)$
0.00	90.00000 00	1	x	-0.50000	0.00000 00	0.00000 000	-0.24609 37
0.01	89.42703 26	-0.49985	-0.01499 75	0.02457 330	0.04893 045	0.07285 701	-0.24474 14
0.02	88.85400 80	-0.49940	-0.02998 00	0.04893 045	0.07285 701	0.09614 188	-0.24069 84
0.03	88.28086 87	-0.49865	-0.04493 25	0.07285 701	0.09614 188	0.11857 899	-0.23400 69
0.04	87.70755 72	-0.49760	-0.05984 00	0.09614 188	0.11857 899	0.13996 890	-0.22473 64
0.05	87.13401 60	-0.49625	-0.07468 75	0.11857 899	0.13996 890	0.16012 040	-0.21298 35
0.06	86.56018 72	-0.49460	-0.08946 00	0.13996 890	0.16012 040	0.17885 206	-0.19887 11
0.07	85.98601 28	-0.49265	-0.10414 25	0.16012 040	0.17885 206	0.19599 366	-0.18254 68
0.08	85.41143 43	-0.49040	-0.11872 00	0.17885 206	0.19599 366	0.21138 764	-0.16418 20
0.09	84.83639 29	-0.48785	-0.13317 75	0.19599 366	0.21138 764	0.22489 042	-0.14397 02
0.10	84.26082 95	-0.48500	-0.14750 00	0.21138 764	0.22489 042	0.23637 363	-0.12212 50
0.11	83.68468 44	-0.48185	-0.16167 25	0.22489 042	0.23637 363	0.24572 526	-0.09887 86
0.12	83.10789 74	-0.47840	-0.17568 00	0.23637 363	0.24572 526	0.25285 070	-0.07447 93
0.13	82.53040 77	-0.47465	-0.18950 75	0.24572 526	0.25285 070	0.25785 632	-0.04918 90
0.14	81.95215 37	-0.47060	-0.20314 00	0.25285 070	0.25785 632	0.25309 918	-0.02328 12
0.15	81.37307 34	-0.46625	-0.21656 25	0.25785 632	0.25309 918	0.24595 712	+0.00296 18
0.16	80.79310 38	-0.46160	-0.22976 00	0.24595 712	0.23647 631	0.22472 407	0.02925 20
0.17	80.21218 10	-0.45665	-0.24271 75	0.23647 631	0.21078 870	0.19477 914	0.05529 81
0.18	79.63024 02	-0.45140	-0.25542 00	0.21078 870	0.17682 442	0.15707 305	0.08080 85
0.19	79.04721 58	-0.44585	-0.26785 25	0.17682 442	0.15707 305	0.13569 215	0.10549 42
0.20	78.46304 10	-0.44000	-0.28000 00	0.15707 305	0.13569 215	0.11286 642	0.12907 20
0.21	77.87764 77	-0.43385	-0.29184 75	0.13569 215	0.11286 642	0.08879 707	0.15126 74
0.22	77.29096 70	-0.42740	-0.30338 00	0.11286 642	0.08879 707	0.06370 038	0.17181 75
0.23	76.70292 82	-0.42065	-0.31458 25	0.08879 707	0.06370 038	0.03780 634	0.19047 36
0.24	76.11345 96	-0.41360	-0.32544 00	0.06370 038	0.03780 634	0.01135 691	0.20700 49
0.25	75.52248 78	-0.40625	-0.33593 75	0.03780 634	0.01135 691	-0.01539 566	0.22120 02
0.26	74.92993 79	-0.39860	-0.34606 00	0.01135 691	-0.01539 566	-0.04219 085	0.23287 14
0.27	74.33573 31	-0.39065	-0.35579 25	-0.01539 566	-0.04219 085	-0.06876 185	0.24185 52
0.28	73.73979 53	-0.38240	-0.36512 00	-0.04219 085	-0.06876 185	-0.09483 780	0.24801 62
0.29	73.14204 40	-0.37385	-0.37402 75	-0.06876 185	-0.09483 780	-0.12014 608	0.25124 81
0.30	72.54239 69	-0.36500	-0.38250 00	-0.09483 780	-0.12014 608	-0.14441 472	0.25147 63
0.31	71.94076 95	-0.35585	-0.39052 25	-0.12014 608	-0.14441 472	-0.16737 489	0.24865 91
0.32	71.33707 51	-0.34640	-0.39808 00	-0.14441 472	-0.16737 489	-0.18876 356	0.24278 89
0.33	70.73122 45	-0.33665	-0.40515 75	-0.16737 489	-0.18876 356	-0.20832 609	0.23389 37
0.34	70.12312 59	-0.32660	-0.41174 00	-0.18876 356	-0.20832 609	-0.22581 900	0.22203 73
0.35	69.51268 49	-0.31625	-0.41781 25	-0.20832 609	-0.22581 900	-0.24101 269	0.20732 00
0.36	68.99980 39	-0.30560	-0.42336 00	-0.22581 900	-0.24101 269	-0.25369 426	0.18987 83
0.37	68.48438 27	-0.29465	-0.42836 75	-0.24101 269	-0.25369 426	-0.26367 022	0.16988 48
0.38	67.96631 73	-0.28340	-0.43282 00	-0.25369 426	-0.26367 022	-0.27076 932	0.14754 72
0.39	67.44550 06	-0.27185	-0.43670 25	-0.26367 022	-0.27076 932	-0.27484 521	0.12310 73
0.40	66.92182 15	-0.26000	-0.44000 00	-0.27076 932	-0.27484 521	-0.27577 908	0.09683 91
0.41	66.39516 52	-0.24785	-0.44269 75	-0.27484 521	-0.27577 908	-0.27348 225	0.06904 71
0.42	65.86541 25	-0.23540	-0.44478 00	-0.27577 908	-0.27348 225	-0.26789 856	0.04006 39
0.43	65.33243 99	-0.22265	-0.44623 25	-0.26789 856	-0.26789 856	-0.25369 426	+0.01024 69
0.44	64.79611 88	-0.20960	-0.44704 00	-0.25369 426	-0.25369 426	-0.23667 022	-0.02002 45
0.45	64.25631 61	-0.19625	-0.44718 75	-0.23667 022	-0.23667 022	-0.21625 000	-0.05035 30
0.46	63.71289 25	-0.18260	-0.44666 00	-0.21625 000	-0.21625 000	-0.19260 000	-0.08032 72
0.47	63.16570 35	-0.16865	-0.44544 25	-0.19260 000	-0.19260 000	-0.16865 000	-0.10952 64
0.48	62.61459 80	-0.15440	-0.44352 00	-0.16865 000	-0.16865 000	-0.14441 472	-0.13752 51
0.49	62.05941 84	-0.13985	-0.44087 75	-0.14441 472	-0.14441 472	-0.12014 608	-0.16389 87
0.50	60.00000 00	-0.12500	-0.43750 00	-0.12014 608	-0.12014 608	-0.09614 188	-0.18822 86

$$\begin{bmatrix} (-4)5 \\ 5 \end{bmatrix}$$

$$P_2(x) = \frac{1}{2}(-1+3x^2)$$

$$\begin{bmatrix} (-5)4 \\ 3 \end{bmatrix}$$

$$P_3(x) = \frac{x}{2}(-3+5x^2)$$

$$\begin{bmatrix} (-5)9 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} (-4)4 \\ 6 \end{bmatrix}$$

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$$P_9(x) = \frac{x}{512}(1260 - 18480x^2 + 72072x^4 - 102960x^6 + 48620x^8)$$

$$P_{10}(x) = \frac{1}{1024}(-252 + 13860x^2 - 120120x^4 + 360360x^6 - 437580x^8 + 184756x^{10})$$

$$(n+1)P_{n+1}(x) = (2n+1)xP_n(x) - nP_{n-1}(x)$$

For coefficients of other polynomials, see chapter 22.