

Appendix

PSI	Q	S	N
3.000000	1	1	0.16666667
3.000000	1	2	1.16666667
3.000000	1	3	2.16666667
3.000000	1	4	3.16666667
3.000000	1	5	4.16666667
3.000000	1	6	5.16666667
3.000000	1	7	6.16666667
3.000000	1	8	7.16666667
3.000000	1	9	8.16666667
3.000000	1	10	9.16666667
3.000000	1	11	10.16666667
3.000000	1	12	11.16666667
3.791288	2	1	-0.09817536
3.791288	2	2	0.90182464
3.791288	2	3	1.90182464
3.791288	2	4	2.90182464
3.791288	2	5	3.90182464
3.791288	2	6	4.90182464
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3.791288	2	8	6.90182464
3.791288	2	9	7.90182464
3.791288	2	10	8.90182464
3.791288	2	11	9.90182464
3.791288	2	12	10.90182464
3.951380	3	1	-0.55778121
3.951380	3	2	0.44221879
3.951380	3	3	1.44221879
3.951380	3	4	2.44221879
3.951380	3	5	3.44221879
3.951380	3	6	4.44221879
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3.951380	3	8	6.44221879
3.951380	3	9	7.44221879
3.951380	3	10	8.44221879
3.951380	3	11	9.44221879
3.951380	3	12	10.44221879

PSI	Q	S	N
3.988140	4	1	-1.05281229
3.988140	4	2	-0.05281229
3.988140	4	3	0.94718771
3.988140	4	4	1.94718771
3.988140	4	5	2.94718771
3.988140	4	6	3.94718771
3.988140	4	7	4.94718771
3.988140	4	8	5.94718771
3.988140	4	9	6.94718771
3.988140	4	10	7.94718771
3.988140	4	11	8.94718771
3.988140	4	12	9.94718771
3.997060	5	1	-1.55566922
3.997060	5	2	-0.55566922
3.997060	5	3	0.44433078
3.997060	5	4	1.44433078
3.997060	5	5	2.44433078
3.997060	5	6	3.44433078
3.997060	5	7	4.44433078
3.997060	5	8	5.44433078
3.997060	5	9	6.44433078
3.997060	5	10	7.44433078
3.997060	5	11	8.44433078
3.997060	5	12	9.44433078
3.999267	6	1	-2.05940513
3.999267	6	2	-1.05940513
3.999267	6	3	-0.05940513
3.999267	6	4	0.94059487
3.999267	6	5	1.94059487
3.999267	6	6	2.94059487
3.999267	6	7	3.94059487
3.999267	6	8	4.94059487
3.999267	6	9	5.94059487
3.999267	6	10	6.94059487
3.999267	6	11	7.94059487
3.999267	6	12	8.94059487

PSI	Q	S	N
3.999817	7	1	-2.56259444
3.999817	7	2	-1.56259444
3.999817	7	3	-0.56259444
3.999817	7	4	0.43740556
3.999817	7	5	1.43740556
3.999817	7	6	2.43740556
3.999817	7	7	3.43740556
3.999817	7	8	4.43740556
3.999817	7	9	5.43740556
3.999817	7	10	6.43740556
3.999817	7	11	7.43740556
3.999817	7	12	8.43740556
3.999954	8	1	-3.06512790
3.999954	8	2	-2.06512790
3.999954	8	3	-1.06512790
3.999954	8	4	-0.06512790
3.999954	8	5	0.93487210
3.999954	8	6	1.93487210
3.999954	8	7	2.93487210
3.999954	8	8	3.93487210
3.999954	8	9	4.93487210
3.999954	8	10	5.93487210
3.999954	8	11	6.93487210
3.999954	8	12	7.93487210
3.999989	9	1	-3.56713535
3.999989	9	2	-2.56713535
3.999989	9	3	-1.56713535
3.999989	9	4	-0.56713535
3.999989	9	5	0.43286465
3.999989	9	6	1.43286465
3.999989	9	7	2.43286465
3.999989	9	8	3.43286465
3.999989	9	9	4.43286465
3.999989	9	10	5.43286465
3.999989	9	11	6.43286465
3.999989	9	12	7.43286465

L	Q	S	I
1	1	1	0.50000000
2	1	2	1.12500000
3	1	3	1.78125000
4	1	4	2.44531250
5	1	5	3.11132813
6	1	6	3.77783203
7	1	7	4.44445801
8	1	8	5.11111450
9	1	9	5.77777863
10	1	10	6.44444466
11	1	11	7.11111116
12	1	12	7.77777779
1	2	1	0.29128785
2	2	1	0.29128785
3	2	1	0.29128785
4	2	1	0.29128785
5	2	1	0.29128785
6	2	1	0.29128785
7	2	1	0.29128785
8	2	1	0.29128785
9	2	1	0.29128785
10	2	1	0.29128785
11	2	1	0.29128785
12	2	1	0.29128785
1	2	2	1.01148972
1	2	3	1.78098668
2	2	4	2.63194391
2	2	5	3.46106227
3	2	6	4.29779996
3	2	7	5.13245975
4	2	8	5.96773699
4	2	9	6.80284777
5	2	10	7.63800606
5	2	11	8.47315163
6	2	12	9.30830074
1	3	1	0.19869074
2	3	1	0.19869074
3	3	1	0.19869074
4	3	1	0.19869074
5	3	1	0.19869074
6	3	1	0.19869074
7	3	1	0.19869074
8	3	1	0.19869074
9	3	1	0.19869074
10	3	1	0.19869074
11	3	1	0.19869074
12	3	1	0.19869074

L	Q	S	T
1	3	2	0.68648445
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3	3	2	0.68648445
4	3	2	0.68648445
5	3	2	0.68648445
6	3	2	0.68648445
7	3	2	0.68648445
8	3	2	0.68648445
9	3	2	0.68648445
10	3	2	0.68648445
11	3	2	0.68648445
12	3	2	0.68648445
1	3	3	1.49436679
1	3	4	2.33637512
1	3	5	3.22750396
2	3	6	4.11998441
2	3	7	5.00818789
2	3	8	5.89744295
3	3	9	6.78672108
3	3	10	7.67591605
3	3	11	8.56513112
4	3	12	9.45434660
1	4	1	0.14976224
2	4	1	0.14976224
3	4	1	0.14976224
4	4	1	0.14976224
5	4	1	0.14976224
6	4	1	0.14976224
7	4	1	0.14976224
8	4	1	0.14976224
9	4	1	0.14976224
10	4	1	0.14976224
11	4	1	0.14976224
12	4	1	0.14976224
1	4	2	0.51686227
2	4	2	0.51686227
3	4	2	0.51686227
4	4	2	0.51686227
5	4	2	0.51686227
6	4	2	0.51686227
7	4	2	0.51686227
8	4	2	0.51686227
9	4	2	0.51686227
10	4	2	0.51686227
11	4	2	0.51686227
12	4	2	0.51686227

L	G	S	I
1	4	3	1.12426325
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3	4	3	1.12426325
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7	4	3	1.12426325
8	4	3	1.12426325
9	4	3	1.12426325
10	4	3	1.12426325
11	4	3	1.12426325
12	4	3	1.12426325
1	4	4	1.97892968
1	4	5	2.85951597
1	4	6	3.77667695
1	4	7	4.69384199
2	4	8	5.61126204
2	4	9	6.52780100
2	4	10	7.44453088
2	4	11	8.36126077
3	4	12	9.27799173
1	5	1	0.11995293
2	5	1	0.11995293
3	5	1	0.11995293
4	5	1	0.11995293
5	5	1	0.11995293
6	5	1	0.11995293
7	5	1	0.11995293
8	5	1	0.11995293
9	5	1	0.11995293
10	5	1	0.11995293
11	5	1	0.11995293
12	5	1	0.11995293
1	5	2	0.41387379
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3	5	2	0.41387379
4	5	2	0.41387379
5	5	2	0.41387379
6	5	2	0.41387379
7	5	2	0.41387379
8	5	2	0.41387379
9	5	2	0.41387379
10	5	2	0.41387379
11	5	2	0.41387379
12	5	2	0.41387379

L	Q	S	J
1	5	3	0.90008001
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3	5	3	0.90008001
4	5	3	0.90008001
5	5	3	0.90008001
6	5	3	0.90008001
7	5	3	0.90008001
8	5	3	0.90008001
9	5	3	0.90008001
10	5	3	0.90008001
11	5	3	0.90008001
12	5	3	0.90008001
1	5	4	1.58411566
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3	5	4	1.58411566
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5	5	4	1.58411566
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9	5	4	1.58411566
10	5	4	1.58411566
11	5	4	1.58411566
12	5	4	1.58411566
1	5	5	2.46756013
1	5	6	3.37181285
1	5	7	4.30525697
1	5	8	5.23870135
1	5	9	6.17214580
2	5	10	7.10564359
2	5	11	8.03895147
2	5	12	8.97229715
1	6	1	0.09999023
2	6	1	0.09999023
3	6	1	0.09999023
4	6	1	0.09999023
5	6	1	0.09999023
6	6	1	0.09999023
7	6	1	0.09999023
8	6	1	0.09999023
9	6	1	0.09999023
10	6	1	0.09999023
11	6	1	0.09999023
12	6	1	0.09999023

L	Q	E	I
1	6	2	0.34497379
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3	6	2	0.34497379
4	6	2	0.34497379
5	6	2	0.34497379
6	6	2	0.34497379
7	6	2	0.34497379
8	6	2	0.34497379
9	6	2	0.34497379
10	6	2	0.34497379
11	6	2	0.34497379
12	6	2	0.34497379
1	6	3	0.75020432
2	6	3	0.75020432
3	6	3	0.75020432
4	6	3	0.75020432
5	6	3	0.75020432
6	6	3	0.75020432
7	6	3	0.75020432
8	6	3	0.75020432
9	6	3	0.75020432
10	6	3	0.75020432
11	6	3	0.75020432
12	6	3	0.75020432
1	6	4	1.32029619
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4	6	4	1.32029619
5	6	4	1.32029619
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4	6	5	2.05656329
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8	6	5	2.05656329
9	6	5	2.05656329
10	6	5	2.05656329
11	6	5	2.05656329
12	6	5	2.05656329

L	Q	S	I
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1	6	8	4.82399439
1	6	9	5.76846392
1	6	10	6.71293346
1	6	11	7.65740300
2	6	12	8.60188412
1	7	1	0.08571219
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3	7	1	0.08571219
4	7	1	0.08571219
5	7	1	0.08571219
6	7	1	0.08571219
7	7	1	0.08571219
8	7	1	0.08571219
9	7	1	0.08571219
10	7	1	0.08571219
11	7	1	0.08571219
12	7	1	0.08571219
1	7	2	0.29570868
2	7	2	0.29570868
3	7	2	0.29570868
4	7	2	0.29570868
5	7	2	0.29570868
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7	7	2	0.29570868
8	7	2	0.29570868
9	7	2	0.29570868
10	7	2	0.29570868
11	7	2	0.29570868
12	7	2	0.29570868
1	7	3	0.64306165
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8	7	3	0.64306165
9	7	3	0.64306165
10	7	3	0.64306165
11	7	3	0.64306165
12	7	3	0.64306165

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11	7	6	2.53666935
12	7	6	2.53666935
1	7	7	3.45334173
1	7	8	4.38489394
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1	7	10	6.28966728
1	7	11	7.24205395
1	7	12	8.19444062

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1	8	1	0.07499954
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3	8	1	0.07499954
4	8	1	0.07499954
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6	8	1	0.07499954
7	8	1	0.07499954
8	8	1	0.07499954
9	8	1	0.07499954
10	8	1	0.07499954
11	8	1	0.07499954
12	8	1	0.07499954
1	8	2	0.25874877
2	8	2	0.25874877
3	8	2	0.25874877
4	8	2	0.25874877
5	8	2	0.25874877
6	8	2	0.25874877
7	8	2	0.25874877
8	8	2	0.25874877
9	8	2	0.25874877
10	8	2	0.25874877
11	8	2	0.25874877
12	8	2	0.25874877
1	8	3	0.56268535
2	8	3	0.56268535
3	8	3	0.56268535
4	8	3	0.56268535
5	8	3	0.56268535
6	8	3	0.56268535
7	8	3	0.56268535
8	8	3	0.56268535
9	8	3	0.56268535
10	8	3	0.56268535
11	8	3	0.56268535
12	8	3	0.56268535
1	8	4	0.99026875
2	8	4	0.99026875
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6	8	4	0.99026875
7	8	4	0.99026875
8	8	4	0.99026875
9	8	4	0.99026875
10	8	4	0.99026875
11	8	4	0.99026875
12	8	4	0.99026875

L	Q	S	I
1	8	5	1.54248386
2	8	5	1.54248386
3	8	5	1.54248386
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5	8	5	1.54248386
6	8	5	1.54248386
7	8	5	1.54248386
8	8	5	1.54248386
9	8	5	1.54248386
10	8	5	1.54248386
11	8	5	1.54248386
12	8	5	1.54248386
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9	8	7	3.02169219
10	8	7	3.02169219
11	8	7	3.02169219
12	8	7	3.02169219
1	8	8	3.94877683
1	8	9	4.88888206
1	8	10	5.84721669
1	8	11	6.80555133
1	8	12	7.76388597
1	9	1	0.06666657
2	9	1	0.06666657
3	9	1	0.06666657
4	9	1	0.06666657
5	9	1	0.06666657
6	9	1	0.06666657
7	9	1	0.06666657
8	9	1	0.06666657
9	9	1	0.06666657
10	9	1	0.06666657
11	9	1	0.06666657
12	9	1	0.06666657

L	Q	S	I
1	9	2	0.22999974
2	9	2	0.22999974
3	9	2	0.22999974
4	9	2	0.22999974
5	9	2	0.22999974
6	9	2	0.22999974
7	9	2	0.22999974
8	9	2	0.22999974
9	9	2	0.22999974
10	9	2	0.22999974
11	9	2	0.22999974
12	9	2	0.22999974
1	9	3	0.50016621
2	9	3	0.50016621
3	9	3	0.50016621
4	9	3	0.50016621
5	9	3	0.50016621
6	9	3	0.50016621
7	9	3	0.50016621
8	9	3	0.50016621
9	9	3	0.50016621
10	9	3	0.50016621
11	9	3	0.50016621
12	9	3	0.50016621
1	9	4	0.88024100
2	9	4	0.88024100
3	9	4	0.88024100
4	9	4	0.88024100
5	9	4	0.88024100
6	9	4	0.88024100
7	9	4	0.88024100
8	9	4	0.88024100
9	9	4	0.88024100
10	9	4	0.88024100
11	9	4	0.88024100
12	9	4	0.88024100
1	9	5	1.37109954
2	9	5	1.37109954
3	9	5	1.37109954
4	9	5	1.37109954
5	9	5	1.37109954
6	9	5	1.37109954
7	9	5	1.37109954
8	9	5	1.37109954
9	9	5	1.37109954
10	9	5	1.37109954
11	9	5	1.37109954
12	9	5	1.37109954

L	Q	S	I
1	9	6	1.97298202
2	9	6	1.97298202
3	9	6	1.97298202
4	9	6	1.97298202
5	9	6	1.97298202
6	9	6	1.97298202
7	9	6	1.97298202
8	9	6	1.97298202
9	9	6	1.97298202
10	9	6	1.97298202
11	9	6	1.97298202
12	9	6	1.97298202
1	9	7	2.68595275
2	9	7	2.68595275
3	9	7	2.68595275
4	9	7	2.68595275
5	9	7	2.68595275
6	9	7	2.68595275
7	9	7	2.68595275
8	9	7	2.68595275
9	9	7	2.68595275
10	9	7	2.68595275
11	9	7	2.68595275
12	9	7	2.68595275
1	9	8	3.51002865
2	9	8	3.51002865
3	9	8	3.51002865
4	9	8	3.51002865
5	9	8	3.51002865
6	9	8	3.51002865
7	9	8	3.51002865
8	9	8	3.51002865
9	9	8	3.51002865
10	9	8	3.51002865
11	9	8	3.51002865
12	9	8	3.51002865
1	9	9	4.44521415
1	9	10	5.39197367
1	9	11	6.35493694
1	9	12	7.31790021

Table: The value of $K(S,Q)$ in Dollars for different values of S & Q .

Q	PSI	S=1	S=2	S=3	S=4
1	3.000000	821.66666650	809.16666650	798.54166650	788.38541650
2	3.791288	672.38603900	665.59815120	661.76796880	662.82540260
3	3.951380	639.81050490	619.07812750	617.55106790	618.07156770
4	3.988140	636.62634890	608.65235070	595.09640950	596.37639530
5	3.997060	644.98063680	612.61588840	591.78826160	582.83040060
6	3.999267	658.96967030	623.66868390	597.98251570	582.18802790
7	3.999817	676.12959626	638.72938566	609.57056386	588.89037086
8	3.999954	695.25636740	656.28132120	624.51751600	600.17252000
9	3.999989	715.69009503	675.49008523	641.70007343	614.50456083

Q	PSI	S=5	S=6	S=7	S=8
1	3.000000	778.34635430	768.33658830	758.33414710	748.33353650
2	3.791288	662.57250420	662.77676560	662.85635300	662.97298740
3	3.951380	621.53929810	625.08812510	628.38033390	631.73563750
4	3.988140	599.21157270	604.24123150	609.27113390	614.31633690
5	3.997060	585.83706880	590.09223200	596.09887920	602.10554200
6	3.999267	576.36405390	580.53222610	585.74174870	592.40991990
7	3.999817	576.75634746	573.18702586	578.18736866	584.08050126
8	3.999954	583.30542660	573.93244840	572.05792640	577.68300480
9	3.999989	593.95607323	580.06902203	572.84726583	572.29181989

Q	PSI	S=9	S=10	S=11	S=12
1	3.000000	738.33338430	728.33334610	718.33333610	708.33333390
2	3.791288	663.07963420	663.18913160	663.29786580	663.40681240
3	3.951380	635.09232530	638.44402350	641.79692770	645.14985650
4	3.988140	619.30867450	624.31246730	629.31626070	634.32011830
5	3.997060	608.11220900	614.12207640	620.12054920	626.12129000
6	3.999267	599.07809170	605.74626410	612.41443650	619.08330370
7	3.999817	591.22370146	598.36690166	605.51010186	612.65330206
8	3.999954	584.08931860	591.58939640	599.08947480	606.58955320
9	3.999989	578.40294983	585.20852103	592.98631723	600.76411343

The optimum value of $K(S,Q) = K(7,8) = 572.05792640$

; This program calculates the value of the variable I.

```
(defun i-fn (/ i-fac k1-fac m-fac n-fac p0-fac p1-fac psi-fac final-sum-p0
             final-sum-p1 final-sum-p2 int-sum-p0 int-sum-p1 int-sum-p2
             sum-p0 sum-p1 sum-psi-fac)
  (setq flag 'T)
  (setq qfac 1.0)
  (setq file-desc (open "dpm1.dat" "w"))
  (while (= flag 'T)
    (if (= qfac 1.0) (setq psifac 3.000000))
    (if (= qfac 2.0) (setq psifac 3.791288))
    (if (= qfac 3.0) (setq psifac 3.951380))
    (if (= qfac 4.0) (setq psifac 3.988140))
    (if (= qfac 5.0) (setq psifac 3.997060))
    (if (= qfac 6.0) (setq psifac 3.999267))
    (if (= qfac 7.0) (setq psifac 3.999817))
    (if (= qfac 8.0) (setq psifac 3.999954))
    (if (= qfac 9.0) (setq psifac 3.999989))
    (setq sfac 1.0)
    (repeat 12
      (setq lfac 1.0)
      (repeat 12
        (if (and (>= sfac 0) (< sfac qfac))
          (progn (setq sum-psi-fac 0)
                 (setq n-fac 0)
                 (while (<= n-fac (- sfac 1.0))
                   (setq psi-fac
                     (* (- sfac n-fac)
                       (+ 1.0 (/ (- psifac 1.0)
                                  (expt (+ psifac 1.0)
                                         (+ n-fac 1.0))))
                       (* -1.0 (/ 1.0 (expt psifac n-fac))))))
                   (setq sum-psi-fac (+ sum-psi-fac psi-fac))
                   (setq n-fac (+ n-fac 1.0)))
                 (setq i-fac (/ sum-psi-fac qfac))
                 (setq k-list
                   (strcat (decimal lfac 4 0) (decimal qfac 4 0)
                           (decimal sfac 4 0) (decimal i-fac 16 8)))
                 (write-line k-list file-desc)))
```



```

(if (= (* lfac qfac) sfac)
  (progn (setq m-fac 0)
         (setq final-sum-p0 0)
         (while (<= m-fac (- lfac 1.0))
           (setq k1-fac 0)
           (setq int-sum-p0 0)
           (while (<= k1-fac m-fac)
             (setq n-fac 0)
             (setq sum-p0 0)
             (while (<= n-fac (- qfac 1.0))
               (setq p0-fac
                    (* (- sfac (* m-fac qfac) n-fac)
                       (p-fn qfac psifac k1-fac
                            (- m-fac k1-fac)
                            n-fac)))
               (setq sum-p0 (+ sum-p0 p0-fac))
               (setq n-fac (+ n-fac 1.0)))
             (setq int-sum-p0 (+ int-sum-p0 sum-p0))
             (setq k1-fac (+ k1-fac 1.0)))
           (setq final-sum-p0 (+ final-sum-p0 int-sum-p0))
           (setq m-fac (+ m-fac 1.0)))
         (setq i-fac final-sum-p0)
         (setq k-list
              (strcat (decimal lfac 4 0) (decimal qfac 4 0)
                      (decimal sfac 4 0) (decimal i-fac 16 8)))
         (write-line k-list file-desc)))
(if (and (> sfac (* lfac qfac)) (< sfac (* (+ lfac 1.0) qfac)))
  (progn (setq m-fac 0)
         (setq final-sum-p1 0)
         (while (<= m-fac (- lfac 1.0))
           (setq k1-fac 0)
           (setq int-sum-p1 0)
           (while (<= k1-fac m-fac)
             (setq n-fac 0)
             (setq sum-p1 0)
             (while (<= n-fac (- qfac 1.0))
               (setq p1-fac
                    (* (- sfac
                        (* m-fac qfac) n-fac)
                       (p-fn qfac psifac k1-fac
                            (- m-fac k1-fac)
                            n-fac)))
               (setq sum-p1 (+ sum-p1 p1-fac))
               (setq n-fac (+ n-fac 1.0)))
             (setq int-sum-p1 (+ int-sum-p1 sum-p1))
             (setq k1-fac (+ k1-fac 1.0)))
           (setq final-sum-p1 (+ final-sum-p1 int-sum-p1))
           (setq m-fac (+ m-fac 1.0)))
         (setq k1-fac 0)
         (setq final-sum-p2 0)

```

```

      (while (<= k1-fac 1fac)
        (setq n-fac 0)
        (setq int-sum-p2 0)
        (while (<= n-fac (+ sfac (* 1fac qfac 1.0)))
          (setq p2-fac (* (- sfac (* 1fac qfac)
                               n-fac)
                          (p-fn qfac psifac k1-fac
                               (- 1fac k1-fac)
                               n-fac)))
          (setq int-sum-p2 (+ int-sum-p2 p2-fac))
          (setq n-fac (+ n-fac 1.0)))
        (setq final-sum-p2 (+ final-sum-p2 int-sum-p2))
        (setq k1-fac (+ k1-fac 1.0)))
      (setq i-fac (+ final-sum-p1 final-sum-p2))
      (setq k-list
        (strcat (decimal 1fac 4 0) (decimal qfac 4 0)
                (decimal sfac 4 0) (decimal i-fac 16 8)))
      (write-line k-list file-desc)))
    (setq 1fac (+ 1fac 1.0)))
  (setq sfac (+ sfac 1.0)))
  (setq qfac (+ qfac 1.0))
  (if (> qfac 9.0)
    (progn (setq flag '())
           (close file-desc))))))

(defun p-fn (qfac psifac k1fac morlfac nfac / temp)
  (setq temp 0)
  (if (and (= k1fac 0) (= morlfac 0) (= nfac 0))
    (setq temp (/ (- psifac 1.0) (* qfac (+ psifac 1.0)))))
  (if (and (= k1fac 0) (= morlfac 0) (/= nfac 0))
    (setq temp (/ (+ 1.0 (/ (- psifac 1.0) (expt (+ psifac 1.0) (+ nfac 1.0)))
                  (* -1.0 (/ 1.0 (expt psifac nfac))))
                qfac)))
  (if (and (= k1fac 0) (/= morlfac 0))
    (setq temp (- (/ (* (- psifac 1.0) (expt (- 4.0 psifac) (- morlfac 1.0)))
                    (* (expt 4.0 morlfac) qfac (expt psifac nfac)))
                  (/ (* (- psifac 1.0) (expt (- 4.0 psifac) (- morlfac 1.0))
                    psifac)
                    (* (expt 4.0 morlfac) qfac (expt (+ psifac 1.0)
                                                      (+ nfac 1.0)))))))
  (if (and (/= k1fac 0) (/= morlfac 0) (/= nfac 0))
    (setq temp (/ (* (- psifac 1.0) (expt (- 4.0 psifac) (+ k1fac morlfac -1)))
                  (* qfac (expt 3.0 k1fac) (expt 4.0 (+ morlfac 1.0))
                    (expt psifac nfac))))))
  (eval temp))

(defun decimal (a l d)
  (setq g (rtos a 2 d))
  (setq len (strlen g))
  (repeat (- 1 len)
    (setq g (strcat " " g)))
  (eval g))

```



```

(setq n6-fac (* (/ 1.0 qfac)
               (+ (/ (* (- qfac 1.0) qfac) 2.0)
                  (* (- psifac 1.0)
                     (/ (+ (expt (+ psifac 1.0) qfac)
                          (* -1.0 qfac psifac) -1.0)
                        (* (expt (+ psifac 1.0) qfac)
                           (expt psifac 2.0))))))
              (* -1.0 (/ (+ (- qfac 1.0) (* -1.0 qfac psifac)
                          (expt psifac qfac)
                          (* (expt psifac (- qfac 1.0))
                             (expt (- 1.0 psifac) 2.0)))))))
(setq n7-fac (+ sfac (* -1.0 n1-fac) (* -1.0 n2-fac) (* -1.0 n3-fac)
                (* -1.0 n4-fac) (* -1.0 n5-fac) (* -1.0 n6-fac)))
(setq k-list (strcat (decimal psifac 9 6) (decimal qfac 4 0)
                    (decimal sfac 4 0) (decimal n7-fac 16 8)))
(write-line k-list file-desc)
(setq k-list "")
(setq sfac (+ sfac 1.0))
(setq qfac (+ qfac 1.0))
(if (> qfac 9.0)
    (progn (setq flag '())
           (close file-desc))))

```

```

(defun decimal (a l d)
  (setq g (rtos a 2 d))
  (setq len (strlen g))
  (repeat (- l len)
    (setq g (strcat " " g)))
  (eval g))

```

; This program calculates the value of K(S,Q).
; Given: $K(S,Q) = 300/Q + 60I - 50N + 500$.

```
(defun k-fn (/ i-fac k-fac k-list n-fac psifac qfac sfac)
  (setq file-desc1 (open "dpm1.dat" "r"))
  (setq file-desc2 (open "dpm3.dat" "w"))
  (setq istring (read-line file-desc1))
  (while (/= istring nil)
    (setq qfac (atoi (substr istring 5 4)))
    (setq sfac (atoi (substr istring 9 4)))
    (setq i-fac (atof (substr istring 13 16)))
    (setq file-desc0 (open "dpm.dat" "r"))
    (setq nstring (read-line file-desc0))
    (setq c-qfac (atoi (substr nstring 10 4)))
    (setq c-sfac (atoi (substr nstring 14 4)))
    (setq n-fac (atof (substr nstring 18 16)))
    (while (not (and (= qfac c-qfac) (= sfac c-sfac)))
      (setq nstring (read-line file-desc0))
      (setq c-qfac (atoi (substr nstring 10 4)))
      (setq c-sfac (atoi (substr nstring 14 4)))
      (setq n-fac (atof (substr nstring 18 16))))
    (close file-desc0)
    (setq k-fac (+ (/ 300.0 qfac) (* 60.0 i-fac) (* -1.0 50.0 n-fac)
                  500.0))
    (if (= qfac 1.0) (setq psifac 3.00000000))
    (if (= qfac 2.0) (setq psifac 3.79128800))
    (if (= qfac 3.0) (setq psifac 3.95138000))
    (if (= qfac 4.0) (setq psifac 3.98814000))
    (if (= qfac 5.0) (setq psifac 3.99706000))
    (if (= qfac 6.0) (setq psifac 3.99926700))
    (if (= qfac 7.0) (setq psifac 3.99981700))
    (if (= qfac 8.0) (setq psifac 3.99995400))
    (if (= qfac 9.0) (setq psifac 3.99998900))
    (setq k-list (strcat (decimal qfac 10 1) (decimal psifac 15 8)
                        (decimal sfac 10 1) (decimal k-fac 19 8)))
    (write-line k-list file-desc2)
    (setq istring (read-line file-desc1)))
  (close file-desc1)
  (close file-desc2))
```

```
(defun decimal (a l d)
  (setq g (rtos a 2 d))
  (setq len (strlen g))
  (repeat (- l len)
    (setq g (strcat " " g)))
  (eval g))
```