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TITLE: COMPOUND INTEREST TABLES FOR FARM MANAGEMENT DECISIONS

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FOR FARM MANAGEMENT DECISIONS

All compound interest problems involve four variables:

1)	A present sum of money	(PV)
2)	A future sum on money and/or	(FV)
	a series of equal future sums	(A)
3)	An interest rate	(I)
4)	A time period	(n)

Generally, if the interest rate and time period are known, compound interest tables can be used to solve a variety of problems in which either present sum of money is to be expressed in terms of an equivalent future sum or series of future payments, and vice versa.

Table 1: Future Value of 1

The formula for the future value of a dollar is:

$$FV = PV\ (1+I)^n \qquad (1)$$

Example Problem: If I invest $1,500 today at 12 percent interest, compounded annually, and allow principal and interest to accumulate how much money will I have at the end of five years?

Answer: By going down the 12 percent interest column in Table 1 to row n=5 (years), we see that $1 now would be worth $1.762 if allowed to accumulate. Thus, a $1,500 deposit would accumulate to

$$1500 \times 1.762 = \$2643.00$$

Table 1 can also be used to determine the present value of a known future sum:

$$PV = \frac{FV}{(1+I)^n} \qquad (2)$$

Example: I expect to receive $1,200 four years from now. If the interest rate is 11 percent, what is the present percent value of the $1,200 future sum?

Answer: The present value is found by dividing the known future value by the appropriate entry in Table 1. Thus, for I = 11 percent and n = 4, the present value of $1,200 is:

$$PV = \frac{FV}{(1+I)^n} = \frac{1200}{1.518} = \$790.51$$

Another interpretation of this answer is that if I invest $790.51 today and leave it to accumulate at 11 percent interest compounded annually, I will have $1,200 at the end of four years.

Table 2: Future Value of 1 Per Annum

The future value of a series of $1 payments (an annuity) is

$$FVA = \$1 \left[\frac{(1+I)^n - 1}{I}\right] \qquad (3)$$

Example: If I invest $2,200 at the end of each year at 9 percent compounded annually how much will I have at the end of six years?

Answer: The entry for I=9, n=6 in Table 2 indicates that $1 invested at the end of each year for six years, with the first payment occurring one year from now, would accumulate to $7.523; thus, a $2,200 per year investment would accumulate to

$$FVA = \$2,200 \times 7.523 = \$16,550.60$$

Table 3: Present Value of 1 Per Annum

The present value of a uniform series of $1 payments is

$$PVA_{i,n} = \$1 \left[\frac{1 - (1+i)^{-n}}{i} \right] \qquad (4)$$

Example: I expect to receive $1,200 annually for the next 8 years, with the first payment to be received one year from now. If the interest rate is 10 percent, what is the present value of these payments?

Answer: From Table 3, n=8, i=10 percent, the present value of eight payments of $1 each is $5.335. These eight payments of $1,200 would be worth

$$PVA = 1200 \times 5.335 = \$6402$$

An alternate interpretation of this answer is that if I invest $6,402 today at 10 percent, I could withdraw $1,200 at the end of each year for 8 years, the first withdrawal occurring one year from now.

Table 3 can also be used to compute the payments on a loan that is repaid in equal installments.

Example: What are the payments on an $80,000 loan if the interest rate is 13 percent and the loan is repaid in 20 equal annual installments?

Answer: Level-payment loan installments are found by dividing the amount of the loan by the Table 3 value for the corresponding repayment period and interest rate. In other words,

$$A = \frac{PV}{PVA_{i,n}} \qquad (5)$$

For this example,

$$A = \frac{\$80,000}{7.025} = \$11,387.90$$

Limitations and Approximations

There are two major limitations in the use of compound interest tables. The first is rounding error. To obtain results that are accurate to the penny, it would be necessary to use tables rounded to eight, ten or twelve decimal places, depending upon the amounts, interest rate and time period involved. The second limitation is that they contain only a limited selection of interest rates and time periods. Because of these and other limitations, tables should be used only as an approximation.

Approximations for interest rates not given in the tables can be found by interpolating between table values.

Example: What are the payments on an $80,000, 12-3/4 percent loan amortized in 20 equal annual installments.

Answer: Table 3 contains the following values for n=20:

n	12%	12 3/4%	13%
•	•	•	•
•	•	•	•
20	7.469	_____	7.025
•	•	•	•
•	•	•	•

The approximate value for 12 3/4 percent, which would be 3/4 of the way between 12 and 13 percent, would be

$$7.469 - 3/4\ (7.469 - 7.025)$$
$$= 7.469 - .75\ (.444)$$
$$= 7.469 - .333 = 7.136$$

The corresponding estimate of the loan payment is $80,000 \div 7.136 = \$11,210.76$. The actual payment is $11,217.58, so the error due to rounding and interpolation is $6.58. Notice too that the estimate slightly understates the actual value.

Sometimes it is possible to use the tables for problems involving semi-annual, quarterly or monthly payments.

Example: What are the equal semi-annual payments on a $20,000, 5 year, 12 percent loan?

Answer: To convert from annual to semi-annual payments, multiply the number of payments by two and divide the interest rate by two. Thus, i becomes 6 percent, n becomes 10 and the semi-annual payment is:

$$A = \frac{PV}{PVA_{6,10}} = \frac{20,000}{7.360} = \$2,717.39.$$

For monthly payments, I = 1 percent and n = 60,

$$A = \frac{PV}{PVA_{1,60}} = \frac{20,000}{44.955} = \$444.89$$

In most cases, however it is not possible to use the tables in this fashion to accurately estimate semi-annual, quarterly or monthly payments. In these cases a high approximation can be obtained by simply dividing the annual payment by 2, 4 or 12 as the case may be. The following table illustrates the possible magnitude of the error for a $20,000, 12 percent, 10 year loan.

Payment Plan	Actual Payment	Table	Approximation (Annual payment) ÷ (2,4 or 12)	Error Amt.	Error %
Annual	$3539.69	$3539.82	--	--	--
Semi annual	1743.69	1743.68	$1769.91	$26.22	1.5
Quarterly	865.25	865.25	884.96	19.71	2.3
Monthly	286.94	*	294.99	8.05	2.8

* No table value for I=1, n=120.

Notice that the differences between the actual payments and the approximations are significant - 1.5 percent for semi-annual, 2.3 percent for the quarterly and 2.8 percent for the monthly payments. This margin of error increases with larger values of I and n.

The hand held calculator has replaced compound interest tables for many applications. Some have special programs to handle compound interest problems, and if the calculator has a "y^x" function you can use the actual formula.

Example: What is the monthly payment on an $8,000, 4 year, 13 percent loan?

Answer: For monthly payments, I = 13 ÷ 12 = 1.0833 percent and n=48. Using equation (4),

$$PVA_{I,n} = PVA_{1.0833,48} = \frac{1 - \frac{1}{(1+.010833)^{48}}}{.010833}$$

$$= \frac{1 - \frac{1}{1.6773}}{.010833}$$

$$= \frac{.4038}{.010833} = 37.2750$$

Thus, the loan payment is 8,000 ÷ 37.2750 = $214.62, and because the formula itself was used, this is the exact payment. The approximation obtained by dividing the annual table value estimate by 12 is $224.16, which is 4.4 percent higher than the actual value. When using the compound interest formulas, it is wise to carry about six decimal places to minimize rounding errors.

COMPOUND INTEREST TABLES

Table 1: Future Value of 1
Table 2: Future Value of 1 Per Annum
Table 3: Present Value of 1 Per Annum

Source: Barry, Peter J., John A. Hopkin and C. B. Baker, Financial Management in Agriculture, Second Edition, Danville, Ill., The Interstate Printers & Publishers Inc., 1979. Tables reproduced with permission of the publisher.

TABLE 1: Future Value of $1

$$FV = PV(1+i)^n$$

n	5%	75%	1 0%	1 5%	2%	3%	4%	5%	6%	7%
1	1 005	1 008	1 010	1 015	1 020	1 030	1 040	1 050	1 060	1 070
2	1 010	1 015	1 020	1 030	1 040	1 061	1 082	1 103	1 124	1 145
3	1 015	1 023	1 030	1 046	1 061	1 093	1 125	1 158	1 191	1 225
4	1 020	1 030	1 041	1 061	1 082	1 126	1 170	1 216	1 262	1 311
5	1 025	1 038	1 051	1 077	1 104	1 158	1 217	1 276	1 338	1 403
6	1 030	1 046	1 062	1 093	1 126	1 194	1 266	1 340	1 419	1 501
7	1 036	1 054	1 072	1 110	1 149	1 230	1 316	1 407	1 504	1 606
8	1 041	1 062	1 083	1 126	1 172	1 267	1 369	1 477	1 594	1 718
9	1 046	1 070	1 094	1 143	1 195	1 305	1 423	1 551	1 690	1 838
10	1 051	1 078	1 105	1 161	1 219	1 344	1 480	1 629	1 791	1 967
11	1 056	1 086	1 116	1 178	1 243	1 384	1 539	1 710	1 898	2.105
12	1 062	1 094	1 127	1 196	1 268	1 426	1 601	1 796	2.012	2.252
13	1 067	1 102	1 138	1 214	1 294	1 469	1 665	1 886	2 133	2 410
14	1 072	1 110	1 149	1 232	1 319	1 513	1 732	1 980	2.261	2.579
15	1 078	1 119	1 161	1 250	1 346	1 558	1 801	2.079	2.397	2.759
16	1 083	1 127	1 173	1 269	1 373	1 605	1 873	2 183	2 540	2.952
17	1 088	1 135	1 184	1 228	1 400	1 653	1 948	2 292	2 693	3.159
18	1 094	1 144	1 196	1 307	1 428	1 702	2.026	2 407	2 854	3 380
19	1 099	1 153	1 208	1 327	1 457	1 754	2 107	2 527	3 026	3.617
20	1 105	1 161	1 220	1 347	1 486	1 806	2 191	2 653	3.207	3.870
24	1 127	1 196	1 270	1 430	1 608	2.033	2 563	3.225	4 049	5.072
25	1 133	1 206	1 282	1 451	1 641	2 094	2 666	3 386	4 292	5.427
30	1 161	1 251	1 348	1 563	1 811	2 427	3 243	4 322	5.743	7 612
36	1 197	1 309	1 431	1 709	2 040	2 898	4 104	5.792	8.147	11 424
40	1 221	1 348	1 489	1 814	2.208	3 262	4 801	7 040	10.286	14 974
48	1 270	1 431	1 612	2 043	2.587	4 132	6.571	10 401	16.384	25.729
50	1 283	1 463	1 646	2.105	2.692	4 384	7 107	11 467	18.420	29.457
60	1 348	1 566	1 817	2.443	3.281	5.892	10.520	18.679	32.988	57 946

n	8%	9%	10%	11%	12%	13%	14%	15%	16%
1	1 080	1 090	1 100	1 110	1 120	1 130	1 140	1 150	1 160
2	1 166	1 188	1 210	1 232	1 254	1 277	1 300	1 323	1 346
3	1 260	1 295	1 331	1 368	1 406	1 443	1 482	1 521	1 561
4	1 360	1 412	1 464	1 518	1 574	1 630	1 689	1 749	1 811
5	1 469	1 539	1 611	1 685	1 762	1 842	1 925	2.011	2 100
6	1 587	1 677	1 772	1 870	1 974	2.082	2.195	2.313	2 436
7	1 714	1 828	1 949	2.076	2.211	2.353	2.502	2 660	2 826
8	1 851	1 993	2.144	2.305	2 476	2 658	2 853	3 059	3.278
9	1 999	2.172	2.358	2.558	2.773	3.004	3.252	3.518	3.803
10	2.159	2 367	2.594	2 839	3 106	3 395	3.707	4 046	4 411
11	2 332	2.580	2.853	3.152	3 479	3.836	4 226	4 652	5.117
12	2.518	2 813	3.138	3 498	3.896	4 334	4 818	5.350	5.936
13	2.720	3 066	3 452	3 883	4 363	4 898	5.492	6 153	6 886
14	2 937	3 342	3.797	4 310	4 887	5.535	6.261	7 076	7 988
16	3 172	3 642	4 177	4 786	5.474	6.254	7 138	8 137	9 266
16	3.426	3.970	4 595	5 311	6.130	7 067	8.137	9 358	10 748
17	3.700	4 328	5.054	5.895	6.866	7 986	9.276	10 761	12 468
18	3.996	4 717	5 560	6 544	7 690	9.024	10.575	12 375	14 463
19	4 316	5.142	6 116	7 263	8.613	10 197	12.056	14 232	16 777
20	4 661	5.604	6.727	8 062	9 646	11 523	13.743	16.367	19 461
24	6.341	7 911	9 850	12 239	15.179	18.788	23 212	28 625	35.236
25	6.848	8.623	10 835	13 586	17 000	21 231	26.462	32 919	40.874
30	10 063	13.268	17 449	22 892	29 960	38 116	50 950	66.212	85.850
36	15.865	22.251	30.913	42.818	58.136	81 437	111 834	153.152	208.164
40	21 725	31 409	46.289	65.001	93.051	132.782	188.883	267 864	378.721
48	40.211	62.585	97 017	148 797	230 391	362.992	536.807	819 401	1241 605
50	46.902	74 358	117 390	184 565	289.002	460.736	700.233	1083 657	1670.704
60	101 257	176.031	304 481	524 056	897 596	1530 053	2566.919	4383 999	7370.201

n	17%	18%	19%	20%	21%	22%	23%	24%	25%
1	1 170	1 180	1 190	1 200	1 210	1 220	1 230	1 240	1 250
2	1 369	1 392	1 416	1 440	1 464	1 488	1 513	1 538	1 562
3	602	1 643	1 685	1 728	1 772	1 816	1 861	1 907	1 953
4	1 874	1 939	2 006	1 074	2 144	2 215	2 288	2 364	2 441
5	2 192	2 288	2 386	2 448	2 594	2 703	2 815	2 923	3 052
6	2 566	2 700	2 840	2 986	3 138	3 297	3 462	3 636	3 815
7	3 001	3 186	3 379	3 583	3 797	4 023	4 259	4 508	4 768
8	3 511	3 759	4 021	4 300	4 595	4 908	5 238	5 589	5 960
9	4 108	4 436	4 786	5 160	5 560	5 987	6 444	6 931	7 451
10	4 807	5 234	5 696	6 192	6 728	7 304	7 926	8 594	9 313
11	5 624	6 176	6.777	7 430	8 140	8 912	9 749	10 657	11 642
12	6 580	7 288	8 064	8 916	9 850	10 872	11 991	13 215	14 552
13	7 699	8 599	9 596	10 699	11 918	3 264	14 749	16 386	18 190
14	9 007	10 147	11 420	12 839	14 421	16 182	18 141	20 319	22 737
15	10 539	11 974	13 590	15 407	17 449	9 742	22 314	25 196	28 421
16	12 330	14 129	16 172	18.488	21 114	24 086	27 446	31 243	35 527
17	14 426	16.672	19 244	22 186	25 548	29 384	33 758	38 741	44 409
18	16 879	19 673	22 901	26 623	30 913	35 849	41 523	48 038	55 511
19	19 748	23.214	27 252	31 948	37 404	43 736	51 074	59 568	69 389
20	23 106	27 393	32.429	38 338	45 259	53 358	62 821	73 864	86 736
24	43 297	53 109	66 032	79 497	97 017	118 205	143 788	174 631	211 758
25	50 658	62 669	77 388	95 396	117 391	144 210	176 859	216 542	264 698
30	111 065	143 371	184 675	273 376	304 482	389 758	494 913	634 820	807 794
36	284 889	387 037	524 434	708 802	965 584	1285 150	1724 186	2307 707	3081 488
40	533 869	750.378	1051 668	1469 772	2048 400	2847 038	3946 430	5455 913	7523.164
48	1874 865	2820 567	4229 160	6319 749	9412 344	13958 428	20674 982	30496 880	44841 561
50	2566.215	3927 357	5988.914	9100 439	13780 612	20796 561	31279 196	46880 436	70084 923
60	12338.386	20668.140	34104 971	56347 514	92708 089	151911 216	247917 216	40 2966 347	662530.447

TABLE 2: Future Value of $1 Per Annum

$$FVA = \left[\frac{(1+i)^n - 1}{1}\right]$$

n	5%	7½%	1%	1 5%	2%	3%	4%	5%	6%	7%
1	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
2	2 005	2.008	2.010	2 015	2 020	2 030	2.040	2 050	2.060	2.070
3	3 015	3.023	3.030	3 045	3 060	3 091	3 122	3 152	3.184	3.215
4	4 030	4 046	4 060	4 091	4 122	4 184	4 246	4 310	4 375	4 440
5	5.050	5.076	5.101	5 152	5 204	5.308	5 416	5 526	5.637	5.751
6	6.076	6.114	6.152	6.230	6 308	6.468	6 633	6 802	6.975	7 153
7	7 106	7 159	7 214	7 323	7 434	7 662	7 898	8 142	8 394	8.664
8	8.141	8.213	8.286	8 432	8 583	8 892	9 214	9 549	9 897	10.260
9	9 182	9 275	9 369	9 559	9 755	10 159	10 583	11 027	11 491	11 978
10	10 228	10.344	10 462	10 703	10 950	11 464	12 006	12.578	13 181	13.816
11	11 279	11 422	11 567	11 863	12 169	12 808	13 486	14 207	14 972	15.784
12	12 336	12 508	12 683	13 041	13 412	14 192	15 026	15 917	16.870	17 888
13	13 397	13 601	13 809	14 237	14 680	15 618	16 627	17 713	18.882	20.141
14	14 464	14 703	14 947	15 450	15 974	17 086	18.292	19 598	21 051	22.550
15	15 537	15 814	16.097	16 682	17 293	18 599	20 024	21 579	23.276	25.129
16	16.614	16.932	17 258	17 932	18 638	20 157	21 825	23 667	25.673	27 888
17	17 697	18.059	18.430	19 201	20 012	21 762	23.698	25 840	28.213	30.840
18	18.786	19 195	19 615	20 489	21 412	23 414	25 645	28 132	30 906	33.999
19	19 880	20.339	20 811	21 797	22.841	25 117	27 671	30 539	33.760	37 379
20	20.979	21 491	22.019	23 124	24 297	26 870	29 778	33 066	36.786	40.995
24	25.432	26.188	26.973	28.634	30.422	34 426	39.083	44 502	50.816	58.177
25	26.569	27 386	28.243	30.063	32.030	36.459	41 646	47 727	54 865	63.249
30	32.280	33.503	34 785	37 539	40 568	47 575	56.085	66 439	79.058	74 461
36	38.336	41 153	43.077	47 276	51 994	63.276	77 598	96 836	119.121	148.913
40	44.158	48.446	48.886	54 268	60 402	75.401	95.026	120 800	154 762	199.636
48	54 098	57 521	61 223	69 565	79.354	104 408	138.263	188.096	256.565	353.270
50	56.646	60.394	64 463	73.683	84 579	112 797	152.667	209.348	290.336	406.529
60	88.770	75.434	81 670	96.215	114 052	163.053	237 991	353.584	533.128	813.520

n	8%	9%	10%	11%	12%	13%	14%	15%	16%
1	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
2	2.080	2.090	2 100	2 110	2 120	2.130	2 140	2 150	2 160
3	3.246	3 278	3 310	3 342	3.374	3 407	3 440	3 473	3.506
4	4 506	4 573	4 641	4 709	4 779	4 850	4 921	4 993	5 066
5	5.867	5.985	6.105	6.228	6.353	6 480	6.610	6 742	6.877
6	7 336	7 523	7 716	7 913	8.115	8.323	8 536	8.754	8.977
7	8.923	9.200	9 487	9 783	10 089	10 405	10 730	11 067	11 414
8	10 637	11 028	11 436	11 859	12 300	12 757	13 233	13.727	14 240
9	12.488	13.021	13 579	14 164	14 776	15 416	16.085	16 786	17 518
10	14 487	15.193	15.937	16.722	17 549	18 420	19 377	20 304	21 321
11	16.645	17 560	18 531	19 561	20.655	21 814	23 045	24 349	25 733
12	18.977	20.141	21 384	22 713	24 133	25 650	27 271	29.002	30.850
13	21 495	22 953	24 523	26.212	28.029	29 985	32.089	34 352	36.786
14	24 215	26.019	27 975	30 095	32 393	34 883	37 581	40.505	43 672
15	27 152	29.361	31 772	34 405	37 280	40 417	43 842	47 580	51 660
16	30 324	33 003	35.950	39 190	42 753	46.672	50.980	55 717	60 925
17	33.750	36.974	40.545	44 501	48.884	53.739	59 118	65.075	71 673
18	37 450	41 301	45 599	50 396	55 750	61 725	68.394	75 836	84 141
19	41 446	46.018	51 159	56.939	63 440	70 749	78 969	88.212	98 603
20	45.762	51 160	57 275	64 203	72.052	80.947	91 025	102.444	115 380
24	66.765	76.790	88.497	102 174	118.155	136.831	158.658	184 168	213 978
25	73.106	84 701	98.347	114 413	133 334	155.620	181 871	212 793	248 214
30	113.283	136.308	164 494	199 021	241 333	293 199	356.787	434 745	530.312
36	187 102	236 125	299 127	380.164	484 463	618.748	791 673	1014 346	1301 027
40	259 057	337 882	442 593	581 826	767 091	1013 704	1342.025	1779 090	2360 757
48	490.132	684 280	960 172	1362.700	1911 590	2707 633	3841 475	5468 006	7753 782
50	573.770	815.084	1163 908	1668.771	2400 018	3459 507	4994 521	7217 716	10436.649
60	1236.213	1944 792	3034 816	4756.066	7471 641	11761 980	18636.133	28819.682	44067 509

n	17%	18%	19%	20%	21%	22%	23%	24%	25%
1	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
2	2.170	2.180	2.190	2.200	2.210	2.220	2.230	2.240	2.250
3	3.539	3.572	3.606	3.640	3.674	3.708	3.743	3.778	3.813
4	5.141	5.215	5.291	5.368	5.446	5.524	5.604	5.684	5.766
5	7 014	7 154	7 297	7 442	7 589	7 740	7 893	8.048	8.207
6	9.207	9.442	9.683	9 930	10.183	10 442	10.708	10.980	11.259
7	11 772	12.142	12.523	12.916	13.321	13.740	14 171	14.615	15.073
8	14 773	15.327	15.902	16.499	17 119	17 762	18.430	19 123	19.842
9	18.286	19 086	19 923	20.799	21 714	22.670	23.669	24 712	25.802
10	22 393	23 521	24 709	25 959	27 274	28.657	30.113	31 643	33.253
11	27 200	28.755	30.404	32.150	34 001	35.962	38.039	40 238	42.566
12	32 824	34 931	37 180	39.581	42 142	44 874	47 786	50 895	54.208
13	39.404	42.219	45.244	48.497	51 991	55.746	59.779	64.110	68.760
14	47 103	50.818	54 841	59.196	63.909	69 010	74 528	80.496	86.949
15	56.110	60.965	66.261	72 035	78 330	85.192	92 669	100.815	109.687
16	66.649	72.939	79 850	87 442	95.780	104 936	114 983	126.011	138.109
17	78.979	87 068	96.022	105 931	116.894	129 020	142.430	157 253	173.636
18	93.406	103.740	115 266	128.117	142 441	158.405	176.188	195.994	218.046
19	110.285	123.414	138 166	154 740	173 354	194 254	217 712	244 033	273.558
20	130.033	146.628	165.418	186.688	210 758	237 989	268.785	303.601	342.946
24	248.808	289.494	337 010	392.484	457 225	532 750	620.817	723.461	843.033
25	292.105	342.603	402.042	471 981	554 242	650.955	764 605	898.092	1054.791
30	647 439	790.948	966.712	1181 882	1445.151	1767 081	2160.491	2640.916	3227 174
36	1669.894	2144 649	2754 914	3539.009	4545 695	5837 047	7492.111	9611 278	12321 952
40	3134 522	4163.213	5529 829	7343.858	9749.525	12936.536	17154 048	22728.803	30088.655
48	11021 500	15994 259	22253 475	31563.744	44815.922	63506 460	89866.922	127051 917	178982.203
50	15088.502	21813.094	31515.336	46497 191	68817 202	94825 279	135992.154	195372.644	280255.693
60	72966 038	114189.666	179494 584	281732.572	441466.894	690600 982	1077896.561	1678147 280	2610117 787

TABLE 3: Present Value of $1 Per Annum

$$PVA = \$1 \left[\frac{1 - (1+i)^{-n}}{i}\right]$$

n	5%	75%	1%	1 5%	2%	3%	4%	5%	6%	7%
1	986	983	980	986	980	971	962	952	943	935
2	1 986	1 978	1 970	1 956	1 942	1 913	1 886	1 859	1 833	1 808
3	2 970	2 956	2 941	2 912	2 884	2 829	2 775	2 723	2 673	2 624
4	3 950	3 928	3 902	3 854	3 808	3 717	3 630	3 546	3 465	3 387
5	4 926	4 889	4 853	4 783	4 713	4 580	4 329	4 432	4 212	4 100
6	5 896	5 846	5 795	5 697	5 601	5 417	5 242	5 076	4 917	4 767
7	6 862	6 795	6 728	6 598	6 472	6 230	6 002	5 786	5 582	5 389
8	7 823	7 737	7 652	7 486	7 325	7 020	6 733	6 463	6 210	5 971
9	8 779	8 672	8 566	8 361	8 162	7 786	7 435	7 108	6 802	6 515
10	9 730	9 600	9 471	9 222	8 893	8 530	8 111	7 722	7 360	7 024
11	10 677	10 521	10 368	10 071	9 787	9 253	8 760	8 306	7 887	7 499
12	11 619	11 435	11 255	10 908	10 575	9 954	9 385	8 863	8 384	7 943
13	12 556	12 342	12.134	11 732	11 348	10 635	9 986	9 394	8 853	8 358
14	13 488	13 243	13 004	12 543	12 106	11 296	10 563	9 899	9 295	8 745
15	14 417	14 137	13.865	13 343	12 849	11 938	11 118	10 380	9 712	9 108
16	15.340	15.024	14 718	14 131	13 578	12 561	11 652	10 838	10 106	9 447
17	16 258	15 906	15 562	14 908	14 292	13 166	12 166	11 274	10 477	9 763
18	17 173	16.779	16.398	15 673	14 992	13 754	12 659	11 690	10.828	10 059
19	18 082	17 647	17 226	17 426	15 678	14 324	13 134	12 085	11 158	10 336
20	18.987	18.508	18.046	17 169	16.351	14 877	13 590	12 462	11 470	10 594
24	22.563	21 889	21 243	20 030	18.914	16 936	15 247	13 799	12.550	11 469
25	23.446	22 718	22.023	20 720	19 523	17 413	15 622	14 094	12 783	11 654
30	27 794	26.775	25.808	24 016	22 397	19 600	17 292	15.373	13.765	12 409
36	32.871	31 447	30.108	27 661	25.489	21 832	18 908	16 547	14 621	13 035
40	36.172	34 447	32 835	29 916	27 355	23 115	19 793	17 159	15.046	13 332
48	42.580	40.185	37 974	34 043	30.673	25 267	21 196	18 077	15 660	13 730
50	44 143	41 566	38 196	35.000	31 424	25.730	21 482	18.256	15.762	13 801
60	51 726	48.173	44 966	39 380	34 761	27 676	22.624	18.929	16.161	14 039

n	8%	9%	10%	11%	12%	13%	14%	15%	16%
1	926	917	909	901	893	886	877	870	862
2	1 783	1 759	1 736	1 713	1 690	1 668	1 647	1 626	1 605
3	2 577	2 531	2 487	2.444	2 402	2.361	2.322	2.283	2.246
4	3.312	3.240	3.170	3.102	3.037	2 974	2 914	2.855	2.798
5	3.993	3.890	3 791	3 696	3.606	3 517	3.433	3 352	3.274
6	4 623	4 486	4 356	4 231	4 111	3.998	3 889	3 784	3.685
7	5.206	5.033	4 868	4 712	4 564	4 423	4 288	4 160	4 039
8	5.747	5.535	5.335	5.146	4 968	4 799	4 639	4 487	4 344
9	6.247	5.986	5.758	5 537	5.328	5.132	4 946	4 772	4 607
10	6.710	6.418	6.145	5.889	5 650	5 426	5 216	5.019	4 833
11	7 139	6 805	6 495	6 207	5 938	5 687	5 453	5.234	5.029
2	7 536	7 161	6.814	6 492	6.194	5 918	5 600	5.421	5.197
13	7 904	7 487	7 103	6.750	6 424	6.122	5 842	5.583	5.342
14	8.244	7 786	7 367	6.982	6.628	6 302	6 002	5.724	5.468
15	8 559	8.060	7 606	7 191	6 811	6.462	6 142	5.847	5.575
16	8.851	8.313	7 824	7 379	6 974	6 604	6 265	5.954	5.668
17	9 122	8.544	8.022	7 549	7 120	6.729	6.373	6.047	5.749
18	9.372	8.756	8 201	7 702	7 250	6 840	6 467	6.128	5.818
19	9 604	8.950	8.365	7 839	7 366	6 938	6.550	6.198	5.877
20	9 818	8.128	8 514	7 963	7 469	7 025	6 623	6.259	5.929
24	10 529	9 707	8.985	8.348	7 784	7 283	6 835	6.434	6.073
25	10 675	9 823	9 077	8.422	7 843	7 330	6.873	6.464	6.097
30	11 258	10 274	9 427	8.694	8 006	7 496	7 003	6.566	6.177
36	11 717	10.612	9 677	8.879	8 192	7 568	7 079	6.623	6.220
40	11 925	10 757	9 779	8.951	8 244	7 634	7 106	6.642	6.233
48	12.189	10.934	9 897	9 030	8.297	7 671	7 130	6.659	6.246
50	12.233	10 962	9 915	9 042	8.304	7 675	7 133	6.661	6.246
60	12.377	11 048	9 967	9 074	8.324	7 687	7 140	6.665	6.249

n	17%	18%	19%	20%	21%	22%	23%	24%	25%
1	855	848	840	833	826	820	813	806	800
2	1 585	1 566	1 547	1 528	1 509	1 492	1 474	1 457	1 440
3	2 210	2.174	2 140	2 106	2 074	2.042	2.011	1 981	1 952
4	2.743	2 690	2 639	2 589	2 540	2 494	2 448	2 404	2 362
5	3.199	3 127	3 058	2 991	2 926	2 864	2 803	2 745	2 689
6	3 589	3 498	3.410	3 326	3 245	3 167	3 092	3 020	2.951
7	3.922	3 812	3 706	3 605	3 508	3.416	3 327	3.242	3 161
8	4 207	4 078	3 954	3 837	3 726	3 619	3 518	3 421	3.329
9	4 451	4 303	4 163	4 031	3 906	3 786	3 673	3 566	3 463
10	4 659	4 494	4 339	4 192	4 054	3 923	3 799	3.682	3 571
11	4 836	4 656	4 487	4 327	4 177	4 035	3 901	3 776	3 656
12	4 988	4 793	4 611	4 439	4 278	4 127	3 985	3 851	3 725
13	5.118	4 910	4 715	4 533	4 362	4 203	4 053	3 912	3 780
14	5 229	5 008	4 802	4 611	4 432	4 265	4 108	3 962	3 824
15	5.324	5.092	4 876	4 675	4 489	4 315	4 153	4 001	3 859
16	5 405	5.162	4 938	4 730	4 536	4 357	4 189	4 033	3.887
17	5.475	5.222	4 990	4 775	4 576	4 391	4 219	4 059	3 910
18	5.534	5.273	5.033	4 812	4 608	4 419	4 243	4 080	3 928
19	5.584	5.316	5.070	4 843	4 636	4 442	4 263	4 097	3 942
20	5.628	5.353	5.101	4 870	4 657	4 460	4 279	4 110	3.954
24	5.746	5.461	5 182	4,937	4 713	4 507	4 316	4 143	3 981
25	5.766	5.467	5.185	4 948	4 721	4 514	4 323	4 147	3.986
30	5.829	5.517	5.235	4 979	4 746	4 534	4 339	4 160	3.998
36	5.880	5.541	5.253	4 998	4 757	4 542	4 345	4 165	3.999
40	5.871	5.548	5.258	4 997	4 760	4 544	4 347	4 166	3.999
48	5.879	5.554	5.262	4 999	4.761	4 545	4 348	4 167	4 000
50	5.880	5.554	5.262	4 999	4 762	4 545	4 348	4 167	4 000
60	5.882	5.555	5.263	5.000	4 762	4 545	4 348	4 167	4 000