

UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama
Sidang 1990/91

Oktober/November 1990

HGM 436 - Geografi Pertanian

Masa: [3 jam]

Kertas Peperiksaan ini mengandungi TUJUH (7) soalan dalam SEMBILAN (9) muka surat

Jawab EMPAT (4) soalan, SOALAN NO. 1 daripada Bahagian A adalah WAJIB dan TIGA (3) soalan daripada Bahagian B.

BAHAGIAN A - Soalan No 1 WAJIB dijawab

1. Satu projek tanaman buah-buahan secara estet akan dijalankan di lereng bukit yang mempunyai kecerunan sekitar 15 darjah. Berikut di adalah jadual aliran tunai untuk tahun 1 hingga tahun 25 berdasar kepada satu hektar keluasan. (Jadual Faktor Diskaun dan Faktor Kompaun).

Tahun	Aliran Tunai (\$)
1	- 930
2	- 560
3	- 550
4	- 492
5	- 360
6	- 164
7	40
8	381
9	569
10	650
11	710
12	751
13	781
14 -25	884

- (a) Dari segi fizikal kawasan, Apakah langkah-langkah kawalan yang perlu di ambil untuk menjalankan projek tersebut?

(10 markah)

- (b) Kira Kadar Pulangan Dalam. Pada kadar faedah pinjaman bank sebanyak 11% setahun, adakah projek ini mempunyai daya maju?
(20 markah)
- (c) Sekiranya tanaman estet ini diteruskan 25 tahun lagi, dan aliran tunai tahun 26 hingga tahun 50 ialah \$885, adakah terdapat perubahan pada Kadar Pulangan Dalam.
(10 markah)

BAHAGIAN B - Jawab tiga (3) soalan

2. Mengikut H. Ruthenberg, Sistem Pertanian Dunia boleh di kelaskan kepada 7 kelas, jelaskan kesemua kelas ini beserta contoh-contohnya.
(20 markah)
3. Ahli-Ahli Geografi tidak memandang Geografi Pertanian sebagai satu bahagian utama dalam Geografi, tetapi mengelaskan sebagai sebahagian dari Geografi Ekonomi. Bincangkan pernyataan ini.
(20 markah)
4. Hakisan tanah oleh tindakan air boleh diramalkan dengan menggunakan persamaan yang dikemukakan oleh Wischmeir dan Smith (1965) yang dikenali dengan " Universal Soil Loss Equation,"
$$A = R. K. LS. C. P.$$
Bincangkan elemen-elemen yang diambil kira dalam persamaan di atas, dan adakah persamaan ini sesuai untuk diaplikasikan dengan situasi di negara kita.
(20 markah)
5. Berdasarkan Teori Von Thunen, bincangkan pola gunatanah pertanian yang mengambilkira sewa ekonomi, intensiti, dan persaingan.
(20 markah)
6. (a) Bezakan diantara tekstur dan struktur tanah-tanah. diantaranya, yang manakah sukar dikawal dalam aktiviti pertanian?
(5 markah)
- (b) Jelaskan fungsi pH dalam larutan tanah-tanah.
(5 markah)

(c) Huraikan horizon-horizon di dalam profil tanah-tanah yang matang dan susunkan mengikut darjah ketinggian-nya terhadap kandungan bahan organan, larut-resap dan amaun aktiviti biologi.

(10 markah)

7. Pertanian di negara-negara maju seperti di Eropah Barat dan Amerika Utara adalah sukar ditandingi oleh negara-negara dunia ketiga. Bincangkan faktor-faktor yang menghalang perkembangan pertanian di dunia ketiga ini.

(20 markah)

.../Lampiran

.../4

RATE
11%

COMPOUNDING FACTOR
FOR 1
What an initial
amount becomes
when growing at
compound interest

COMPOUNDING FACTOR
FOR 1 PER ANNUM
Growth of equal
year-end deposits
all growing
at compound interest

SINKING FUND
FACTOR
Level deposit
required each
year to reach 1
by a given year

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
1	1.110 000	1.231 000	1.367 631	1.518 070	1.685 058	1.870 415	2.076 150	2.304 538	2.558 037	2.839 421	3.151 757	3.498 451	3.883 280	4.310 441	4.781 589	5.310 894	5.895 033	6.543 553	7.263 344	8.062 312	8.949 166	9.933 574	11.026 267	12.239 157	13.585 464	15.079 865	16.738 650	18.579 901	20.623 691	22.892 297	25.410 449	28.205 599	31.308 214	34.752 118	38.574 851	42.818 085	47.528 074	52.756 162	58.559 340	65.000 867	72.150 963	80.087 569	88.897 201	98.675 893	109.530 242	121.578 568	134.952 211	149.796 954	166.274 619	184.564 827																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
2	1.000 000	2.110 000	3.342 100	4.709 731	6.227 801	7.912 860	9.783 274	11.859 434	14.163 972	16.722 059	19.561 430	22.713 187	26.211 638	30.094 918	34.405 359	39.189 948	44.500 843	50.395 936	56.939 488	64.202 832	72.265 144	81.214 309	91.147 884	102.174 151	114.413 307	127.998 771	143.078 636	159.817 286	178.397 187	199.020 878	221.913 174	247.323 624	275.529 222	306.837 437	341.589 555	380.164 405	422.982 490	470.510 564	523.266 726	581.826 066	646.826 934	718.977 896	799.065 465	887.962 666	986.638 559	1,096.168 801	1,217.747 369	1,352.699 580	1,502.496 534	1,668.771 152																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
3	1.000 000	473 934	299 213	212 326	160 570	126 377	102 215	84 321	70 602	59 801	51 121	44 027	38 151	33 228	29 065	25 517	22 471	19 843	17 563	15 576	13 838	12 313	10 971	9 787	8 740	7 813	7 000	6 287	5 661	5 119	4 654	4 259	3 928	3 654	3 431	3 254	3 125	3 028	2 951	2 888	2 836	2 792	2 756	2 727	2 702	2 680	2 661	2 645	2 631	2 619	2 609	2 600	2 592	2 585	2 579	2 574	2 569	2 565	2 561	2 558	2 555	2 552	2 549	2 546	2 543	2 540	2 537	2 534	2 531	2 528	2 525	2 522	2 519	2 516	2 513	2 510	2 507	2 504	2 501	2 498	2 495	2 492	2 489	2 486	2 483	2 480	2 477	2 474	2 471	2 468	2 465	2 462	2 459	2 456	2 453	2 450	2 447	2 444	2 441	2 438	2 435	2 432	2 429	2 426	2 423	2 420	2 417	2 414	2 411	2 408	2 405	2 402	2 399	2 396	2 393	2 390	2 387	2 384	2 381	2 378	2 375	2 372	2 369	2 366	2 363	2 360	2 357	2 354	2 351	2 348	2 345	2 342	2 339	2 336	2 333	2 330	2 327	2 324	2 321	2 318	2 315	2 312	2 309	2 306	2 303	2 300	2 297	2 294	2 291	2 288	2 285	2 282	2 279	2 276	2 273	2 270	2 267	2 264	2 261	2 258	2 255	2 252	2 249	2 246	2 243	2 240	2 237	2 234	2 231	2 228	2 225	2 222	2 219	2 216	2 213	2 210	2 207	2 204	2 201	2 198	2 195	2 192	2 189	2 186	2 183	2 180	2 177	2 174	2 171	2 168	2 165	2 162	2 159	2 156	2 153	2 150	2 147	2 144	2 141	2 138	2 135	2 132	2 129	2 126	2 123	2 120	2 117	2 114	2 111	2 108	2 105	2 102	2 099	2 096	2 093	2 090	2 087	2 084	2 081	2 078	2 075	2 072	2 069	2 066	2 063	2 060	2 057	2 054	2 051	2 048	2 045	2 042	2 039	2 036	2 033	2 030	2 027	2 024	2 021	2 018	2 015	2 012	2 009	2 006	2 003	2 000	1 997	1 994	1 991	1 988	1 985	1 982	1 979	1 976	1 973	1 970	1 967	1 964	1 961	1 958	1 955	1 952	1 949	1 946	1 943	1 940	1 937	1 934	1 931	1 928	1 925	1 922	1 919	1 916	1 913	1 910	1 907	1 904	1 901	1 898	1 895	1 892	1 889	1 886	1 883	1 880	1 877	1 874	1 871	1 868	1 865	1 862	1 859	1 856	1 853	1 850	1 847	1 844	1 841	1 838	1 835	1 832	1 829	1 826	1 823	1 820	1 817	1 814	1 811	1 808	1 805	1 802	1 799	1 796	1 793	1 790	1 787	1 784	1 781	1 778	1 775	1 772	1 769	1 766	1 763	1 760	1 757	1 754	1 751	1 748	1 745	1 742	1 739	1 736	1 733	1 730	1 727	1 724	1 721	1 718	1 715	1 712	1 709	1 706	1 703	1 700	1 697	1 694	1 691	1 688	1 685	1 682	1 679	1 676	1 673	1 670	1 667	1 664	1 661	1 658	1 655	1 652	1 649	1 646	1 643	1 640	1 637	1 634	1 631	1 628	1 625	1 622	1 619	1 616	1 613	1 610	1 607	1 604	1 601	1 598	1 595	1 592	1 589	1 586	1 583	1 580	1 577	1 574	1 571	1 568	1 565	1 562	1 559	1 556	1 553	1 550	1 547	1 544	1 541	1 538	1 535	1 532	1 529	1 526	1 523	1 520	1 517	1 514	1 511	1 508	1 505	1 502	1 499	1 496	1 493	1 490	1 487	1 484	1 481	1 478	1 475	1 472	1 469	1 466	1 463	1 460	1 457	1 454	1 451	1 448	1 445	1 442	1 439	1 436	1 433	1 430	1 427	1 424	1 421	1 418	1 415	1 412	1 409	1 406	1 403	1 400	1 397	1 394	1 391	1 388	1 385	1 382	1 379	1 376	1 373	1 370	1 367	1 364	1 361	1 358	1 355	1 352	1 349	1 346	1 343	1 340	1 337	1 334	1 331	1 328	1 325	1 322	1 319	1 316	1 313	1 310	1 307	1 304	1 301	1 298	1 295	1 292	1 289	1 286	1 283	1 280	1 277	1 274	1 271	1 268	1 265	1 262	1 259	1 256	1 253	1 250	1 247	1 244	1 241	1 238	1 235	1 232	1 229	1 226	1 223	1 220	1 217	1 214	1 211	1 208	1 205	1 202	1 199	1 196	1 193	1 190	1 187	1 184	1 181	1 178	1 175	1 172	1 169	1 166	1 163	1 160	1 157	1 154	1 151	1 148	1 145	1 142	1 139	1 136	1 133	1 130	1 127	1 124	1 121	1 118	1 115	1 112	1 109	1 106	1 103	1 100	1 097	1 094	1 091	1 088	1 085	1 082	1 079	1 076	1 073	1 070	1 067	1 064	1 061	1 058	1 055	1 052	1 049	1 046	1 043	1 040	1 037	1 034	1 031	1 028	1 025	1 022	1 019	1 016	1 013	1 010	1 007	1 004	1 001	998	995	992	989	986	983	980	977	974	971	968	965	962	959	956	953	950	947	944	941	938	935	932	929	926	923	920	917	914	911	908	905	902	899	896	893	890	887	884	881	878	875	872	869	866	863	860	857	854	851	848	845	842	839	836	833	830	827	824	821	818	815	812	809	806	803	800	797	794	791	788	785	782	779	776	773	770	767	764	761	758	755	752	749	746	743	740	737	734	731	728	725	722	719	716	713	710	707	704	701	698	695	692	689	686	683	680	677	674	671	668	665	662	659	656	653	650	647	644	641	638	635	632	629	626	623	620	617	614	611	608	605	602	599	596	593	590	587	584	581	578	575	572	569	566	563	560	557	554	551	548	545	542	539	536	533	530	527	524	521	518	515	512	509	506	503	500	497	494	491	488	485	482	479	476	473	470	467	464	461	458	455	452	449	446	443	440	437	434	431	428	425	422	419	416	413	410	407	404	401	398	395	392	389	386	383	380	377	374	371	368	365	362	359	356	353	350	347	344	341	338	335	332	329	326	323	320	317	314	311	308	305	302	299	296	293	290	287	284	281	278	275	272	269	266	263	260	257	254	251	248	245	242	239	236	233	230	227	224	221	218	215	212	209	206	203	200	197	194	191	188	185	182	179	176	173	170	167	164	161	158	155	152	149	146	143	140	137	134	131	128	125	122	119	116	113	110	107	104	101	98	95	92	89	86	83	80	77	74	71	68	65	62	59	56	53	50	47	44	41	38	35	32	29	26	23	20	17	14	11	8	5	2	1

DISCOUNT FACTOR
How much 1 at
a future date
is worth today

PRESENT WORTH OF
AN ANNUITY FACTOR
How much 1 received
or paid annually
for X years
is worth today

CAPITAL RECOVERY
FACTOR
Annual payment that will
repay a \$1 loan in X years
with compound interest
on the unpaid balance

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50																	
1	900 901	811 632	731 191	658 731	593 451	534 641	481 658	433 926	390 925	352 184	317 283	285 841	257 514	231 995	209 004	188 292	169 633	152 822	137 678	124 034	111 742	100 669	90 693	81 705	73 608	66 314	59 742	53 822	48 488	43 683	39 354	35 454	31 940	28 775	25 924	23 355	21 040	18 955	17 077	15 384	13 860	12 486	11 249	10 134	9 091 30	8 130	7 225	6 451	5 713	5 011	4 435	3 975	3 621	3 273	2 939	2 618	2 309	2 011	1 724	1 448	1 182	936	700	484	288	112	1
2	1.110 000	583 934	409 213	322 326	270 570	236 377	212 156	194 321	180 602	169 801	161 121	154 027	148 151	143 228	139 065	135 517	132 471	129 843	127 563	125 576	123 838	122 313	120 971	119 787	118 740	117 813	116 989	116 257	115 605	115 025																																					

RATE 10%

RATE 10%

Year	COMPOUNDING FACTOR FOR 1 What an initial amount becomes when growing at compound interest	COMPOUNDING FACTOR FOR 1 PER ANNUM Growth of equal year-end deposits all growing at compound interest	SINKING FUND FACTOR Level deposit required each year to reach 1 by a given year	DISCOUNT FACTOR How much 1 at a future date is worth today	PRESENT WORTH OF AN ANNUITY FACTOR How much 1 received or paid annually for X years is worth today	CAPITAL RECOVERY FACTOR Annual payment that will repay a \$1 loan in X years with compound interest on the unpaid balance
1	1.100 000	1.000 000	1.000 000	.909 091	.909 091	1.100 000
2	1.210 000	2.100 000	.476 190	.826 446	1.735 537	.576 190
3	1.331 000	3.310 000	.302 115	.751 315	2.486 852	.402 115
4	1.464 100	4.641 000	.215 471	.683 013	3.169 865	.315 471
5	1.610 510	6.105 100	.163 797	.620 921	3.790 787	.263 797
6	1.771 561	7.715 610	.129 607	.564 474	4.355 261	.229 607
7	1.948 717	9.487 171	.105 405	.513 158	4.868 419	.205 405
8	2.143 589	11.435 888	.087 444	.466 507	5.334 926	.187 444
9	2.357 948	13.579 477	.073 641	.424 098	5.759 024	.173 641
10	2.593 742	15.937 425	.062 745	.385 543	6.144 567	.162 745
11	2.853 117	18.531 167	.053 963	.350 494	6.495 061	.153 963
12	3.138 428	21.384 284	.046 763	.318 631	6.813 692	.146 763
13	3.452 271	24.522 712	.040 779	.289 664	7.103 356	.140 779
14	3.797 498	27.974 983	.035 746	.263 331	7.366 687	.135 746
15	4.177 248	31.772 482	.031 474	.239 392	7.606 080	.131 474
16	4.594 973	35.949 730	.027 817	.217 629	7.823 709	.127 817
17	5.054 470	40.544 703	.024 664	.197 845	8.021 553	.124 664
18	5.559 917	45.599 173	.021 930	.179 859	8.201 412	.121 930
19	6.115 909	51.159 090	.019 547	.163 508	8.364 920	.119 547
20	6.727 500	57.274 999	.017 460	.148 644	8.513 564	.117 460
21	7.400 250	64.002 499	.015 624	.135 131	8.648 694	.115 624
22	8.140 275	71.402 749	.014 005	.122 846	8.771 540	.114 005
23	8.954 302	79.543 024	.012 572	.111 678	8.883 218	.112 572
24	9.849 733	88.497 327	.011 300	.101 526	8.984 744	.111 300
25	10.834 706	98.347 059	.010 168	.092 296	9.077 040	.110 168
26	11.918 177	109.181 765	.009 159	.083 905	9.160 945	.109 159
27	13.109 994	121.099 942	.008 258	.076 278	9.237 223	.108 258
28	14.420 994	134.209 936	.007 451	.069 343	9.306 567	.107 451
29	15.863 093	148.630 930	.006 728	.063 039	9.369 606	.106 728
30	17.449 402	164.494 023	.006 079	.057 309	9.426 914	.106 079
31	19.194 342	181.943 425	.005 496	.052 099	9.479 013	.105 496
32	21.113 777	201.137 767	.004 972	.047 362	9.526 376	.104 972
33	23.225 154	222.251 544	.004 499	.043 057	9.569 432	.104 499
34	25.547 670	245.476 699	.004 074	.039 143	9.608 575	.104 074
35	28.102 437	271.024 368	.003 690	.035 584	9.644 159	.103 690
36	30.912 681	299.126 805	.003 343	.032 349	9.676 508	.103 343
37	34.003 949	330.039 486	.003 030	.029 408	9.705 917	.103 030
38	37.404 343	364.043 434	.002 747	.026 735	9.732 651	.102 747
39	41.144 778	401.447 778	.002 491	.024 304	9.756 956	.102 491
40	45.259 256	442.592 556	.002 259	.022 095	9.779 051	.102 259
41	49.785 181	487.851 811	.002 050	.020 086	9.799 137	.102 050
42	54.763 699	537.636 992	.001 860	.018 260	9.817 397	.101 860
43	60.240 069	592.400 692	.001 688	.016 600	9.833 998	.101 688
44	66.264 076	652.640 761	.001 532	.015 091	9.849 089	.101 532
45	72.890 484	718.904 837	.001 391	.013 719	9.862 808	.101 391
46	80.179 532	791.795 321	.001 263	.012 472	9.875 280	.101 263
47	88.197 485	871.974 853	.001 147	.011 338	9.886 618	.101 147
48	97.017 234	960.172 338	.001 041	.010 307	9.896 926	.101 041
49	106.718 957	1,057.189 572	.000 946	.009 370	9.906 296	.100 946
50	117.390 853	1,163.908 529	.000 859	.008 519	9.914 814	.100 859

RATE
15%

COMPOUNDING FACTOR FOR 1
What an initial amount becomes when growing at compound interest

COMPOUNDING FACTOR FOR 1 PER ANNUM
Growth of equal year-end deposits all growing at compound interest

SINKING FUND FACTOR
Level deposit required each year to reach 1 by a given year

Year

1	1.150 000	1.000 000	1 000 000
2	1.322 500	2.150 000	.465 116
3	1.520 875	3.472 500	.287 977
4	1.749 006	4.993 375	.200 265
5	2.011 357	6.742 381	.148 316
6	2.313 061	8.753 738	.114 237
7	2.660 020	11.066 799	.090 360
8	3.059 023	13.726 819	.072 850
9	3.517 876	16.785 842	.059 574
10	4.045 558	20.303 718	.049 252
11	4.652 391	24.349 276	.041 069
12	5.350 250	29.001 667	.034 481
13	6.152 788	34.351 917	.029 110
14	7.075 705	40.504 705	.024 688
15	8.137 062	47.580 411	.021 017
16	9.357 621	55.717 472	.017 948
17	10.761 264	65.075 093	.015 367
18	12.375 454	75.836 357	.013 186
19	14.231 772	88.211 811	.011 336
20	16.366 537	102.443 583	.009 761
21	18.821 518	118.810 120	.008 417
22	21.644 746	137.631 638	.007 266
23	24.891 458	159.276 384	.006 278
24	28.625 176	184.167 841	.005 430
25	32.918 953	212.793 017	.004 699
26	37.856 706	245.711 970	.004 070
27	43.535 315	283.568 766	.003 526
28	50.065 612	327.104 080	.003 057
29	57.575 454	377.169 693	.002 651
30	66.211 772	434.745 146	.002 300
31	76.143 538	500.956 918	.001 996
32	87.565 068	577.100 456	.001 733
33	100.699 829	664.665 524	.001 505
34	115.804 803	765.365 353	.001 307
35	133.175 523	881.170 156	.001 135
36	153.151 852	1.014.345 680	.000 986
37	176.124 630	1.167.497 532	.000 857
38	202.543 324	1.343.622 161	.000 744
39	232.924 823	1.546.165 485	.000 647
40	267.863 546	1.779.090 308	.000 562
41	308.043 078	2.046.953 854	.000 489
42	354.249 540	2.354.996 933	.000 425
43	407.386 971	2.709.246 473	.000 369
44	468.495 017	3.116.633 443	.000 321
45	538.769 269	3.585.128 460	.000 279
46	619.584 659	4.123.897 729	.000 242
47	712.522 358	4.743.482 388	.000 211
48	819.400 712	5.456.004 746	.000 183
49	942.310 819	6.275.405 458	.000 159
50	1,083.657 442	7,217.716 277	.000 139

RATE
15%

PRESENT WORTH OF AN ANNUITY FACTOR
How much 1 received or paid annually for X years is worth today

CAPITAL RECOVERY FACTOR
Annual payment that will repay a \$1 loan in X years with compound interest on the unpaid balance

Year

1	869 565	1.150 000
2	756 144	.615 116
3	657 516	.437 977
4	571 753	.350 265
5	497 177	.299 316
6	432 328	.264 237
7	375 937	.240 360
8	326 902	.222 850
9	284 262	.209 574
10	247 185	.199 252
11	214 943	.191 069
12	186 907	.184 481
13	162 528	.179 110
14	141 329	.174 688
15	122 894	.171 017
16	106 865	.167 948
17	92 926	.165 367
18	80 805	.163 186
19	70 265	.161 336
20	61 100	.159 761
21	53 131	.158 417
22	46 201	.157 266
23	40 174	.156 278
24	34 934	.155 430
25	30 378	.154 699
26	26 415	.154 070
27	22 970	.153 526
28	19 974	.153 057
29	17 369	.152 651
30	15 103	.152 300
31	13 133	.151 996
32	11 420	.151 733
33	9 931	.151 505
34	8 635	.151 307
35	7 509	.151 135
36	6 529	.150 986
37	5 678	.150 857
38	4 937	.150 744
39	4 293	.150 647
40	3 733	.150 562
41	3 246	.150 489
42	2 823	.150 425
43	2 455	.150 369
44	2 134	.150 321
45	1 856	.150 279
46	1 614	.150 242
47	1 403	.150 211
48	1 220	.150 183
49	1 061	.150 159
50	923	.150 139

**RATE
5%**

**COMPOUNDING FACTOR
FOR 1**
What an initial
amount becomes at
when growing at
compound interest

**COMPOUNDING FACTOR
FOR 1 PER ANNUM**
Growth of equal
year-end deposits
all growing
at compound interest

**SINKING FUND
FACTOR**
Level deposit
required each
year to reach 1
by a given year

Year	COMPOUNDING FACTOR FOR 1	COMPOUNDING FACTOR FOR 1 PER ANNUM	SINKING FUND FACTOR
1	1.050 000	1.000 000	1.000 000
2	1.102 500	2.050 000	487 805
3	1.157 625	3.152 500	317 209
4	1.215 506	4.310 125	232 012
5	1.276 282	5.525 631	180 975
6	1.340 096	6.801 913	147 017
7	1.407 100	8.142 008	122 820
8	1.477 455	9.549 109	104 722
9	1.551 328	11 026 564	90 690
10	1.628 895	12 577 893	79 505
11	1.710 339	14 206 787	70 389
12	1.795 856	15 917 127	62 825
13	1.885 649	17 712 983	56 456
14	1.979 932	19 598 632	51 024
15	2.078 928	21 578 564	46 342
16	2.182 875	23 675 492	42 270
17	2.292 018	25 840 366	38 699
18	2.406 619	28 132 385	35 546
19	2.525 950	30 539 004	32 745
20	2.651 298	33 065 954	30 243
21	2.785 963	35 719 252	27 936
22	2.925 261	38 505 214	25 971
23	3.071 524	41 430 475	24 137
24	3.225 100	44 501 999	22 471
25	3.386 355	47 727 099	20 952
26	3.555 673	51 113 454	19 564
27	3.733 456	54 669 126	18 292
28	3.920 129	58 402 583	17 123
29	4.116 136	62 322 712	16 046
30	4.321 942	66 438 848	15 051
31	4.538 039	70 760 790	14 132
32	4.764 941	75 298 829	13 280
33	5.003 189	80 063 771	12 490
34	5.253 348	85 066 959	11 755
35	5.516 015	90 320 307	11 072
36	5.791 816	95 836 323	10 434
37	6.081 407	101 628 139	9 840
38	6.385 477	107 709 545	9 284
39	6.704 751	114 095 023	8 765
40	7.039 989	120 799 774	8 278
41	7.391 988	127 839 763	7 822
42	7.761 588	135 231 751	7 395
43	8.149 667	142 993 339	6 993
44	8.557 150	151 143 006	6 616
45	8.985 008	159 700 156	6 262
46	9.434 258	168 685 164	5 928
47	9.905 971	178 119 422	5 614
48	10.401 270	188 025 393	5 318
49	10.921 333	198 426 663	5 040
50	11.467 400	209 347 996	4 777

**RATE
5%**

**PRESENT WORTH OF
AN ANNUITY FACTOR**
How much 1 received
or paid annually
for X years
is worth today

**CAPITAL RECOVERY
FACTOR**
Annual payment that will
repay a \$1 loan in X years
with compound interest
on the unpaid balance

Year	PRESENT WORTH OF AN ANNUITY FACTOR	CAPITAL RECOVERY FACTOR
1	952 381	1.050 000
2	907 029	1.859 410
3	863 838	2.723 248
4	822 702	3.545 951
5	783 526	4.329 477
6	746 215	5.075 692
7	710 681	5.786 373
8	676 839	6.463 213
9	644 609	7.107 822
10	613 913	7.721 735
11	584 679	8.306 414
12	556 837	8.863 252
13	530 321	9.393 573
14	505 068	9.898 641
15	481 017	10.379 658
16	458 112	10.837 770
17	436 297	11.274 066
18	415 521	11.689 587
19	395 734	12.085 321
20	376 889	12.462 210
21	358 942	12.821 153
22	341 850	13.163 003
23	325 571	13.488 574
24	310 068	13.798 642
25	295 303	14.093 945
26	281 241	14.375 185
27	267 848	14.643 034
28	255 094	14.898 127
29	242 946	15.141 074
30	231 377	15.372 451
31	220 359	15.592 811
32	209 866	15.802 677
33	199 873	16.002 549
34	190 355	16.192 904
35	181 290	16.374 194
36	172 657	16.546 852
37	164 436	16.711 287
38	156 605	16.867 893
39	149 148	17.017 041
40	142 046	17.159 086
41	135 282	17.294 368
42	128 840	17.423 208
43	122 704	17.545 912
44	116 861	17.662 773
45	111 297	17.774 070
46	105 997	17.880 066
47	100 949	17.981 016
48	96 142	18.077 158
49	91 564	18.168 722
50	87 204	18.255 925

RATE
20%

COMPOUNDING FACTOR
FOR 1

What an initial
amount becomes
when growing at
compound interest

Year

1	1 200 000
2	1 440 000
3	1 728 000
4	2 073 600
5	2 488 320
6	2 985 984
7	3 583 181
8	4 299 817
9	5 159 780
10	6 191 736
11	7 430 084
12	8 915 100
13	10 699 321
14	12 839 185
15	15 407 022
16	18 488 426
17	22 186 111
18	26 623 333
19	31 948 000
20	38 337 600
21	46 005 120
22	55 206 144
23	66 247 373
24	79 406 847
25	95 396 217
26	114 475 450
27	137 370 552
28	164 844 662
29	197 813 595
30	237 376 314
31	284 851 577
32	341 821 892
33	410 186 270
34	492 223 524
35	590 668 229
36	708 801 875
37	850 552 250
38	1 020 674 700
39	1 224 809 640
40	1 469 771 568
41	1 763 725 882
42	2 116 471 058
43	2 539 765 269
44	3 047 718 323
45	3 657 261 988
46	4 388 714 386
47	5 266 457 263
48	6 319 748 715
49	7 583 698 458
50	9 100 438 150

COMPOUNDING FACTOR
FOR 1 PER ANNUM

Growth of equal
year-end deposits
all growing
at compound interest

Year

1	1 000 000
2	2 200 000
3	3 640 000
4	5 368 000
5	7 441 600
6	9 929 920
7	12 915 904
8	16 499 085
9	20 798 902
10	25 958 682
11	32 150 419
12	39 580 502
13	48 496 603
14	59 195 923
15	72 035 108
16	87 442 129
17	105 930 555
18	128 116 606
19	154 740 000
20	186 688 000
21	225 025 600
22	271 030 719
23	326 236 853
24	392 484 235
25	471 981 083
26	567 377 300
27	681 852 760
28	819 223 312
29	984 067 974
30	1 181 881 569
31	1 419 257 883
32	1 704 109 459
33	2 045 931 351
34	2 456 117 621
35	2 948 341 146
36	3 539 009 375
37	4 247 811 250
38	5 098 373 500
39	6 119 048 200
40	7 343 857 840
41	8 813 629 408
42	10 577 355 29
43	12 693 826 35
44	15 233 591 62
45	18 281 309 94
46	21 938 571 93
47	26 327 286 31
48	31 593 743 58
49	37 913 492 29
50	45 497 190 75

SINKING FUND
FACTOR

Level deposit
required each
year to reach 1
by a given year

Year

1	1 000 000
2	454 545
3	274 725
4	186 289
5	134 380
6	100 706
7	77 424
8	60 609
9	48 079
10	38 523
11	31 104
12	25 265
13	20 620
14	16 803
15	13 882
16	11 435
17	9 094
18	7 005
19	5 462
20	4 257
21	3 311
22	2 600
23	2 065
24	1 658
25	1 339
26	1 076
27	835
28	638
29	491
30	374
31	283
32	215
33	163
34	126
35	97
36	75
37	57
38	43
39	33
40	25
41	19
42	14
43	11
44	8
45	6
46	4
47	3
48	2
49	1
50	0

DISCOUNT FACTOR

How much 1 at
a future date
is worth today

Year

1	.833 333
2	.694 444
3	.578 704
4	.482 253
5	.401 878
6	.334 898
7	.279 082
8	.232 568
9	.193 807
10	.161 506
11	.134 588
12	.112 157
13	.093 464
14	.077 887
15	.064 905
16	.054 088
17	.045 073
18	.037 561
19	.031 301
20	.026 084
21	.021 737
22	.018 114
23	.015 095
24	.012 579
25	.010 483
26	.008 735
27	.007 280
28	.006 066
29	.005 055
30	.004 213
31	.003 511
32	.002 926
33	.002 438
34	.002 032
35	.001 693
36	.001 411
37	.001 176
38	.000 980
39	.000 816
40	.000 680
41	.000 567
42	.000 472
43	.000 394
44	.000 328
45	.000 273
46	.000 228
47	.000 190
48	.000 158
49	.000 132
50	.000 110

PRESENT WORTH OF
AN ANNUITY FACTOR

How much 1 received
or paid annually
for X years
is worth today

Year

1	.833 333
2	1 527 778
3	2 106 481
4	2 588 735
5	2 990 612
6	3 325 510
7	3 604 592
8	3 837 160
9	4 030 967
10	4 192 472
11	4 327 060
12	4 439 217
13	4 532 681
14	4 610 567
15	4 675 473
16	4 729 561
17	4 774 634
18	4 812 195
19	4 843 496
20	4 869 580
21	4 891 316
22	4 909 430
23	4 924 525
24	4 937 104
25	4 947 587
26	4 956 323
27	4 963 602
28	4 969 668
29	4 974 724
30	4 978 936
31	4 982 447
32	4 985 372
33	4 987 810
34	4 989 842
35	4 991 535
36	4 992 946
37	4 994 122
38	4 995 101
39	4 995 918
40	4 996 598
41	4 997 165
42	4 997 638
43	4 998 031
44	4 998 359
45	4 998 633
46	4 998 861
47	4 999 051
48	4 999 209
49	4 999 341
50	4 999 451

CAPITAL RECOVERY
FACTOR

Annual payment that will
repay a \$1 loan in X years
with compound interest
on the unpaid balance

Year

1	1 200 000
2	654 545
3	474 725
4	386 289
5	334 380
6	300 706
7	277 424
8	260 609
9	248 079
10	238 523
11	231 104
12	225 265
13	220 620
14	216 893
15	213 882
16	211 436
17	209 440
18	207 805
19	206 462
20	205 357
21	204 444
22	203 690
23	203 065
24	202 548
25	202 119
26	201 762
27	201 467
28	201 221
29	201 016
30	200 846
31	200 705
32	200 587
33	200 489
34	200 407
35	200 339
36	200 283
37	200 235
38	200 196
39	200 163
40	200 136
41	200 113
42	200 095
43	200 079
44	200 066
45	200 055
46	200 046
47	200 038
48	200 032
49	200 026
50	200 022