

ROOTS x_n OF $\cot x_n = \lambda x_n$

Table 4.20

λ	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9
0.00	1.57080	4.71239	7.85398	10.99557	14.13717	17.27876	20.42035	23.56194	26.70354
0.05	1.49613	4.49148	7.49541	10.51167	13.54198	16.58639	19.64394	22.71311	25.79232
0.10	1.42887	4.30580	7.22811	10.20026	13.21418	16.25936	19.32703	22.41085	25.50638
0.15	1.36835	4.15504	7.04126	10.01222	13.03901	16.10053	19.18401	22.28187	25.38952
0.20	1.31384	4.03357	6.90960	9.89275	12.93522	16.01066	19.10552	22.21256	25.32765
0.25	1.26459	3.93516	6.81401	9.81188	12.86775	15.95363	19.05645	22.16965	25.28961
0.30	1.21995	3.85460	6.74233	9.75407	12.82073	15.91443	19.02302	22.14058	25.26392
0.35	1.17933	3.78784	6.68698	9.71092	12.78621	15.88591	18.99882	22.11960	25.24544
0.40	1.14223	3.73184	6.64312	9.67758	12.75985	15.86426	18.98052	22.10377	25.23150
0.45	1.10820	3.68433	6.60761	9.65109	12.73907	15.84728	18.96619	22.09140	25.22062
0.50	1.07687	3.64360	6.57833	9.62956	12.72230	15.83361	18.95468	22.08147	25.21190
0.55	1.04794	3.60834	6.55380	9.61173	12.70847	15.82237	18.94523	22.07333	25.20475
0.60	1.02111	3.57756	6.53297	9.59673	12.69689	15.81297	18.93734	22.06653	25.19878
0.65	0.99617	3.55048	6.51508	9.58394	12.68704	15.80500	18.93065	22.06077	25.19373
0.70	0.97291	3.52649	6.49954	9.57292	12.67857	15.79814	18.92490	22.05583	25.18939
0.75	0.95116	3.50509	6.48593	9.56331	12.67121	15.79219	18.91991	22.05154	25.18563
0.80	0.93076	3.48590	6.47392	9.55486	12.66475	15.78698	18.91554	22.04778	25.18234
0.85	0.91158	3.46859	6.46324	9.54738	12.65904	15.78237	18.91168	22.04447	25.17943
0.90	0.89352	3.45292	6.45368	9.54072	12.65395	15.77827	18.90825	22.04151	25.17684
0.95	0.87647	3.43865	6.44508	9.53473	12.64939	15.77459	18.90518	22.03887	25.17453
1.00	0.86033	3.42562	6.43730	9.52933	12.64529	15.77128	18.90241	22.03650	25.17245

λ^{-1}	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	$\langle \lambda \rangle$
1.00	0.86033	3.42562	6.43730	9.52933	12.64529	15.77128	18.90241	22.03650	25.17245	1
0.95	0.84426	3.41306	6.42987	9.52419	12.64138	15.76814	18.89978	22.03424	25.17047	1
0.90	0.82740	3.40034	6.42241	9.51904	12.63747	15.76499	18.89715	22.03197	25.16848	1
0.85	0.80968	3.38744	6.41492	9.51388	12.63355	15.76184	18.89451	22.02971	25.16650	1
0.80	0.79103	3.37438	6.40740	9.50871	12.62963	15.75868	18.89188	22.02745	25.16452	1
0.75	0.77136	3.36113	6.39984	9.50353	12.62570	15.75553	18.88924	22.02519	25.16254	1
0.70	0.75056	3.34772	6.39226	9.49834	12.62177	15.75237	18.88660	22.02292	25.16055	1
0.65	0.72851	3.33413	6.38464	9.49314	12.61784	15.74921	18.88396	22.02066	25.15857	2
0.60	0.70507	3.32037	6.37700	9.48793	12.61390	15.74605	18.88132	22.01839	25.15659	2
0.55	0.68006	3.30643	6.36932	9.48271	12.60996	15.74288	18.87868	22.01612	25.15460	2
0.50	0.65327	3.29231	6.36162	9.47749	12.60601	15.73972	18.87604	22.01386	25.15262	2
0.45	0.62444	3.27802	6.35389	9.47225	12.60206	15.73655	18.87339	22.01159	25.15063	2
0.40	0.59324	3.26355	6.34613	9.46700	12.59811	15.73338	18.87075	22.00932	25.14864	3
0.35	0.55922	3.24891	6.33835	9.46175	12.59415	15.73021	18.86810	22.00705	25.14666	3
0.30	0.52179	3.23409	6.33054	9.45649	12.59019	15.72704	18.86546	22.00478	25.14467	3
0.25	0.48009	3.21910	6.32270	9.45122	12.58623	15.72386	18.86281	22.00251	25.14268	4
0.20	0.43284	3.20393	6.31485	9.44595	12.58226	15.72068	18.86016	22.00024	25.14070	5
0.15	0.37788	3.18860	6.30696	9.44067	12.57829	15.71751	18.85751	21.99797	25.13871	7
0.10	0.31105	3.17310	6.29906	9.43538	12.57432	15.71433	18.85486	21.99569	25.13672	10
0.05	0.22176	3.15743	6.29113	9.43008	12.57035	15.71114	18.85221	21.99342	25.13473	20
0.00	0.00000	3.14159	6.28319	9.42478	12.56637	15.70796	18.84956	21.99115	25.13274	∞
*		$\begin{bmatrix} (-5)2 \\ 3 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	$\begin{bmatrix} (-5)1 \\ 2 \end{bmatrix}$	

 $\langle \lambda \rangle$ = nearest integer to λ .For $\lambda^{-1} > .20$, the maximum error in linear interpolation is $(-4)7$; five-point interpolation gives 5D.For $\lambda^{-1} \leq .20$,

$$x_1 \approx \frac{1}{\sqrt{\lambda}} \left[1 - \frac{1}{6\lambda} + \frac{11}{360\lambda} 2 - \frac{1}{432\lambda} 3 + \dots \right].$$