

Rational Chebyshev Approximations for the Inverse of the Error Function

By J. M. Blair, C. A. Edwards and J. H. Johnson

Abstract. This report presents near-minimax rational approximations for the inverse of the error function $\operatorname{inverf} x$, for $0 \leq x \leq 1 - 10^{-10000}$, with relative errors ranging down to 10^{-23} . An asymptotic formula for the region $x \rightarrow 1$ is also given.

1. Introduction. The inverse error function $\operatorname{inverf} x$ occurs in the solution of nonlinear heat and diffusion problems [1]. It provides exact solutions when the diffusion coefficient is concentration dependent, and may be used to solve certain moving interface problems. The percentage points of the normal distribution, which are important in statistical calculations, are expressible in terms of $\operatorname{inverf} x$, and a common method of computing normally distributed random numbers [2], [3] requires efficient approximations.

The basic mathematical properties of the related function $\operatorname{inverfc} x$ are discussed in [4] and [1], and 10S Chebyshev series expansions are given in [1]. [5] lists 3D rational approximations, and [6] contains 7S rational minimax approximations to $\operatorname{inverf} x$ and $\operatorname{inverfc} x$. The most accurate set of approximations is given in [7], which contains Chebyshev series expansions accurate to at least 18S for $0 \leq x \leq 1 - 10^{-300}$.

This report gives near-minimax rational approximations for $\operatorname{inverf} x$ for $0 \leq x \leq 1 - 10^{-10000}$, with relative errors ranging down to 10^{-23} . An asymptotic series is developed which gives at least twenty-five digits of accuracy over the remaining part of the range $1 - 10^{-10000} \leq x < 1$. Tables 1-88 computed by this method are included in the microfiche section of this issue. These tables provide the most efficient representations available, and the low order approximations should be useful in normal random number generators.

2. Functional Properties. The error function is defined for all real values of the argument y by

$$x = \operatorname{erf} y = 2\pi^{-1/2} \int_0^y e^{-t^2} dt$$

and is an odd function of y . For $y \geq 0$, x lies in the range $[0, 1)$. The complementary error function is defined as

$$\operatorname{erfc} y = 1 - \operatorname{erf} y.$$

The inverse error function is defined by

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$$y = \operatorname{inverf} x,$$

and the inverse error function complement by

$$y = \operatorname{inverfc}(1 - x).$$

$\operatorname{inverf} x$ exists for x in the range $-1 < x < 1$ and is an odd function of x , with a MacLaurin expansion of the form

$$\operatorname{inverf} x = \sum_{n=1}^{\infty} C_n x^{2n-1}.$$

The first two hundred values of C_n are listed in [7].

By inverting the standard asymptotic series

$$(1) \quad \operatorname{erf} y \sim 1 - \frac{\pi^{-1/2}}{y} e^{-y^2} \left[1 + \sum_{m=1}^{\infty} (-1)^m \frac{1 \cdot 3 \cdot 5 \cdots (2m-1)}{(2y^2)^m} \right], \quad y \rightarrow \infty,$$

we can derive an asymptotic expansion for $\operatorname{inverf} x$ of the form

$$\begin{aligned} (\operatorname{inverf} x)^2 &\sim \eta - \frac{1}{2} \ln \eta + \eta^{-1} \left(\frac{1}{4} \ln \eta - \frac{1}{2} \right) \\ &\quad + \eta^{-2} \left(\frac{1}{16} \ln^2 \eta - \frac{3}{8} \ln \eta + \frac{7}{8} \right) \\ (2) \quad &\quad + \eta^{-3} \left(\frac{1}{48} \ln^3 \eta - \frac{7}{32} \ln^2 \eta + \frac{17}{16} \ln \eta - \frac{107}{48} \right) \\ &\quad + \eta^{-4} \left(\frac{1}{128} \ln^4 \eta - \frac{23}{192} \ln^3 \eta + \frac{29}{32} \ln^2 \eta - \frac{31}{8} \ln \eta + \frac{1489}{192} \right) \\ &\quad + \dots, \quad x \rightarrow 1, \end{aligned}$$

where $\eta = -\ln [\pi^{1/2}(1-x)]$.

3. Generation of Approximations. Rational minimax approximations to $\operatorname{inverf} x$ were computed in twenty-nine decimal arithmetic on a CDC 6600 using a version of the second algorithm of Remes due to Ralston [8]. The relative error of the approximations was levelled to three digits.

The approximation forms and intervals are

$$\begin{aligned} \operatorname{inverf} x &\simeq xR_{lm}(x^2), & 0 \leq x \leq 0.75, \\ &\simeq xR_{lm}(x^2), & 0.75 \leq x \leq 0.9375, \\ &\simeq \xi^{-1}R_{lm}(\xi), & 0.9375 \leq x \leq 1 - 10^{-100}, \\ &\simeq \xi^{-1}R_{lm}(\xi), & 1 - 10^{-100} \leq x \leq 1 - 10^{-10000}, \end{aligned}$$

where $R_{lm}(x)$ is a rational function of degree l in the numerator and m in the denominator, and where $\xi = [-\ln(1-x)]^{-1/2}$.

The auxiliary variable ξ is necessary in the higher ranges to allow high accuracy approximations with rational functions of reasonable degree. The form of the asymptotic expansion (2) might suggest $\xi^{-1}R_{lm}(\xi^2)$ as a more natural approximating function. This form was checked, in addition to $\xi^{-1}R_{lm}(\xi)$ and $\xi^{-1}R_{lm}(\xi^{1/2})$ for the highest

range of x , and the latter found to be the most efficient. However, the improvement in accuracy is not enough to offset the cost of the additional square root evaluation.

For the range $0 \leq x \leq 0.9975$ the master routine computes $\text{inverf } x$ by solving the equation $\text{erf } y - x = 0$ by the Newton-Raphson technique. For larger values of x , in the range $0.9975 \leq x \leq 1 - e^{-625}$, we solve instead the equation $\text{erfc } y - (1 - x) = 0$. The computation of $\text{erf } y$ and $\text{erfc } y$ is based on the algorithm in [9], which was programmed in FORTRAN in 29S arithmetic on a CDC 6600. For $x > 1 - e^{-625}$ underflow occurs in evaluating $1 - x$, and the equation is rewritten as $\xi(-\ln \text{erfc } y)^{1/2} - 1 = 0$, where $\xi = [-\ln(1 - x)]^{-1/2}$. Newton-Raphson iteration is again used, starting with $y = 1/\xi$, and the asymptotic formula (1) is used to compute $\text{erfc } y$. Because of the algorithms used, the computed values of $\text{inverf } x$ and $\text{inverfc } x$ are expected to be accurate to almost full-working precision.

The master routine was checked by comparing the results against the published formulae of Strecok [7]. The maximum relative differences for the ranges $[0, 0.8]$, $[0.8, 0.9975]$, $[1 - 25 \times 10^{-4}, 1 - 5 \times 10^{-16}]$, and $[1 - 5 \times 10^{-16}, 1 - 10^{-300}]$ are 0.67×10^{-24} , 0.13×10^{-22} , 0.45×10^{-22} , and 0.39×10^{-22} , respectively, which are consistent with the magnitudes of the coefficients of the last terms retained by Strecok in his series expansions.

Additional checks consisted of a comparison of the results on either side of the transition points 0.9975 and $1 - e^{-625}$, a comparison between the master routine and (2) at $x = 1 - 10^{-10000}$, and differencing of the values generated by the master routine. The results indicate that the master routine is accurate to at least twenty-seven digits.

4. Results. The details of the approximations are given in Tables 1–88, in a format similar to that used in [10]. Tables 1–4 summarize the best approximations in the L_∞ Walsh arrays of the function, and Tables 5–88 give the coefficients of selected approximations.

The precision is defined as

$$-\log_{10} \max_x \left| \frac{f(x) - R_{lm}(x)}{f(x)} \right|,$$

where $f(x)$ is the function being approximated, and the maximum is taken over the appropriate interval.

For the ranges $[0, 0.75]$ and $[0.75, 0.9375]$ the rational functions are ill-conditioned, both in the power polynomial and Chebyshev polynomial forms and lose up to three significant digits by cancellation. To eliminate the cancellation the numerator and denominator were subsequently converted to minimal Newton form (MNF) [11], and the resulting coefficients rounded off by an algorithm similar to that described in [10]. For each of the approximations in the tables the MNF has a particularly simple form, being a polynomial in $(x - x_R)$, where x_R is the right-hand end of the approximation interval; and hence, the MNF is no more costly to evaluate than the power polynomial form.

The approximations in Tables 5–88 were verified by comparing them with the master routine for 5000 pseudorandom values of the argument in each interval.

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Table 1

$$\operatorname{inverf} x \approx x P_l(x^2)/Q_m(x^2)$$

RANGE	PRECISION	l	m	TABLE OF COEFFICIENTS
[0,0.75]	1.00	0	0	5
	2.22	0	1	6
	3.51	1	1	7
	4.78	1	2	8
	6.08	2	2	9
	7.35	2	3	10
	8.64	3	3	11
	9.92	3	4	12
	11.22	4	4	13
	12.50	4	5	14
	13.79	5	5	15
	15.07	5	6	16
	16.37	6	6	17
	17.65	6	7	18
	18.94	7	7	19
	20.23	7	8	20
	21.52	8	8	21
	22.80	8	9	22

Table 2

$$\operatorname{inverf} x \approx x P_l(x^2)/Q_m(x^2)$$

RANGE	PRECISION	l	m	TABLE OF COEFFICIENTS
[.75,.9375]	.89	0	0	23
	1.91	0	1	24
	3.01	1	1	25
	4.09	1	2	26
	5.19	2	2	27
	6.28	2	3	28
	7.38	3	3	29
	8.48	3	4	30
	9.58	4	4	31
	10.67	4	5	32
	11.77	5	5	33
	12.86	5	6	34
	13.97	6	6	35
	15.06	6	7	36
	16.15	7	7	37
	17.25	7	8	38
	18.30	8	8	39
	19.39	8	9	40
	20.42	9	9	41
	21.65	9	10	42
	22.75	10	10	43

Table 3

$$\text{inverf } x \approx \xi^{-1} P_l(\xi)/Q_m(\xi), \quad \xi = [-\ln(1-x)]^{-1/2}$$

RANGE	PRECISION	l	m	TABLE OF COEFFICIENTS
[-.9375, 1-10 ⁻¹⁰⁰]	.95	0	0	44
	2.11	1	0	45
	2.88	0	2	46
	4.02	1	2	47
	5.04	3	1	48
	6.33	2	3	49
	7.61	5	2	50
	8.88	2	6	51
	10.14	8	2	52
	11.02	6	5	53
	13.11	6	7	54
	13.69	9	6	55
	15.05	8	8	56
	15.90	8	9	57
	16.51	10	8	58
	17.78	10	10	59
	18.03	11	10	60
	19.37	13	9	61
	20.32	10	13	62
	21.97	12	13	63
22.85	14	12	64	

Table 4

$$\operatorname{inverf} x \approx \xi^{-1} P_l(\xi) / Q_m(\xi), \quad \xi = [-\ln(1-x)]^{-1/2}$$

RANGE	PRECISION	l	m	TABLE OF COEFFICIENTS
[1-10 ⁻¹⁰⁰ , 1-10 ⁻¹⁰⁰⁰⁰]	2.45	0	0	65
	3.26	0	1	66
	4.50	0	2	67
	5.67	2	1	68
	6.53	1	3	69
	7.63	3	2	70
	8.37	2	4	71
	9.69	4	3	72
	10.15	3	5	73
	11.01	4	5	74
	11.88	4	6	75
	12.77	5	6	76
	13.58	5	7	77
	14.55	6	7	78
	15.36	8	6	79
	16.36	7	8	80
	17.29	9	7	81
	18.35	8	9	82
	18.71	9	9	83
	19.67	8	11	84
	20.45	10	10	85
	21.37	9	12	86
	22.19	10	12	87
23.00	14	9	88	

Table 5

$$\operatorname{inverf} x \approx p_0 x, \quad |x| \leq 0.75$$

P00 (0) .9754

Table 6

$$\operatorname{inverf} x \approx x p_0 / \sum_{j=0}^1 q_j (x^2 - .5625)^j, \quad |x| \leq 0.75$$

P00 (1) -.27095 8

Q00 (1) -.25134 7

Q01 (1) .10000

Table 7

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^1 p_j (x^2 - .5625)^j}{\sum_{j=0}^1 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00 (1) -.10976 672

P01 (0) .53062 1

Q00 (1) -.10123 953

Q01 (1) .10000 00

Table 8

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^1 p_j (x^2 - .5625)^j}{\sum_{j=0}^2 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00 (1) .59362 254

P01 (1) -.58954 591

Q00 (1) .54734 868

Q01 (1) -.82675 896

Q02 (1) .10000 00

Table 9

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^2 p_j (x^2 - .5625)^j}{\sum_{j=0}^2 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00 (1) .15918 63138

P01 (1) -.24423 26820

P02 (0) .37153 461

Q00 (1) .14677 51692

Q01 (1) -.30131 36362

Q02 (1) .10000 0000

Table 10

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^2 p_j (x^2 - .5625)^j}{\sum_{j=0}^3 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00 (2) -.13095 99674 22
P01 (2) .26785 22576 0
P02 (1) -.92890 57365

Q00 (2) -.12074 94262 97
Q01 (2) .30960 61452 9
Q02 (2) -.17149 97799 1
Q03 (1) .10000 0000

Table 11

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^3 p_j (x^2 - .5625)^j}{\sum_{j=0}^3 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00 (1) -.26252 67819 738
P01 (1) .67547 44696 99
P02 (1) -.39030 76246 27
P03 (0) .28847 75643

Q00 (1) -.24205 83755 216
Q01 (1) .74837 69729 08
Q02 (1) -.59793 36646 15
Q03 (1) .10000 00000 0

Table 12

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^3 p_j (x^2 - .5625)^j}{\sum_{j=0}^4 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(2)	.28883	66896	3037
P01	(2)	-.89043	76057	796
P02	(2)	.72122	76821	115
P03	(2)	-.12813	82901	387

Q00	(2)	.26631	69799	5602
Q01	(2)	-.95916	43304	721
Q02	(2)	.99761	47945	595
Q03	(2)	-.29116	50931	897
Q04	(1)	.10000	00000	0

Table 13

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^4 p_j (x^2 - .5625)^j}{\sum_{j=0}^4 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(1)	.46268	02021	25696
P01	(2)	-.16680	59471	26248
P02	(2)	.17623	01761	90819
P03	(1)	-.54309	34290	7266
P04	(0)	.23693	70191	42

Q00	(1)	.42660	64476	06664
Q01	(2)	-.17593	07269	90431
Q02	(2)	.22733	14645	44494
Q03	(1)	-.99013	86347	8727
Q04	(1)	.10000	00000	000

Table 14

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^4 p_j (x^2 - .5625)^j}{\sum_{j=0}^5 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(2)	-.63628	85909	64628	6
P01	(3)	.26184	31346	81937	6
P02	(3)	-.34041	22053	75487	0
P03	(3)	.15187	93313	08045	5
P04	(2)	-.16434	13225	0140	
Q00	(2)	-.58667	91234	96985	4
Q01	(3)	.27186	18962	62689	7
Q02	(3)	-.41856	25576	64677	5
Q03	(3)	.24376	83358	72050	2
Q04	(2)	-.44140	10518	4605	
Q05	(1)	.10000	00000	000	

Table 15

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^5 p_j (x^2 - .5625)^j}{\sum_{j=0}^5 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(1)	-.84938	46999	07046	41
P01	(2)	.39367	94338	34839	55
P02	(2)	-.61087	50573	70550	66
P03	(2)	.36424	44862	95483	54
P04	(1)	-.70154	38565	55874	7
P05	(0)	.20177	10235	1770	
Q00	(1)	-.78316	07832	18833	48
Q01	(2)	.40361	17723	48169	20
Q02	(2)	-.72411	39469	39276	69
Q03	(2)	.53489	35185	41307	87
Q04	(2)	-.14776	96740	68656	41
Q05	(1)	.10000	00000	00000	

Table 16

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^5 p_j (x^2 - .5625)^j}{\sum_{j=0}^6 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(3)	.14002	16916	16135	32398
P01	(3)	-.72042	75515	68640	660
P02	(4)	.12967	08621	66051	0654
P03	(3)	-.96979	32301	51403	067
P04	(3)	.27624	27049	26942	524
P05	(2)	-.20129	40180	55205	4

Q00	(3)	.12910	46303	11468	48865
Q01	(3)	-.73123	08064	26097	292
Q02	(4)	.14949	70492	91578	8517
Q03	(4)	-.13377	93793	68341	8692
Q04	(3)	.50337	47142	78356	698
Q05	(2)	-.62202	05354	52921	6
Q06	(1)	.10000	00000	00000	

Table 17

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^6 p_j (x^2 - .5625)^j}{\sum_{j=0}^6 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75'$$

P00	(2)	.16030	49558	44066	22931	1
P01	(2)	-.90784	95926	29603	26650	
P02	(3)	.18644	91486	16209	87391	
P03	(3)	-.16900	14273	46423	82420	
P04	(2)	.65454	66284	79448	7048	
P05	(1)	-.86421	38115	87247	794	
P06	(0)	.17605	87821	39059	0	

Q00	(2)	.14780	64707	15138	31611	0
Q01	(2)	-.91374	16702	42603	13936	
Q02	(3)	.21015	79048	62053	17714	
Q03	(3)	-.22210	25412	18551	32366	
Q04	(3)	.10769	45391	60551	23830	
Q05	(2)	-.20601	07303	28265	443	
Q06	(1)	.10000	00000	00000	00	

Table 18

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^6 p_j (x^2 - .5625)^j}{\sum_{j=0}^7 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(3)	-.30786	87264	23136	95280	46
P01	(4)	.19007	15359	05281	34753	18
P02	(4)	-.43799	65230	83869	26160	8
P03	(4)	.46631	43353	34343	31286	8
P04	(4)	-.22977	46717	66071	44886	9
P05	(3)	.45960	20427	26891	2817	
P06	(2)	-.23886	24010	43887	559	

Q00	(3)	-.28386	51472	53666	21129	52
Q01	(4)	.18997	76918	64530	57809	85
Q02	(4)	-.48481	63543	08488	72101	5
Q03	(4)	.59039	34813	48436	65625	5
Q04	(4)	-.35033	97638	38772	64098	4
Q05	(3)	.92741	31916	09353	1880	
Q06	(2)	-.83288	32790	19365	700	
Q07	(1)	.10000	00300	00000	00	

Table 19

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^7 p_j (x^2 - .5625)^j}{\sum_{j=0}^7 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(2)	-.30866	88652	77644	97339	502
P01	(3)	.20652	78640	29423	39589	007
P02	(3)	-.52856	77083	50938	23310	87
P03	(3)	.64880	50954	40362	49088	40
P04	(3)	-.39205	50990	19713	91289	20
P05	(3)	.10706	27809	77700	74402	58
P06	(2)	-.10303	48845	54396	78272	
P07	(0)	.15641	51082	19238	600	

Q00	(2)	-.28460	29017	38823	39383	682
Q01	(3)	.20518	92414	92385	30630	152
Q02	(3)	-.57617	12509	01275	38064	10
Q03	(3)	.79669	38817	05637	70334	37
Q04	(3)	-.56509	30556	40234	24022	86
Q05	(3)	.19450	32048	39540	87700	60
Q06	(2)	-.27371	85230	60026	62877	
Q07	(1)	.10000	00060	00000	0000	

Table 20

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^7 p_j (x^2 - .5625)^j}{\sum_{j=0}^8 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(3)	.67645	57952	65851	77112	3606
P01	(4)	-.48716	23471	88061	34686	6351
P02	(5)	.13695	96022	55143	14808	5967
P03	(5)	-.19029	09700	59805	02083	1321
P04	(5)	.13640	77684	03368	98712	5877
P05	(4)	-.47913	05081	90746	14860	895
P06	(3)	.70051	10922	35656	91614	8
P07	(2)	-.27695	28710	47165	16016	
Q00	(3)	.62371	46142	27559	42437	6964
Q01	(4)	-.48153	48706	68920	26495	1208
Q02	(5)	.14739	77692	34566	19584	5274
Q03	(5)	-.22793	78583	40551	31263	8455
Q04	(5)	.18796	28467	69108	65270	7107
Q05	(4)	-.80145	97236	83333	48784	238
Q06	(4)	.15731	07732	42888	54698	81
Q07	(3)	-.10738	78066	58350	86337	5
Q08	(1)	.10000	00000	00000	0000	

Table 21

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^8 p_j (x^2 - .5625)^j}{\sum_{j=0}^8 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(2)	.60344	38910	01173	87447	91235
P01	(3)	-.46574	48486	78771	21440	29462
P02	(4)	.14283	99779	11513	18484	50665 5
P03	(4)	-.22206	96807	53171	82652	79170
P04	(4)	.18508	59444	60577	30525	36718
P05	(3)	-.80469	85535	48242	52453	4489
P06	(3)	.16364	17674	49627	87245	1786
P07	(2)	-.11994	20276	16122	57349	98
P08	(0)	.14888	94789	13897	90290	

Q00	(2)	.55639	52239	27168	70053	53874 1
Q01	(3)	-.45829	50483	21565	58017	38271
Q02	(4)	.15203	10584	86617	42611	44748 2
Q03	(4)	-.26045	08670	10099	65414	27314
Q04	(4)	.24573	13895	58930	43372	91627
Q05	(4)	-.12609	53962	07644	83131	43775
Q06	(3)	.32517	69082	65411	10784	6713
Q07	(2)	-.35087	45112	89498	96062	87
Q08	(1)	.10000	00000	00000	00000	0

Table 22

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^8 p_j (x^2 - .5625)^j}{\sum_{j=0}^9 q_j (x^2 - .5625)^j}, \quad |x| \leq 0.75$$

P00	(4)	-.14855	07416	31375	47585	18888	90
P01	(5)	.12224	37778	86384	25027	57234	20
P02	(5)	-.40583	89788	79680	35456	47898	0
P03	(5)	.69757	81844	60969	87204	28582	1
P04	(5)	-.66288	23025	05639	13958	55685	3
P05	(5)	.34463	97685	29636	34922	35886	8
P06	(4)	-.90929	43390	09954	49270	6398	
P07	(4)	.10216	63340	31473	91172	4304	
P08	(2)	-.31549	39308	61967	72332	97	

Q00	(4)	-.13696	86964	88759	97272	79408	64
Q01	(5)	.11981	80299	00809	72831	85263	25
Q02	(5)	-.42786	90319	25295	57109	76717	7
Q03	(5)	.80377	23153	68116	65072	18183	7
Q04	(5)	-.85372	62983	60500	47166	53500	2
Q05	(5)	.51302	86782	64824	34171	83716	8
Q06	(5)	-.16518	01534	34648	83596	03975	
Q07	(4)	.25060	38305	29015	98314	1685	
Q08	(3)	-.13449	14312	10066	37969	734	
Q09	(1)	.10000	00000	00000	00000	0	

Table 23

$$\operatorname{inverf} x \approx p_0 x, 0.75 \leq x \leq 0.9375$$

P00 (1) .12240

Table 24

$$\operatorname{inverf} x \approx x p_0 / \sum_{j=0}^1 q_j (x^2 - .87890625)^j, 0.75 \leq x \leq 0.9375$$

P00 (1) -.14862 5

Q00 (1) -.10710 4

Q01 (1) .10000 0

Table 25

$$\operatorname{inverf} x \approx x \sum_{j=0}^1 p_j (x^2 - .87890625)^j / \sum_{j=0}^1 q_j (x^2 - .87890625)^j$$

$$0.75 \leq x \leq 0.9375$$

P00 (0) -.49075 0

P01 (0) .73423 2

Q00 (0) -.34963 8

Q01 (1) .10000 00

Table 26

$$\operatorname{inverf} x \approx x \sum_{j=0}^1 p_j (x^2 - .87890625)^j / \sum_{j=0}^2 q_j (x^2 - .87890625)^j$$

$$0.75 \leq x \leq 0.9375$$

P00 (1) .10170 950
P01 (1) -.32827 601

Q00 (0) .72455 99
Q01 (1) -.33871 553
Q02 (1) .10000 000

Table 27

$$\operatorname{inverf} x \approx x \sum_{j=0}^2 p_j (x^2 - .87890625)^j / \sum_{j=0}^2 q_j (x^2 - .87890625)^j$$

$$0.75 \leq x \leq 0.9375$$

P00 (0) .23286 863
P01 (1) -.11816 2169
P02 (0) .53384 223

Q00 (0) .16574 853
Q01 (1) -.10835 6783
Q02 (1) .10000 0000

Table 28

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^2 p_j (x^2 - .87890625)^j}{\sum_{j=0}^3 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00 (0) -.70987 5403
P01 (1) .48420 71339
P02 (1) -.52017 61073

Q00 (0) -.50526 3975
Q01 (1) .41865 85067
Q02 (1) -.68492 72415
Q03 (1) .10000 0000

Table 29

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^3 p_j (x^2 - .87890625)^j}{\sum_{j=0}^3 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00 (0) -.12402 56522 1
P01 (1) .10688 05957 4
P02 (1) -.19594 55607 8
P03 (0) .42305 81357

Q00 (-1) -.88276 97997
Q01 (0) .89007 43359
Q02 (1) -.21757 03119 6
Q03 (1) .10000 00000 0

Table 30

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^3 p_j (x^2 - .87890625)^j}{\sum_{j=0}^4 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(0)	.49633	37483	1
P01	(1)	-.51381	57320	25
P02	(2)	.13411	97417	494
P03	(1)	-.71986	74889	6

Q00	(0)	.35327	24232	3
Q01	(1)	-.41747	50925	62
Q02	(2)	.13568	88557	20
Q03	(2)	-.11436	53583	76
Q04	(1)	.10000	00000	0

Table 31

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^4 p_j (x^2 - .87890625)^j}{\sum_{j=0}^4 q_j (x^2 - .87890625)^j},$$

$$0.75 \leq x \leq 0.9375$$

P00	(-1)	.70156	83618	57
P01	(0)	-.85081	95568	326
P02	(1)	.29255	14644	677
P03	(1)	-.27905	98322	322
P04	(0)	.35215	10941	60

Q00	(-1)	.49935	10018	90
Q01	(0)	-.67874	50194	062
Q02	(1)	.27807	50537	918
Q03	(1)	-.36178	90396	636
Q04	(1)	.10000	00000	000

Table 32

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^4 p_j (x^2 - .87890625)^j}{\sum_{j=0}^5 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(0)	-.34688	76691	975
P01	(1)	.48077	41226	0565
P02	(2)	-.20478	70119	02191
P03	(2)	.28746	57116	0243
P04	(1)	-.92530	46782	146

Q00	(0)	-.24690	21046	736
Q01	(1)	.37837	25103	8596
Q02	(2)	-.18656	21299	89775
Q03	(2)	.33183	07146	4595
Q04	(2)	-.17137	25392	4242
Q05	(1)	.10000	00000	000

Table 33

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^5 p_j (x^2 - .87890625)^j}{\sum_{j=0}^5 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(-1)	-.41139	81706	7782
P01	(0)	.64372	98540	03468
P02	(1)	-.32890	26740	93993
P03	(1)	.62451	84315	79026
P04	(1)	-.36595	35964	95117
P05	(0)	.30260	11494	3200

Q00	(-1)	-.29324	54062	0124
Q01	(0)	.50114	85005	27886
Q02	(1)	-.29014	46872	99145
Q03	(1)	.66539	30519	63183
Q04	(1)	-.54064	05804	12825
Q05	(1)	.10000	00000	00000

Table 34

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^5 P_j (x^2 - .87890625)^j}{\sum_{j=0}^6 Q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(0)	.24224	96386	24227	
P01	(1)	-.42046	64715	16659	5
P02	(2)	.25011	19714	04336	44
P03	(2)	-.60090	53042	30262	6
P04	(2)	.52922	02474	16856	0
P05	(2)	-.11352	87386	00315	7
Q00	(0)	.17242	45722	39610	
Q01	(1)	-.32453	56272	40065	3
Q02	(2)	.21534	95322	70387	63
Q03	(2)	-.60543	86604	59822	3
Q04	(2)	.68454	59265	64466	8
Q05	(2)	-.23943	36037	07420	7
Q06	(1)	.10000	00000	00000	

Table 35

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^6 P_j (x^2 - .87890625)^j}{\sum_{j=0}^6 Q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

Q00	(-1)	.17668	44629	48063	5
Q01	(0)	-.36363	30704	38225	98
Q02	(1)	.27271	87290	63128	61
Q03	(1)	-.91404	63803	21697	81
Q04	(2)	.13531	59828	30615	354
Q05	(1)	-.75390	55414	34509	52
Q06	(1)	.10000	00300	00000	00
P00	(-1)	.24823	46661	96142	9
P01	(0)	-.47451	99401	35955	27
P02	(1)	.32302	00558	30891	51
P03	(1)	-.94705	89734	85633	36
P04	(2)	.11486	63107	16174	902
P05	(1)	-.45575	02217	01686	04
P06	(0)	.26588	64808	95280	0

Table 36

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^6 p_j (x^2 - .87890625)^j}{\sum_{j=0}^7 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(0)	-.16904	78046	78174	49
P01	(1)	.35243	74318	10022	774
P02	(2)	-.26981	43370	55035	2151
P03	(2)	.93407	83061	01874	299
P04	(3)	-.14553	64428	64673	2178
P05	(2)	.88058	52004	72365	945
P06	(2)	-.13490	18591	23194	732
Q00	(0)	-.12032	21171	31342	87
Q01	(1)	.26848	12231	55663	173
Q02	(2)	-.22424	85268	70486	4906
Q03	(2)	.87234	95028	64349	429
Q04	(3)	-.16043	52408	44431	8626
Q05	(3)	.12591	17982	10152	5057
Q06	(2)	-.31848	61786	24882	403
Q07	(1)	.10000	00000	00000	00

Table 37

$$\operatorname{inverf} x \approx x \sum_{j=0}^7 p_j (x^2 - .87890625)^j / \sum_{j=0}^7 q_j (x^2 - .87890625)^j$$

$$0.75 \leq x \leq 0.9375$$

P00	(-1)	-.15238	92634	40726	128
P01	(0)	.34445	56924	13612	5216
P02	(1)	-.29344	39867	25424	78687
P03	(2)	.11763	50570	52178	27302
P04	(2)	-.22655	29282	31011	04193
P05	(2)	.19121	33439	65803	30163
P06	(1)	-.54789	27619	59831	8769
P07	(0)	.23751	66890	24448	000

Q00	(-1)	-.10846	51696	02059	954
Q01	(0)	.26106	28885	84307	8511
Q02	(1)	-.24068	31810	43937	57995
Q03	(2)	.10695	12997	33870	14469
Q04	(2)	-.23716	71552	15965	81025
Q05	(2)	.24640	15894	39172	84883
Q06	(2)	-.10014	37634	97830	70835
Q07	(1)	.10000	00000	00000	0000

Table 38

$$\text{inverf } x \approx x \frac{\sum_{j=0}^7 p_j (x^2 - .87890625)^j}{\sum_{j=0}^8 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(0)	.11788	89795	86894	9835
P01	(1)	-.28690	44151	56443	38990
P02	(2)	.26891	12457	63661	39280 1
P03	(3)	-.12244	67479	86750	07204 0
P04	(3)	.28150	48808	08414	72939 1
P05	(3)	-.30866	76924	69725	28252 1
P06	(3)	.13631	28203	54108	03612 4
P07	(2)	-.15659	36326	14413	24707

Q00	(-1)	.83909	11456	88223	996
Q01	(1)	-.21650	21385	97219	93642
Q02	(2)	.21814	84046	40264	70913 5
Q03	(3)	-.10893	83625	72869	91744 5
Q04	(3)	.28314	32465	28204	70264 8
Q05	(3)	-.36907	64811	17669	62886 7
Q06	(3)	.21317	90751	18569	95133 6
Q07	(2)	-.40848	16219	63519	60986
Q08	(1)	.10000	00000	00000	0000

Table 39

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^8 p_j (x^2 - .87890625)^j}{\sum_{j=0}^8 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(-2)	.94897	36280	86810	8002		
P01	(0)	-.24758	24236	28233	55485	8	
P02	(1)	.25349	38922	07148	93916	88	
P03	(2)	-.12954	19898	06467	71502	07	
P04	(2)	.34810	85774	93575	00873	33	
P05	(2)	-.47644	36712	97871	81802	84	
P06	(2)	.29631	33150	58763	08122	74	
P07	(1)	-.64200	07150	72094	48654	9	
P08	(0)	.21489	18500	73070	62000		
Q00	(-2)	.67544	51277	88509	4594		
Q01	(0)	-.18611	65062	73721	78511	4	
Q02	(1)	.20369	29504	72163	51160	19	
Q03	(2)	-.11315	36062	42380	54876	36	
Q04	(2)	.33880	17677	95951	42684	61	
Q05	(2)	-.53715	37344	88621	43348	55	
Q06	(2)	.41409	99177	84288	88715	67	
Q07	(2)	-.12831	38383	39532	26499	44	
Q08	(1)	.10010	00000	00000	00000	0	

Table 40

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^8 p_j (x^2 - .87890625)^j}{\sum_{j=0}^9 q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(-1)	-.82168	12190	35724	59683	.
P01	(1)	.22861	80685	91703	46309	88
P02	(2)	-.25367	56331	36660	49703	850
P03	(3)	.14367	81666	61149	53140	806
P04	(3)	-.44210	09066	85900	02871	390
P05	(3)	.72855	04644	52946	48562	452
P06	(3)	-.59374	74232	84138	84663	358
P07	(3)	.19987	29891	69772	31980	380
P08	(2)	-.17856	23079	33513	29801	95

Q00	(-1)	-.58484	29920	14349	78481	
Q01	(1)	.17129	09064	02908	92507	23
Q02	(2)	-.20218	71785	32085	94474	378
Q03	(3)	.12358	65726	41248	33025	955
Q04	(3)	-.41892	73760	68941	86680	375
Q05	(3)	.78451	94250	03326	29935	385
Q06	(3)	-.76459	01174	75386	71664	942
Q07	(3)	.33897	18080	99299	65434	408
Q08	(2)	-.50938	07739	23598	69524	61
Q09	(1)	.10000	00000	00000	00000	0

Table 41

$$\operatorname{inverf} x \approx x \sum_{j=0}^9 p_j (x^2 - .87890625)^j / \sum_{j=0}^9 q_j (x^2 - .87890625)^j$$

$$0.75 \leq x \leq 0.9375$$

P00	(-2)	-.59764	86905	88381	75131	8
P01	(0)	.17674	83979	67448	47515	643
P02	(1)	-.21145	24958	94984	66552	6362
P03	(2)	.13166	90005	22637	84798	6855
P04	(2)	-.45790	74446	32397	35517	9198
P05	(2)	.88866	35189	86412	85800	8986
P06	(2)	-.91099	70656	20514	38885	3049
P07	(2)	.43507	10102	80429	18522	7802
P08	(1)	-.73779	42025	51541	85450	674
P09	(0)	.19639	95497	42267	95300	88
Q00	(-2)	-.42538	47359	28801	67288	2
Q01	(0)	.13203	56466	38370	83008	109
Q02	(1)	-.16732	79797	64925	17255	3288
Q03	(2)	.11175	35390	56790	87339	5509
Q04	(2)	-.42412	91295	73455	92290	4538
Q05	(2)	.92124	95357	53296	52561	8751
Q06	(3)	-.10995	52696	68950	14634	81649
Q07	(2)	.65474	13396	56766	42844	5679
Q08	(2)	-.15989	24757	10877	69057	8947
Q09	(1)	.18080	80000	80000	80000	8000

Table 42

$$\operatorname{inverf} x \approx x \frac{\sum_{j=0}^9 p_j (x^2 - .87890625)^j}{\sum_{j=0}^{10} q_j (x^2 - .87890625)^j}$$

$$0.75 \leq x \leq 0.9375$$

P00	(-1)	.57245	10367	06304	13025	736
P01	(1)	-.17922	39910	01163	08457	50333
P02	(2)	.22982	14563	37602	80253	30223
P03	(3)	-.15596	47381	07463	43382	37102 6
P04	(3)	.60488	56566	77555	24751	04163 5
P05	(4)	-.13531	59636	47737	96769	29291 63
P06	(4)	.16816	89509	41079	01541	16292 2
P07	(4)	-.10596	02532	80152	42679	41789 0
P08	(3)	.28095	37086	01439	47177	37933
P09	(2)	-.20077	54828	18109	00130	5957
Q00	(-1)	.40744	99566	65585	29014	277
Q01	(1)	-.13353	49134	41672	33883	49744
Q02	(2)	.18072	83225	79667	13936	04860
Q03	(3)	-.13086	40724	25849	79659	74402 1
Q04	(3)	.54961	76407	56380	40421	50828 7
Q05	(4)	-.13597	68418	15301	54992	87647 42
Q06	(4)	.19289	05692	53913	39207	09331 7
Q07	(4)	-.14607	73580	25996	07012	62205 5
Q08	(3)	.51309	08257	65227	62255	53270
Q09	(2)	-.62115	03816	42844	68933	3398
Q10	(1)	.10000	00000	00000	00000	010

Table 43

$$\text{inverf } x \approx x \sum_{j=0}^{10} p_j (x^2 - .87890625)^j / \sum_{j=0}^{10} q_j (x^2 - .87890625)^j$$

$$0.75 \leq x \leq 0.9375$$

P00	(-2)	.37983	61161	79297	66727	3885
P01	(0)	-.12556	42587	17295	35132	3457
P02	(1)	.17191	66838	39930	98377	33032 2
P03	(2)	-.12641	81923	50003	89155	25868 53
P04	(2)	.54198	57639	69472	07196	29612 88
P05	(3)	-.13784	05771	93031	96737	27419 769
P06	(3)	.20298	24274	37465	85797	76497 21
P07	(3)	-.16186	93620	61499	16906	48635 95
P08	(2)	.61246	55913	29226	67158	38562 1
P09	(1)	-.83526	10553	94993	15138	73433
P10	(0)	.19093	39020	20126	98960	0000
Q00	(-2)	.27035	36183	07234	82129	4499
Q01	(-1)	-.93333	19755	78378	16539	27285
Q02	(1)	.13447	62736	54698	18351	12417 6
Q03	(2)	-.10500	03755	32426	47117	97308 24
Q04	(2)	.48429	10556	29395	17946	31175 19
Q05	(3)	-.13497	31234	71034	81689	34554 936
Q06	(3)	.22315	52950	37563	36487	62242 09
Q07	(3)	-.20810	14743	80799	74854	96484 96
Q08	(2)	.98667	95523	36503	86780	60210 2
Q09	(2)	-.19497	30256	25481	98205	51484 4
Q10	(1)	.10000	90000	00000	00000	00000

Table 44

$$\text{inverf } x \approx \xi^{-1} p_0, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (0) .681

Table 45

$$\text{inverf } x \approx \xi^{-1} \sum_{j=0}^1 p_j \xi^j, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (1) .10256 62

P01 (0) -.38040

Table 46

$$\text{inverf } x \approx \xi^{-1} p_0 / \sum_{j=0}^2 q_j \xi^j, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (1) .22715 88

Q00 (1) .22517 159

Q01 (0) .43813 8

Q02 (1) .10000 00

Table 47

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^1 p_j \xi^j}{\sum_{j=0}^2 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (0) .98650 068
 P01 (0) .92601 777

Q00 (0) .98424 719
 Q01 (1) .10074 7432
 Q02 (1) .10000 0000

Table 48

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^3 p_j \xi^j}{\sum_{j=0}^1 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (0) .56930 6387
 P01 (0) .97371 2122
 P02 (0) -.77555 5339
 P03 (0) .23380 4987

Q00 (0) .56881 3561
 Q01 (1) .10000 00000

Table 49

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^2 p_j \xi^j}{\sum_{j=0}^3 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(0)	.23082	54405	3
P01	(1)	.15148	62609	18
P02	(0)	.76478	59261	

Q00	(0)	.23077	97955	8
Q01	(1)	.15194	85204	63
Q02	(1)	.11941	21785	57
Q03	(1)	.10000	00000	0

Table 50

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^5 p_j \xi^j}{\sum_{j=0}^2 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(0)	.15504	70003	116
P01	(1)	.13827	19649	631
P02	(0)	.69096	93488	87
P03	(1)	-.11280	81391	617
P04	(0)	.68054	42468	25
P05	(0)	-.16444	15679	1

Q00	(0)	.15502	48498	22
Q01	(1)	.13852	28141	995
Q02	(1)	.10000	00000	800

Table 51

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^2 p_j \xi^j}{\sum_{j=0}^6 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(1)	.10676	11247	6342
P01	(2)	.19384	61849	9846
P02	(2)	.53288	15015	8236

Q00	(1)	.10675	48625	1484
Q01	(2)	.19395	10752	45869
Q02	(2)	.55724	35357	9446
Q03	(2)	.24416	64030	4774
Q04	(2)	.21251	85200	4419
Q05	(1)	-.70446	97237	727
Q06	(1)	.10000	00000	000

Table 52

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^8 p_j \xi^j}{\sum_{j=0}^2 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-1)	.11125	21834	95389
P01	(0)	.26833	42048	26738 2
P02	(0)	.97313	42208	25484 2
P03	(0)	-.37745	85822	57143 0
P04	(0)	-.44686	70406	19259
P05	(0)	.71598	15703	61426
P06	(0)	-.46059	71444	09907
P07	(0)	.15164	63463	43608
P08	(-1)	-.20555	09764	649

Q00	(-1)	.11124	79925	39409
Q01	(0)	.26841	99897	32864
Q02	(1)	.10000	03000	00000 0

Table 53

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^6 p_j \xi^j}{\sum_{j=0}^5 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(-2)	.47944	77933	46469	
P01	(0)	.17121	76690	13834	01
P02	(1)	.12618	65207	19596	240
P03	(1)	.21339	06055	64337	15
P04	(0)	.28387	37490	01951	4
P05	(0)	.23530	35904	89892	9
P06	(-1)	-.40076	38986	44416	

Q00	(-2)	.47943	70466	09729	
Q01	(0)	.17124	54255	49151	92
Q02	(1)	.12742	21706	54959	402
Q03	(1)	.24161	88379	94885	09
Q04	(1)	.14957	33748	30505	66
Q05	(1)	.10000	00000	00000	00

Table 54

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^6 p_j \xi^j}{\sum_{j=0}^7 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-2)	.14537	56965	30059	13
P01	(-1)	.75724	22575	02058	771
P02	(0)	.90290	08339	50101	4639
P03	(1)	.30478	36391	60287	47248
P04	(1)	.29528	72269	43320	04428
P05	(1)	.20126	96109	44065	6463
P06	(0)	.87822	13117	50254	978

Q00	(-2)	.14587	37705	96959	530
Q01	(-1)	.75730	50728	17257	843
Q02	(0)	.90690	25318	98225	1188
Q03	(1)	.31885	55138	14325	32505
Q04	(1)	.40562	61832	81058	89543
Q05	(1)	.40734	83581	25808	1838
Q06	(1)	.22017	07144	79728	9713
Q07	(1)	.10000	00000	00000	0000

Table 55

$$\text{inverf } x \approx \xi^{-1} \sum_{j=0}^9 p_j \xi^j / \sum_{j=0}^6 q_j \xi^j, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-2)	.14143	50031	57589	907
P01	(-1)	.79276	74143	50942	1103
P02	(1)	.10098	23529	04220	31850 6
P03	(1)	.34235	55244	32719	18780 7
P04	(1)	.20374	08451	13919	36914
P05	(0)	-.10426	94789	24189	6647
P06	(0)	.92342	93226	80556	7008
P07	(0)	-.46722	37712	07606	3860
P08	(0)	.13265	53492	82737	031
P09	(-1)	-.16766	08689	55712	06

Q00	(-2)	.14143	41958	42495	024
Q01	(-1)	.79282	38229	28832	3465
Q02	(1)	.10137	58305	87846	69844 0
Q03	(1)	.35738	19664	98479	43117
Q04	(1)	.32958	99297	13345	45573
Q05	(1)	.20600	52253	44168	39652
Q06	(1)	.10000	00000	00000	00000

Table 56

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^8 p_j \xi^j}{\sum_{j=0}^8 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-4)	.31008	08562	55295	8465	
P01	(-2)	.40974	87603	01193	99241	
P02	(0)	.12149	02662	89727	61616	64
P03	(1)	.11091	67694	63902	82026	357
P04	(1)	.32283	79855	66392	39484	307
P05	(1)	.28816	91815	65159	88262	11
P06	(1)	.20479	72087	26299	60497	29
P07	(0)	.85459	22081	97214	83280	6
P08	(-2)	.35510	95884	62238	3139	
Q00	(-4)	.31008	09298	56452	2487	
Q01	(-2)	.40975	28678	66391	45041	
Q02	(0)	.12159	07800	74875	71430	68
Q03	(1)	.11186	27167	63169	64210	428
Q04	(1)	.34323	63984	30529	01805	054
Q05	(1)	.41402	84677	11620	21505	54
Q06	(1)	.41197	97271	27220	41212	85
Q07	(1)	.21629	61962	64143	45609	20
Q08	(1)	.10000	00000	00000	00000	00

Table 57

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^8 p_j \xi^j}{\sum_{j=0}^9 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-3)	.10501	31152	37334	38116
P01	(-1)	.10532	61131	42333	38164 25
P02	(0)	.26987	80273	62432	83544 516
P03	(1)	.23268	69578	89196	90806 414
P04	(1)	.71678	54794	91079	96810 001
P05	(1)	.85475	61182	21678	27825 185
P06	(1)	.68738	08807	35438	39802 913
P07	(1)	.36270	02483	09587	08930 02
P08	(0)	.88606	27392	96515	46814 9
Q00	(-3)	.10501	26668	70303	37690
Q01	(-1)	.10532	86230	09333	27531 11
Q02	(0)	.27019	86237	37515	54845 553
Q03	(1)	.23501	43639	79702	53259 123
Q04	(1)	.76078	02878	58012	77064 551
Q05	(2)	.11181	58610	40569	07827 3451
Q06	(2)	.11948	78791	84353	96667 8438
Q07	(1)	.81922	40974	72699	07893 913
Q08	(1)	.40993	87907	63680	15361 45
Q09	(1)	.10000	00000	00000	00000 00

Table 58

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{10} p_j \xi^j}{\sum_{j=0}^8 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-4)	.56451	97770	98648	82298
P01	(-2)	.53504	14748	78930	13765 64
P02	(0)	.12969	55009	97273	52403 0254
P03	(1)	.10426	15854	92982	66122 83637
P04	(1)	.28302	67790	17544	89974 2694
P05	(1)	.26255	67287	94480	72726 6643
P06	(1)	.20789	74263	01749	17228 9354
P07	(0)	.72718	80623	15568	11306 121
P08	(-1)	.66816	80771	18049	89575 0
P09	(-1)	-.17791	00457	51117	59979 1
P10	(-2)	.22419	56322	33463	45828

Q00	(-4)	.56451	69986	27606	51514
Q01	(-2)	.53505	58706	79306	53953 35
Q02	(0)	.12986	61541	69116	46934 5513
Q03	(1)	.10542	93223	26264	91195 2443
Q04	(1)	.30379	33117	35222	06237 2456
Q05	(1)	.37631	16853	64050	28901 0232
Q06	(1)	.38782	85827	70420	11263 5182
Q07	(1)	.20372	43181	74121	77929 8258
Q08	(1)	.10030	00000	00000	00000 000

Table 59

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{10} p_j \xi^j}{\sum_{j=0}^{10} q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-5)	.11738	35250	99916	66680	42
P01	(-3)	.13858	51811	34967	18807	956
P02	(-2)	.43836	70987	71260	95665	3116
P03	(-1)	.53644	86114	71536	48365	69526
P04	(0)	.34839	28713	96575	22572	31828 0
P05	(1)	.15335	29752	39898	90804	34319 43
P06	(1)	.35780	40256	90859	96758	23779 6
P07	(1)	.31598	51960	11320	90206	35148 4
P08	(1)	.21371	21499	72655	15514	51050 7
P09	(0)	.86030	09752	62802	60580	01956
P10	(-2)	.27834	01035	37470	01059	96

Q00	(-5)	.11738	31387	23977	77529	27
Q01	(-3)	.13858	76216	55322	46059	720
Q02	(-2)	.43873	42402	27069	35023	4583
Q03	(-1)	.53963	55030	32008	16743	66763
Q04	(0)	.35609	08730	59002	65560	07175 1
Q05	(1)	.16068	37770	97190	17608	77943 20
Q06	(1)	.39846	60818	46717	57295	52121 6
Q07	(1)	.46632	96034	87366	35331	33480 6
Q08	(1)	.43859	04525	64495	54653	69550 7
Q09	(1)	.22859	98127	24229	05411	98706 6
Q10	(1)	.10000	00000	00000	00000	00000

Table 60

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{11} p_j \xi^j}{\sum_{j=0}^{10} q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-5)	.19953	28896	45372	10824	86
P01	(-3)	.21273	70263	17859	53343	3481
P02	(-2)	.58975	59595	24072	47651	4135
P03	(-1)	.59481	90145	27358	89123	80875
P04	(0)	.31328	28983	89326	67506	43282 3
P05	(1)	.13630	13995	64422	60990	23133 27
P06	(1)	.34152	81520	56529	30673	63048 19
P07	(1)	.30184	18146	89336	06839	71718 9
P08	(1)	.20842	43354	62073	39433	31686 0
P09	(0)	.85545	63502	67434	99993	98754
P10	(-2)	.40273	91840	87128	93132	298
P11	(-3)	-.15196	13911	57447	16810	2

Q00	(-5)	.19953	21037	93742	12953	70
Q01	(-3)	.21274	15696	34040	84598	9564
Q02	(-2)	.59037	06202	37313	54671	0838
Q03	(-1)	.59959	15011	08610	92334	24770
Q04	(0)	.32318	08308	08178	36442	40561 0
Q05	(1)	.14378	33780	47493	44527	82249 33
Q06	(1)	.37644	57150	82579	69664	40074 96
Q07	(1)	.44081	43569	81438	41173	76015 8
Q08	(1)	.42508	71049	71828	04686	34993 8
Q09	(1)	.22127	46942	79697	85343	06411 5
Q10	(1)	.10000	00000	00000	00000	00000 0

Table 61

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{13} p_j \xi^j}{\sum_{j=0}^9 q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-5)	.17029	70491	07967	08016	142
P01	(-3)	.24570	51233	12105	17459	60803
P02	(-2)	.97783	79899	23616	88749	34800 6
P03	(0)	.14537	65287	12209	34050	49862 15
P04	(0)	.89334	91748	59923	39148	10483 28
P05	(1)	.23889	52874	03955	32949	06263 978
P06	(1)	.30900	23631	60079	67119	52925 016
P07	(1)	.19793	33570	92262	72165	70093 09
P08	(0)	.43854	19046	17763	56012	36815 8
P09	(0)	.48534	12494	85699	74824	04914 3
P10	(0)	-.30475	67857	48365	58342	29150 3
P11	(0)	.12046	31192	43646	27398	14332 3
P12	(-1)	-.28282	24938	04011	78345	9565
P13	(-2)	.30528	44117	38658	20854	745
Q00	(-5)	.17029	66312	38113	98774	963
Q01	(-3)	.24570	81299	62366	99010	02795
Q02	(-2)	.97838	61042	11932	13862	84130
Q03	(0)	.14596	83981	34359	67426	83854 39
Q04	(0)	.91164	65700	46856	86528	08523 17
Q05	(1)	.25957	49106	58118	66488	71838 648
Q06	(1)	.40076	44480	82818	03327	68448 626
Q07	(1)	.36979	40604	47932	54095	38307 84
Q08	(1)	.21138	02548	27004	27901	10478 36
Q09	(1)	.10080	00000	00000	00000	00000 00

Table 62

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{10} p_j \xi^j}{\sum_{j=0}^{13} q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-3)	.39069	61256	82794	49520	567
P01	(-1)	.60163	82750	27446	85594	87812
P02	(1)	.25904	29476	40100	41284	18997 00
P03	(2)	.42502	07027	24353	38918	58417 142
P04	(3)	.29989	63587	93527	13098	49698 1052
P05	(4)	.10301	41294	93188	81936	28784 3003
P06	(4)	.22677	59611	31486	67402	05370 4284
P07	(4)	.35209	52855	51729	17247	48533 8948
P08	(4)	.26815	72676	71807	02438	32495 3694
P09	(4)	.16977	37630	23360	28988	34077 911
P10	(3)	.57120	96628	95364	49355	25523 31

Q00	(-3)	.39069	52579	65350	28249	7741
Q01	(-1)	.60164	48077	83463	38892	21804
Q02	(1)	.25916	98570	69825	96179	93466 60
Q03	(2)	.42649	14050	97571	19936	91622 842
Q04	(3)	.38485	56477	28554	80492	75413 3811
Q05	(4)	.10929	28031	30911	92420	37105 8821
Q06	(4)	.25995	95937	79846	81611	49506 2678
Q07	(4)	.44114	35295	61956	85242	22359 3112
Q08	(4)	.44443	06154	47785	02985	90991 0432
Q09	(4)	.36874	98162	49684	46389	47049 2427
Q10	(4)	.17529	93820	52523	97097	48231 323
Q11	(3)	.69751	77437	05862	28156	07985 56
Q12	(2)	-.10612	76925	79519	54218	03792 5
Q13	(1)	.19000	00000	00000	00080	00000

Table 63

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{12} p_j \xi^j}{\sum_{j=0}^{13} q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-6)	.11522	61405	60469	49369	24051	
P01	(-4)	.21819	99668	14587	93482	56875	51
P02	(-2)	.12020	87080	93301	40260	99580	7673
P03	(-1)	.26716	95163	26254	64659	13312	3065
P04	(0)	.27570	68413	75619	89159	20978	9071
P05	(1)	.14646	27875	19201	37024	44941	5715
P06	(1)	.45183	35984	80010	52933	83292	2898
P07	(1)	.88653	55358	42886	66464	44315	7281
P08	(2)	.11130	63973	16379	22481	76029	1236
P09	(2)	.10230	35796	45670	19308	36301	9019
P10	(1)	.67962	24757	84076	19867	16355	1386
P11	(1)	.30104	54413	08139	68517	34479	4706
P12	(0)	.88611	87006	97448	90620	00056	5737

Q00	(-6)	.11522	59575	41306	01406	24614	
Q01	(-4)	.21820	15788	10335	93406	94592	18
Q02	(-2)	.12024	72379	43735	48641	11249	2874
Q03	(-1)	.26772	73698	91010	05853	29925	0042
Q04	(0)	.27817	06139	46817	35880	57652	0533
Q05	(1)	.15085	24376	52335	15563	87854	9036
Q06	(1)	.48769	99209	22942	55757	89186	5613
Q07	(2)	.10377	67812	16985	79281	93858	5565
Q08	(2)	.14958	78195	63311	06554	27518	9149
Q09	(2)	.16322	32437	87484	58073	92297	5853
Q10	(2)	.13167	26933	78105	60031	30634	3686
Q11	(1)	.81793	00909	32540	56092	11112	8117
Q12	(1)	.33952	53241	33505	85425	59088	2338
Q13	(1)	.09999	99999	99999	99999	99999	9999

Table 64

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{14} p_j \xi^j}{\sum_{j=0}^{12} q_j \xi^j}, \quad 0.9375 \leq x \leq 1-10^{-100}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-7)	.55430	47116	50111	60103	79781	
P01	(-4)	.11425	90847	66914	96984	00155	016
P02	(-3)	.68839	21737	78053	02994	29711	5631
P03	(-1)	.16747	34778	29701	53605	80047	8392
P04	(0)	.18722	81387	47262	23861	26543	8230
P05	(1)	.10399	27979	23348	87919	82438	0669
P06	(1)	.31609	87137	84919	25900	92970	6177
P07	(1)	.59873	72841	52602	30257	78610	5671
P08	(1)	.71081	56183	58225	57115	66772	1252
P09	(1)	.49349	55386	73668	83116	16445	1019
P10	(1)	.29386	18828	86453	73079	31788	4758
P11	(0)	.73730	55263	34374	10593	86994	3767
P12	(-1)	.46121	12165	52813	45382	05083	7902
P13	(-2)	.87363	76813	04722	52465	38710	485
P14	(-3)	.77400	27922	69106	13889	81329	5

Q00	(-7)	.55430	39562	53733	78240	40471	
Q01	(-4)	.11425	98011	15445	85037	78726	516
Q02	(-3)	.68857	97999	25517	97551	38217	4915
Q03	(-1)	.16777	05888	67402	51069	84832	3282
Q04	(0)	.18867	02359	53749	57604	57503	2631
Q05	(1)	.10681	66661	65608	47009	91004	0343
Q06	(1)	.34134	07749	15634	61100	15673	4285
Q07	(1)	.70655	51683	22478	33053	86392	3977
Q08	(1)	.97334	65449	61018	95065	71843	8458
Q09	(1)	.90417	25867	08973	52657	41313	2457
Q10	(1)	.65907	80337	34948	61638	59822	5434
Q11	(1)	.29541	10212	58709	90378	50678	2300
Q12	(1)	.09399	99999	99939	99999	39999	9999

Table 65

$$\text{inverf } x \approx \xi^{-1} p_0, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00 (0) .99635

Table 66

$$\text{inverf } x \approx \xi^{-1} p_0 / \sum_{j=0}^1 q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00 (1) .83660 49

Q00 (1) .83558 56

Q01 (1) .10000 0

Table 67

$$\text{inverf } x \approx \xi^{-1} p_0 / \sum_{j=0}^2 q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (0) .79038 112

Q00 (0) .79025 8095

Q01 (-1) .22877 4

Q02 (1) .10000 00

Table 68

$$\text{inverf } x \approx \xi^{-1} \sum_{j=0}^2 p_j \xi^j / \sum_{j=0}^1 q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00 (0) .20504 66018

P01 (0) .99789 4857

P02 (0) -.41635 332

Q00 (0) .20503 99066

Q01 (1) .10000 00000

Table 69

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^1 p_j \xi^j}{\sum_{j=0}^3 q_j \xi^j}, \quad 1 \cdot 10^{-100} \leq x \leq 1 \cdot 10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(0)	.10479 19634 2
P01	(1)	.13707 99584 0

Q00	(0)	.10479 05658 92
Q01	(1)	.13714 19617 2
Q02	(0)	.24919 1738
Q03	(1)	.10000 0000

Table 70

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^3 p_j \xi^j}{\sum_{j=0}^2 q_j \xi^j}, \quad 1 \cdot 10^{-100} \leq x \leq 1 \cdot 10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(-2)	.98045 62029 15
P01	(0)	.36366 78891 71
P02	(0)	.97302 94983 7
P03	(0)	-.53749 47401

Q00	(-2)	.98045 12778 02
Q01	(0)	.36369 99715 44
Q02	(1)	.10000 00000 00

Table 71

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^2 p_j \xi^j}{\sum_{j=0}^4 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(-2)	.61926	76105	55
P01	(0)	.35525	93025	854
P02	(1)	.19887	48035	060
Q00	(-2)	.61926	57895	409
Q01	(0)	.35527	41794	749
Q02	(1)	.20069	01506	325
Q03	(0)	.61930	15752	1
Q04	(1)	.10000	00000	0

Table 72

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^4 p_j \xi^j}{\sum_{j=0}^3 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(-3)	.22899	40827	4324
P01	(-1)	.26383	04418	19694
P02	(0)	.46043	01477	86939
P03	(0)	.94276	21490	4644
P04	(0)	-.57724	78103	254
Q00	(-3)	.22899	37946	4858
Q01	(-1)	.26383	38165	76924
Q02	(0)	.46116	70917	90869
Q03	(1)	.10000	00000	00000

Table 73

$$\operatorname{inverf} x \approx \xi^{-1} \sum_{j=0}^3 p_j \xi^j / \sum_{j=0}^5 q_j \xi^j, \quad 1 \cdot 10^{-100} \leq x \leq 1 \cdot 10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-3)	.25714	37550	27167
P01	(-1)	.35082	77090	74057
P02	(0)	.77626	13473	11802
P03	(1)	.25935	68249	81201

Q00	(-3)	.25714	35002	08623
Q01	(-1)	.35083	10289	17669 6
Q02	(0)	.77710	79252	45628
Q03	(1)	.26730	87273	81966
Q04	(1)	.10876	82207	1345
Q05	(1)	.10000	00000	000

Table 74

$$\operatorname{inverf} x \approx \xi^{-1} \sum_{j=0}^4 p_j \xi^j / \sum_{j=0}^5 q_j \xi^j, \quad 1 \cdot 10^{-100} \leq x \leq 1 \cdot 10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-4)	.27519	57458	20285
P01	(-2)	.51858	36044	76728 0
P02	(0)	.17929	40985	73957 58
P03	(1)	.12231	82562	59906 23
P04	(1)	.10011	38992	23338 8

Q00	(-4)	.27519	55709	83484
Q01	(-2)	.51858	63764	09414 1
Q02	(0)	.17938	85590	14912 49
Q03	(1)	.12329	03254	83169 35
Q04	(1)	.13002	90156	06176 5
Q05	(1)	.10000	00000	00000

Table 75

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^4 p_j \xi^j}{\sum_{j=0}^6 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-5)	.92474	31817	50278	8
P01	(-2)	.23140	55182	29532	59
P02	(0)	.11718	59056	07554	639
P03	(1)	.14071	60462	51535	023
P04	(1)	.31711	94588	28176	88

Q00	(-5)	.92474	27882	00114	5
Q01	(-2)	.23140	62642	29138	718
Q02	(0)	.11721	87977	02384	836
Q03	(1)	.14132	11664	35098	655
Q04	(1)	.33931	02957	17151	17
Q05	(1)	.16360	23734	90049	7
Q06	(1)	.10030	00000	00000	

Table 76

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^5 p_j \xi^j}{\sum_{j=0}^6 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-6)	.77391	27144	24704	74
P01	(-3)	.25069	18142	76151	471
P02	(-1)	.17675	73152	93550	7734
P03	(0)	.33267	16324	27961	8417
P04	(1)	.14854	99518	98026	6532
P05	(0)	.85249	21034	69995	32

Q00	(-6)	.77391	24889	76299	95
Q01	(-3)	.25069	23213	31364	981
Q02	(-1)	.17678	57332	31619	4143
Q03	(0)	.33336	34697	90176	3300
Q04	(1)	.15223	15596	41231	9796
Q05	(1)	.13260	99445	73021	080
Q06	(1)	.10000	00000	00000	00

Table 77

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^5 p_j \xi^j}{\sum_{j=0}^7 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-6)	.33294	31459	54385	810
P01	(-3)	.13257	91534	02762	0528
P02	(-1)	.12114	20989	92880	95635
P03	(0)	.32187	37361	93217	40052
P04	(1)	.24042	21485	76572	48636
P05	(1)	.37941	93273	44354	1350

Q00	(-6)	.33294	30749	33591	505
Q01	(-3)	.13257	93375	02379	28496
Q02	(-1)	.12115	46347	27806	62088
Q03	(0)	.32225	48145	74589	58227
Q04	(1)	.24312	32642	66548	24962
Q05	(1)	.43170	77761	18013	2816
Q06	(1)	.23385	40499	94681	000
Q07	(1)	.10000	00000	00000	0

Table 78

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^6 p_j \xi^j}{\sum_{j=0}^7 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(-7)	.18254	68185	28684	4560
P01	(-5)	.91406	68599	59729	64791
P02	(-2)	.11090	52053	11618	46826 4
P03	(-1)	.42414	86064	92510	81711 5
P04	(0)	.51965	87891	46264	29918 5
P05	(1)	.17136	65754	46791	75585 7
P06	(0)	.76015	05889	85647	3869

Q00	(-7)	.18254	67910	67000	1958
Q01	(-5)	.91406	76949	69990	37461
Q02	(-2)	.11091	22677	94056	38421 8
Q03	(-1)	.42442	29108	36817	18937 3
Q04	(0)	.52230	78707	49893	15803 5
Q05	(1)	.17913	57238	85083	71000 7
Q06	(1)	.14103	12873	30222	76749
Q07	(1)	.10000	00000	00000	0000

Table 79

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^8 p_j \xi^j}{\sum_{j=0}^6 q_j \xi^j}, \quad 1 \cdot 10^{-100} \leq x \leq 1 \cdot 10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-8)	.32054	05422	06204	9557
P01	(-5)	.18994	79322	63212	78529 1
P02	(-3)	.28142	23189	85853	16084 41
P03	(-1)	.13795	04879	06781	66785 818
P04	(0)	.22681	43542	00597	63291 723
P05	(1)	.10984	21959	89234	01502 27
P06	(0)	.67911	43397	05620	82198
P07	(0)	-.63433	41891	67720	7384
P08	(0)	.34219	51267	24034	321

Q00	(-8)	.32054	05053	28239	7844
Q01	(-5)	.18994	80592	26014	28768 4
Q02	(-3)	.28143	49691	09893	97548 65
Q03	(-1)	.13710	92249	60226	55253 243
Q04	(0)	.22751	72815	17447	32321 08
Q05	(1)	.11253	48514	03695	94014 05
Q06	(1)	.10000	00000	00000	00000 0

Table 80

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^7 p_j \xi^j}{\sum_{j=0}^8 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-9)	.34654	29858	80863	50177
P01	(-6)	.25084	67928	24075	70520 55
P02	(-4)	.47378	13196	37286	02986 534
P03	(-2)	.31312	60375	97786	96408 3388
P04	(-1)	.77948	76454	41435	36994 854
P05	(0)	.70045	68123	35816	43868 271
P06	(1)	.18710	42034	21679	31668 683
P07	(0)	.71452	54774	31351	45428 3

Q00	(-9)	.34654	29567	31595	11156
Q01	(-6)	.25084	69079	75380	27114 87
Q02	(-4)	.47379	53129	59749	13536 339
Q03	(-2)	.31320	63536	46177	68348 0813
Q04	(-1)	.78073	48906	27648	97214 733
Q05	(0)	.70715	04479	95337	58619 993
Q06	(1)	.19998	51543	49112	15105 214
Q07	(1)	.15072	90269	27316	80008 56
Q08	(1)	.10000	80000	00000	00000 0

Table 81

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^9 p_j \xi^j}{\sum_{j=0}^7 q_j \xi^j}, \quad 1 \cdot 10^{-100} \leq x \leq 1 \cdot 10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-10)	.50069	22457	74829	13579	0
P01	(-7)	.42644	79707	07689	30599	206
P02	(-5)	.97151	77540	82926	26982	995
P03	(-3)	.79888	39561	63239	07020	2216
P04	(-1)	.25754	36302	13164	56967	69417
P05	(0)	.31603	21190	95869	40127	79409
P06	(1)	.12318	55657	87185	87095	32610
P07	(0)	.59095	59395	19430	09590	378
P08	(0)	-.84662	68725	78715	48013	1
P09	(0)	.38309	31372	38705	57727	

Q00	(-10)	.50069	22135	48022	43226	8
Q01	(-7)	.42644	81160	13360	72655	398
Q02	(-5)	.97153	83520	90643	26300	944
Q03	(-3)	.79902	42104	44356	79144	0542
Q04	(-1)	.25780	91817	03742	44563	74228
Q05	(0)	.31783	41778	76637	96754	37642
Q06	(1)	.12780	06728	89813	56657	25887
Q07	(1)	.10000	00000	00000	00000	100

Table 82

$$\text{inverf } x \approx \xi^{-1} \sum_{j=0}^8 p_j \xi^j / \sum_{j=0}^9 q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-11)	.45344	68956	32093	98449	85
P01	(-8)	.46156	00632	13453	32510	214
P02	(-5)	.12964	48156	06431	97452	43907
P03	(-3)	.13714	32956	96651	28933	38403 9
P04	(-2)	.60537	91473	91621	89689	04216 2
P05	(0)	.11279	04635	36302	80004	88142 45
P06	(0)	.82810	03090	44626	90215	64139 9
P07	(1)	.19507	62028	75805	68829	45716
P08	(0)	.69952	99060	70581	54857	725

Q00	(-11)	.45344	68737	70882	06782	75
Q01	(-8)	.46156	01760	09335	92555	3458
Q02	(-5)	.12964	67185	09449	81712	63671
Q03	(-3)	.13715	89198	83502	05065	39350 4
Q04	(-2)	.60574	83055	00971	40404	30833 6
Q05	(0)	.11311	88933	43557	82064	55024 32
Q06	(0)	.84001	81591	81780	42918	55594 1
Q07	(1)	.21238	24208	74549	93541	81012
Q08	(1)	.15771	92238	66620	40545	9982
Q09	(1)	.10000	00000	00000	00000	000

Table 83

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^9 p_j \xi^j}{\sum_{j=0}^9 q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-11)	.30006	62273	74526	28797	20
P01	(-8)	.31986	69132	73796	11030	9165
P02	(-6)	.94421	97286	45889	91856	01036
P03	(-3)	.10534	57332	40790	18000	26721 71
P04	(-2)	.49218	40580	59009	07732	50148 0
P05	(-1)	.97387	83430	50087	14951	22456 1
P06	(0)	.76186	67260	66484	56564	15906 4
P07	(1)	.19219	51565	14520	53065	38663 7
P08	(0)	.76735	17075	12467	94056	5421
P09	(-1)	-.32127	14293	75016	71268	86
Q00	(-11)	.30006	62140	50252	94571	67
Q01	(-8)	.31986	69847	91603	71893	8965
Q02	(-6)	.94423	23876	89546	96713	73492
Q03	(-3)	.10535	66376	24038	75391	17000 00
Q04	(-2)	.49245	53495	53784	48712	41584 7
Q05	(-1)	.97643	09930	81769	95890	19104 5
Q06	(0)	.77169	91486	19879	15780	48711 3
Q07	(1)	.20743	13944	79558	74487	98422 5
Q08	(1)	.15973	83887	80216	33004	88467
Q09	(1)	.10300	00000	00000	00000	3600

Table 84

$$\text{inverf } x \approx \xi^{-1} \sum_{j=0}^8 p_j \xi^j / \sum_{j=0}^{11} q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-11)	-.13124	90974	79764	24520	781	
P01	(-8)	-.16203	38613	00164	28723	49571	
P02	(-6)	-.56725	45647	54309	83537	32831	4
P03	(-4)	-.77453	70355	11304	15524	60972	88
P04	(-2)	-.46272	83674	13004	78209	67493	486
P05	(0)	-.12503	32997	07870	34688	03505	488
P06	(1)	-.14896	49339	20549	99557	81110	554
P07	(1)	-.70907	47555	97692	12756	80548	35
P08	(2)	-.10246	72796	27527	56662	48265	46
Q00	(-11)	-.13124	90929	00508	77949	985	
Q01	(-8)	-.16203	38888	19818	31999	38604	
Q02	(-6)	-.56726	01915	87571	45756	82478	8
Q03	(-4)	-.77459	35507	75199	26589	47788	60
Q04	(-2)	-.46289	65871	01542	83731	72002	547
Q05	(0)	-.12522	94724	58366	06977	72867	7826
Q06	(1)	-.14995	23996	52287	70396	74316	202
Q07	(1)	-.73082	43222	23446	71818	66043	76
Q08	(2)	-.12221	72573	30643	12806	20240	14
Q09	(1)	-.61596	29859	38871	01668	35542	
Q10	(1)	-.34057	10449	54562	32403	9575	
Q11	(1)	.10000	00000	00000	00000	00	

Table 85

$$\text{inverf } x \approx \xi^{-1} \frac{\sum_{j=0}^{10} p_j \xi^j}{\sum_{j=0}^{10} q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-4}$$

P00	(-13)	.61030	51444	04846	43546	175
P01	(-10)	.83627	01775	54663	16032	40067
P02	(-7)	.32895	40748	21529	40087	14972 96
P03	(-5)	.51207	14652	44177	52859	73927 147
P04	(-3)	.35495	88070	22054	72544	54485 7008
P05	(-1)	.11373	87937	82738	40561	34035 4397
P06	(0)	.16530	28350	24119	50466	80015 9331
P07	(1)	.10005	22126	37720	74438	90021 0815
P08	(1)	.20278	48941	18170	23500	67687 124
P09	(0)	.62007	85767	56069	85548	19286 6
P10	(-1)	.35748	66812	96909	04933	3411

Q00	(-13)	.61030	51265	91503	12030	967
Q01	(-10)	.83627	02940	65339	68793	95595
Q02	(-7)	.32895	67214	26348	14815	49374 81
Q03	(-5)	.51210	10935	46738	53317	60061 077
Q04	(-3)	.35505	83876	39567	11327	31007 8886
Q05	(-1)	.11387	20528	91897	05662	05065 7271
Q06	(0)	.16608	83843	53424	62673	44744 9094
Q07	(1)	.10213	35668	36093	82947	97313 5691
Q08	(1)	.22641	42663	75653	78003	54021 940
Q09	(1)	.16070	39392	03457	26285	89084 08
Q10	(1)	.10000	00000	00000	00000	00000 0

Table 86

$$\operatorname{inverf} x \approx \xi^{-1} \sum_{j=0}^9 p_j \xi^j / \sum_{j=0}^{12} q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-13)	-.29362	42807	03304	56456	8813
P01	(-10)	-.45569	08392	99777	69467	00986 9
P02	(-7)	-.20661	58807	73254	33313	37468 452
P03	(-5)	-.37915	51991	54100	68941	05205 6780
P04	(-3)	-.31925	24670	13463	99646	34665 9748
P05	(-1)	-.12962	36759	29796	12248	J0720 2561
P06	(0)	-.25455	27776	73182	11222	73078 3902
P07	(1)	-.23216	04794	95143	86424	72111 0112
P08	(1)	-.88602	26435	74993	81878	40275 7899
P09	(2)	-.10788	02036	88225	33680	67469 1425

Q00	(-13)	-.29362	42737	48929	90139	0653
Q01	(-10)	-.45569	08894	98461	64006	31663 9
Q02	(-7)	-.20661	71712	53893	11397	80711 678
Q03	(-5)	-.37917	16460	76279	17782	31537 2738
Q04	(-3)	-.31931	65869	67920	51431	33822 0009
Q05	(-1)	-.12972	57169	86378	06521	78702 1667
Q06	(0)	-.25529	32129	20342	34231	33335 7987
Q07	(1)	-.23470	20640	29079	89250	44136 9561
Q08	(1)	-.92668	07918	99399	62247	86735 9296
Q09	(2)	-.13603	46216	78558	15932	90984 2616
Q10	(1)	-.70172	99309	08465	53670	62189 59
Q11	(1)	-.33815	46415	78074	88009	10525 8
Q12	(1)	.10000	00000	00000	00000	0000

Table 87

$$\operatorname{inverf} x \approx \xi^{-1} \frac{\sum_{j=0}^{10} p_j \xi^j}{\sum_{j=0}^{12} q_j \xi^j}, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1/2}$$

P00	(-13)	-.11144	11840	89227	21195	24166	5
P01	(-10)	-.19119	39783	48760	64457	87638	96
P02	(-8)	-.96897	42581	21424	53472	26024	603
P03	(-5)	-.20133	93036	04021	83920	09331	4217
P04	(-3)	-.19492	74462	63834	66099	52419	8152
P05	(-2)	-.92692	51667	45455	10243	40721	3849
P06	(0)	-.21798	41478	99542	16188	09754	8642
P07	(1)	-.24458	96454	69975	79364	81984	2773
P08	(2)	-.11876	11205	92536	12747	12825	1973
P09	(2)	-.19546	08206	45925	23676	09201	4877
P10	(1)	-.32100	77829	15892	35002	51937	036

Q00	(-13)	-.11144	11818	69514	24646	54990	3
Q01	(-10)	-.19119	39957	48164	89241	45896	51
Q02	(-8)	-.96897	92090	64174	22653	22195	481
Q03	(-5)	-.20134	63045	02032	96487	10360	9909
Q04	(-3)	-.19495	80857	20015	81837	20558	1439
Q05	(-2)	-.92748	02537	70744	06125	24013	3059
Q06	(0)	-.21845	06536	13219	91038	30982	8534
Q07	(1)	-.24648	46047	73745	58206	25646	3103
Q08	(2)	-.12244	86332	45744	57884	77754	1533
Q09	(2)	-.22767	93429	05551	97989	11476	7526
Q10	(2)	-.13896	04217	65147	58525	64387	1644
Q11	(1)	-.79944	87768	81734	52374	10887	91
Q12	(1)	-.10000	03000	00030	00000	00000	

Table 88

$$\text{inverf } x \approx \xi^{-1} \sum_{j=0}^{14} p_j \xi^j / \sum_{j=0}^9 q_j \xi^j, \quad 1-10^{-100} \leq x \leq 1-10^{-10000}$$

$$\xi = [-\ln(1-x)]^{-1}$$

P00	(-15)	.17282	25279	92059	75832	59875	3
P01	(-12)	.32540	28651	66164	78673	62617	888
P02	(-9)	.18265	82587	16819	00382	03640	1575
P03	(-7)	.42476	70049	86077	38551	85422	5216
P04	(-5)	.46568	12807	53131	87330	81084	5795
P05	(-3)	.25404	52862	01718	65179	92289	0421
P06	(-2)	.69476	23100	43492	67072	10122	5981
P07	(-1)	.91641	16260	51727	03216	79292	9794
P08	(0)	.51942	13171	04180	49977	07173	1647
P09	(0)	.87215	81134	38965	94071	98077	4131
P10	(0)	-.49556	07220	18979	93096	62559	0308
P11	(0)	-.24268	94852	28365	49265	16430	345
P12	(0)	.55493	79789	56013	48962	92072	43
P13	(0)	-.36369	94313	49610	35169	96986	3
P14	(-1)	.97875	40375	23532	30765	0497	

Q00	(-15)	.17282	25250	66133	22808	44097	5
Q01	(-12)	.32540	28899	53293	53748	80631	238
Q02	(-9)	.18265	90341	78667	49753	09812	3222
Q03	(-7)	.42477	90796	80458	54200	89419	0714
Q04	(-5)	.46574	00169	14010	99728	27782	8170
Q05	(-3)	.25416	49029	90323	85434	23874	6124
Q06	(-2)	.69590	71551	62581	22692	39712	2897
Q07	(-1)	.92178	72685	85015	04424	95826	8494
Q08	(0)	.53171	13832	16288	32710	92310	6676
Q09	(1)	.09999	99999	99999	99999	99999	9999