NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: Bachelor of science ; Bachelor of science in Applied Mathematics and Statistics	
QUALIFICATION CODE: 07BSOC; 07BAMS	**LEVEL: 6**
COURSE CODE: FIM601S	**COURSE NAME:** FINANCIAL MATHEMATICS 2
SESSION: JULY 2019	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS: 100**

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER	Dr A. S. EEGUNJOBI
MODERATOR:	Dr V. KATOMA

INSTRUCTIONS
1. Answer ALL the questions in the booklet provided. 2. Show clearly all the steps used in the calculations. 3. All written work must be done in blue or black ink and sketches must be done in pencil.

PERMISSIBLE MATERIALS

1. Non-programmable calculator without a cover.

ATTACHMENTS

1. Actuarial table will be given

THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)

QUESTION 1 [22marks]

1. (a) Suppose $a = (a_0, a_1, \cdots, a_n)$ and $b = (b_0, b_1, \cdots, b_n)$ are 2 cash-flow with $NPV(a) \geq NPV(b)$ at interest rate i per annum. Show that the cash-flow sequence **a** can be transform by investing and borrowing at rate i into a cash-flow sequence $c = (c_0, c_1, \cdots, c_n)$ with $c_0 \geq b_0, c_1 \geq b_1, \cdots, c_n \geq b_n$. (6)

   (b) The force of interest $\delta(t)$ is a function of time and at any time t, measured in years is given by

$$\delta(t) = \begin{cases} 0.04 + 0.01t; & \text{if } 0 \leq t \leq 4 \\ 0.12 - 0.01t; & \text{if } 4 < t \leq 8 \\ 0.06; & \text{if } 8 < t \end{cases}$$

   Calculate the present value at time $t = 0$ if a payment stream, paid continuously from time $t = 9$ to $t = 12$, under which the rate of payment at time t is $50e^{0.01t}$. (8)

   (c) The force of interest $\delta(t)$ at time t(measured in year) is given by

$$\delta(t) = \begin{cases} 0.05; & \text{if } 0 < t < 8 \\ 0.04 + 0.0004t^2; & \text{if } 8 \leq t \leq 15 \end{cases}$$

   Calculate the accumulated values at time $t = 15$ of a continuous payment stream of $N\$50$ per annum payable from time $t = 0$ to time $t = 8$. (8)

QUESTION 2 [25 marks]

2. (a) $N\$2$million certificate of deposit was issued on 17 January for 60 days with a 4.5% coupon. Hence it matures on 18 June.

   i. What are the proceeds on maturity? (5)

   ii. On 4th March, what should the secondary market price be in order that the yield is then 4%? (5)

   iii. Suppose the Certificate of Deposit is purchased in the secondary market on 4th March for the price calculated in part (ii). By 4th April, the yield has dropped to 3.5%. What is the rate of return for holding the Certificate of Deposit from 4th March to 4th April? (Assume ACT/365.) (5)

   (b) At time 0, the value of a risk-free bond is $B_0 = 100$, and the stock price is $S_0 = 100$. Suppose that the annual risk-free interest rate is $r = 5\%$, and the one-year return on the stock is

$$r_S = \begin{cases} 10\%; & \text{with probability } 60\% \\ \text{-}5\%; & \text{with probability } 40\% \end{cases}$$

   i. Find position x and y so that the wealth $\prod_t = xS_t + yB_t$ of the portfolio (x, y) at time $t = T$ is

$$\prod_T = \begin{cases} \text{N\$1000}; & \text{if the stock price goes up} \\ \text{N\$1500}; & \text{if the stock price goes down} \end{cases}$$

   (5)

   ii. What is the expected return of the portfolio over the first year? (5)

QUESTION 3 [30 marks]

3. (a) Consider a 12-month long forward contract on a stock currently priced at $N\$90$. The risk-free interest rate is 7% per annum, compounded continuously. Suppose that dividend payments of $N\$8$ per share are expected after 4 months and $N\$7$ after 8 months.
   i. Determine the forward price at time 0. (5)
   ii. What is the value of this forward contract 6 months from now if the stock price at that time is $N\$95$? (6)
   iii. Suppose that the value of this forward contract 6 months from now is $N\$5$. Determine whether there is an arbitrage opportunity. If one exists in this situation, construct an arbitrage portfolio and find the profit realized. (5)

   (b) i. Consider a European call option on a non-dividend-paying stock where the stock price is $N\$40$, the strike price is $N\$40$, the risk-free rate is 4% per annum, the volatility is 30% per annum, and the time to maturity is 6 months. Calculate u, d, and p for the two-step tree. (7)
   ii. Calculate u, d, and p for the two-step tree for America put option on a future contract with strike price and future price of $N\$50$, the risk-free rate is 10%, the time to maturity is 6 months, and the volatility is 40% per annum. (7)

QUESTION 4 [23 marks]

4. (a) A loan of $N\$5,000$ is repaid by an annuity payable annually in arrears for 12 years calculated at effective rate of interest of 8% per annum. Find the element in the 5th payment. (7)

   (b) A customer borrows $4,000$ under a consumer credit loan. Repayments are calculated to give an APR of 15%. Instalments are paid monthly in arrears for 5 years. Calculate the flat rate of interest. (6)

   (c) An insurance company issues an annuity of $N\$10,000$ p.a. payable monthly in arrear for 20 years. The cost of the annuity is calculated using effective rate of interest of 10% p.a.
   i. Calculate the interest component of the first instalment of of the sixth year of the annuity. (5)
   ii. Calculate the capital and interest paid in the first 5 years. (5)

End of Exam!

ACTUARIAL TABLES

4 per cent

Constants	
Function	Value
i	·040 000
$i^{(2)}$	·039 608
$i^{(4)}$	·039 414
$i^{(12)}$	·039 285
δ	·039 221
$(1+i)^{\frac{1}{2}}$	1·019 804
$(1+i)^{\frac{1}{4}}$	1·009 853
$(1+i)^{\frac{1}{12}}$	1·003 274
v	·961 538
$v^{\frac{1}{2}}$	·980 581
$v^{\frac{1}{4}}$	·990 243
$v^{\frac{1}{12}}$	·996 737
d	·038 462
$d^{(2)}$	·038 839
$d^{(4)}$	·039 029
$d^{(12)}$	·039 157
$i/i^{(2)}$	1·009 902
$i/i^{(4)}$	1·014 877
$i/i^{(12)}$	1·018 204
i/δ	1·019 869
$i/d^{(2)}$	1·029 902
$i/d^{(4)}$	1·024 877
$i/d^{(12)}$	1·021 537
$\log_{10}(1+i)$	·017 033 3

n	$(1+i)^n$	v^n	$s_{\overline{n}}$	$a_{\overline{n}}$	$(a_{\overline{n}})^{-1}$	n
1	1·040 00	·961 54	1·000 0	0·961 5	1·040 000	1
2	1·081 60	·924 56	2·040 0	1·886 1	0·530 196	2
3	1·124 86	·889 00	3·121 6	2·775 1	·360 349	3
4	1·169 86	·854 80	4·246 5	3·629 9	·275 490	4
5	1·216 65	·821 93	5·416 3	4·451 8	·224 627	5
6	1·265 32	·790 31	6·633 0	5·242 1	·190 762	6
7	1·315 93	·759 92	7·898 3	6·002 1	·166 610	7
8	1·368 57	·730 69	9·214 2	6·732 7	·148 528	8
9	1·423 31	·702 59	10·582 8	7·435 3	·134 493	9
10	1·480 24	675 56	12·006 1	8·110 9	·123 291	10
11	1·539 45	·649 58	13·486 4	8·760 5	·114 149	11
12	1·601 03	·624 60	15·025 8	9·385 1	·106 552	12
13	1·665 07	·600 57	16·626 8	9·985 6	·100 144	13
14	1·731 68	·577 48	18·291 9	10·563 1	·094 669	14
15	1·800 94	·555 26	20·023 6	11·118 4	·089 941	15
16	1·872 98	·533 91	21·824 5	11·652 3	·085 820	16
17	1·947 90	·513 37	23·697 5	12·165 7	·082 199	17
18	2·025 82	·493 63	25·645 4	12·659 3	·078 993	18
19	2·106 85	·474 64	27·671 2	13·133 9	·076 139	19
20	2·191 12	·456 39	29·778 1	13·590 3	·073 582	20
21	2·278 77	·438 83	31·969 2	14·029 2	·071 280	21
22	2·369 92	·421 96	34·248 0	14·451 1	·069 199	22
23	2·464 72	·405 73	36·617 9	14·856 8	·067 309	23
24	2·563 30	·390 12	39·082 6	15·247 0	·065 587	24
25	2·665 84	·375 12	41·645 9	15·622 1	·064 012	25
26	2·772 47	·360 69	44·311 7	15·982 8	·062 567	26
27	2·883 37	·346 82	47·084 2	16·329 6	·061 239	27
28	2·998 70	·333 48	49·967 6	16·663 1	·060 013	28
29	3·118 65	·320 65	52·966 3	16·983 7	·058 880	29
30	3·243 40	·308 32	56·084 9	17·292 0	·057 830	30
31	3·373 13	·296 46	59·328 3	17·588 5	·056 855	31
32	3·508 06	·285 06	62·701 5	17·873 6	·055 949	32
33	3·648 38	·274 09	66·209 5	18·147 6	·055 104	33
34	3·794 32	·263 55	69·857 9	18·411 2	·054 315	34
35	3·946 09	·253 42	73·652 2	18·664 6	·053 577	35
36	4·103 93	·243 67	77·598 3	18·908 3	·052 887	36
37	4·268 09	·234 30	81·702 2	19·142 6	·052 240	37
38	4·438 81	·225 29	85·970 3	19·367 9	·051 632	38
39	4·616 37	·216 62	90·409 1	19·584 5	·051 061	39
40	4·801 02	·208 29	95·025 5	19·792 8	·050 523	40
41	4·993 06	·200 28	99·826 5	19·993 1	·050 017	41
42	5·192 78	·192 57	104·819 6	20·185 6	·049 540	42
43	5·400 50	·185 17	110·012 4	20·370 8	·049 090	43
44	5·616 52	·178 05	115·412 9	20·548 8	·048 665	44
45	5·841 18	·171 20	121·029 4	20·720 0	·048 262	45
46	6·074 82	·164 61	126·870 6	20·884 7	·047 882	46
47	6·317 82	·158 28	132·945 4	21·042 9	·047 522	47
48	6·570 53	·152 19	139·263 2	21·195 1	·047 181	48
49	6·833 35	·146 34	145·833 7	21·341 5	·046 857	49
50	7·106 68	·140 71	152·667 1	21·482 2	·046 550	50
60	10·519 63	·095 06	237·990 7	22·623 5	·044 202	60
70	15·571 62	·064 22	364·290 5	23·394 5	·042 745	70
80	23·049 80	·043 38	551·245 0	23·915 4	·041 814	80
90	34·119 33	·029 31	827·983 3	24·267 3	·041 208	90
100	50·504 95	·019 80	1 237·623 7	24·505 0	·040 808	100

4½ per cent

n	$(1+i)^n$	v^n	$s_{\overline{n}}$	$a_{\overline{n}}$	$(a_{\overline{n}})^{-1}$	n
1	1·045 00	·956 94	1·000 0	0·956 9	1·045 000	1
2	1·092 03	·915 73	2·045 0	1·872 7	0·533 998	2
3	1·141 17	·876 30	3·137 0	2·749 0	·363 773	3
4	1·192 52	·838 56	4·278 2	3·587 5	·278 744	4
5	1·246 18	·802 45	5·470 7	4·390 0	·227 792	5
6	1·302 26	·767 90	6·716 9	5·157 9	·193 878	6
7	1·360 86	·734 83	8·019 2	5·892 7	·169 701	7
8	1·422 10	·703 19	9·380 0	6·595 9	·151 610	8
9	1·486 10	·672 90	10·802 1	7·268 8	·137 574	9
10	1·552 97	·643 93	12·288 2	7·912 7	·126 379	10
11	1·622 85	·616 20	13·841 2	8·528 9	·117 248	11
12	1·695 88	·589 66	15·464 0	9·118 6	·109 666	12
13	1·772 20	·564 27	17·159 9	9·682 9	·103 275	13
14	1·851 94	·539 97	18·932 1	10·222 8	·097 820	14
15	1·935 28	·516 72	20·784 1	10·739 5	·093 114	15
16	2·022 37	·494 47	22·719 3	11·234 0	·089 015	16
17	2·113 38	·473 18	24·741 7	11·707 2	·085 418	17
18	2·208 48	·452 80	26·855 1	12·160 0	·082 237	18
19	2·307 86	·433 30	29·063 6	12·593 3	·079 407	19
20	2·411 71	·414 64	31·371 4	13·007 9	·076 876	20
21	2·520 24	·396 79	33·783 1	13·404 7	·074 601	21
22	2·633 65	·379 70	36·303 4	13·784 4	·072 546	22
23	2·752 17	·363 35	38·937 0	14·147 8	·070 682	23
24	2·876 01	·347 70	41·689 2	14·495 5	·068 987	24
25	3·005 43	·332 73	44·565 2	14·828 2	·067 439	25
26	3·140 68	·318 40	47·570 6	15·146 6	·066 021	26
27	3·282 01	·304 69	50·711 3	15·451 3	·064 719	27
28	3·429 70	·291 57	53·993 3	15·742 9	·063 521	28
29	3·584 04	·279 02	57·423 0	16·021 9	·062 415	29
30	3·745 32	·267 00	61·007 1	16·288 9	·061 392	30
31	3·913 86	·255 50	64·752 4	16·544 4	·060 443	31
32	4·089 98	·244 50	68·666 2	16·788 9	·059 563	32
33	4·274 03	·233 97	72·756 2	17·022 9	·058 745	33
34	4·466 36	·223 90	77·030 3	17·246 8	·057 982	34
35	4·667 35	·214 25	81·496 6	17·461 0	·057 270	35
36	4·877 38	·205 03	86·164 0	17·666 0	·056 606	36
37	5·096 86	·196 20	91·041 3	17·862 2	·055 984	37
38	5·326 22	·187 75	96·138 2	18·050 0	·055 402	38
39	5·565 90	·179 67	101·464 4	18·229 7	·054 856	39
40	5·816 36	·171 93	107·030 3	18·401 6	·054 343	40
41	6·078 10	·164 53	112·846 7	18·566 1	·053 862	41
42	6·351 62	·157 44	118·924 8	18·723 5	·053 409	42
43	6·637 44	·150 66	125·276 4	18·874 2	·052 982	43
44	6·936 12	·144 17	131·913 8	19·018 4	·052 581	44
45	7·248 25	·137 96	138·850 0	19·156 3	·052 202	45
46	7·574 42	·132 02	146·098 2	19·288 4	·051 845	46
47	7·915 27	·126 34	153·672 6	19·414 7	·051 507	47
48	8·271 46	·120 90	161·587 9	19·535 6	·051 189	48
49	8·643 67	·115 69	169·859 4	19·651 3	·050 887	49
50	9·032 64	·110 71	178·503 0	19·762 0	·050 602	50
60	14·027 41	·071 29	289·498 0	20·638 0	·048 454	60
70	21·784 14	·045 90	461·869 7	21·202 1	·047 165	70
80	33·830 10	·029 56	729·557 7	21·565 3	·046 371	80
90	52·537 11	·019 03	1 145·269 0	21·799 2	·045 873	90
100	81·588 52	·012 26	1 790·856 0	21·949 9	·045 558	100

Constants	
Function	Value
i	·045 000
$i^{(2)}$	·044 505
$i^{(4)}$	·044 260
$i^{(12)}$	·044 098
δ	·044 017
$(1+i)^{\frac{1}{2}}$	1·022 252
$(1+i)^{\frac{1}{4}}$	1·011 065
$(1+i)^{\frac{1}{12}}$	1·003 675
v	·956 938
$v^{\frac{1}{2}}$	·978 232
$v^{\frac{1}{4}}$	·989 056
$v^{\frac{1}{12}}$	·996 339
d	·043 062
$d^{(2)}$	·043 536
$d^{(4)}$	·043 776
$d^{(12)}$	·043 936
$i/i^{(2)}$	1·011 126
$i/i^{(4)}$	1·016 720
$i/i^{(12)}$	1·020 461
i/δ	1·022 335
$i/d^{(2)}$	1·033 626
$i/d^{(4)}$	1·027 970
$i/d^{(12)}$	1·024 211
$\log_{10}(1+i)$	·019 116 3

ACTUARIAL TABLES

5 per cent

Constants	
Function	Value
i	·050 000
$i^{(2)}$	·049 390
$i^{(4)}$	·049 089
$i^{(12)}$	·048 889
δ	·048 790
$(1+i)^{\frac{1}{2}}$	1·024 695
$(1+i)^{\frac{1}{4}}$	1·012 272
$(1+i)^{\frac{1}{12}}$	1·004 074
v	·952 381
$v^{\frac{1}{2}}$	·975 900
$v^{\frac{1}{4}}$	·987 877
$v^{\frac{1}{12}}$	·995 942
d	·047 619
$d^{(2)}$	·048 200
$d^{(4)}$	·048 494
$d^{(12)}$	·048 691
$i/i^{(2)}$	1·012 348
$i/i^{(4)}$	1·018 559
$i/i^{(12)}$	1·022 715
i/δ	1·024 797
$i/d^{(2)}$	1·037 348
$i/d^{(4)}$	1·031 059
$i/d^{(12)}$	1·026 881
$\log_{10}(1+i)$	·021 189 3

n	$(1+i)^n$	v^n	$s_{\overline{n}\rceil}$	$a_{\overline{n}\rceil}$	$(a_{\overline{n}\rceil})^{-1}$	n
1	1·050 00	·952 38	1·000 0	0·952 4	1·050 000	1
2	1·102 50	·907 03	2·050 0	1·859 4	0·537 805	2
3	1·157 63	·863 84	3·152 5	2·723 2	·367 209	3
4	1·215 51	·822 70	4·310 1	3·546 0	·282 012	4
5	1·276 28	·783 53	5·525 6	4·329 5	·230 975	5
6	1·340 10	·746 22	6·801 9	5·075 7	·197 017	6
7	1·407 10	·710 68	8·142 0	5·786 4	·172 820	7
8	1·477 46	·676 84	9·549 1	6·463 2	·154 722	8
9	1·551 33	·644 61	11·026 6	7·107 8	·140 690	9
10	1·628 89	·613 91	12·577 9	7·721 7	·129 505	10
11	1·710 34	·584 68	14·206 8	8·306 4	·120 389	11
12	1·795 86	·556 84	15·917 1	8·863 3	·112 825	12
13	1·885 65	·530 32	17·713 0	9·393 6	·106 456	13
14	1·979 93	·505 07	19·598 6	9·898 6	·101 024	14
15	2·078 93	·481 02	21·578 6	10·379 7	·096 342	15
16	2·182 87	·458 11	23·657 5	10·837 8	·092 270	16
17	2·292 02	·436 30	25·840 4	11·274 1	·088 699	17
18	2·406 62	·415 52	28·132 4	11·689 6	·085 546	18
19	2·526 95	·395 73	30·539 0	12·085 3	·082 745	19
20	2·653 30	·376 89	33·066 0	12·462 2	·080 243	20
21	2·785 96	·358 94	35·719 3	12·821 2	·077 996	21
22	2·925 26	·341 85	38·505 2	13·163 0	·075 971	22
23	3·071 52	·325 57	41·430 5	13·488 6	·074 137	23
24	3·225 10	·310 07	44·502 0	13·798 6	·072 471	24
25	3·386 35	·295 30	47·727 1	14·093 9	·070 952	25
26	3·555 67	·281 24	51·113 5	14·375 2	·069 564	26
27	3·733 46	·267 85	54·669 1	14·643 0	·068 292	27
28	3·920 13	·255 09	58·402 6	14·898 1	·067 123	28
29	4·116 14	·242 95	62·322 7	15·141 1	·066 046	29
30	4·321 94	·231 38	66·438 8	15·372 5	·065 051	30
31	4·538 04	·220 36	70·760 8	15·592 8	·064 132	31
32	4·764 94	·209 87	75·298 8	15·802 7	·063 280	32
33	5·003 19	·199 87	80·063 8	16·002 5	·062 490	33
34	5·253 35	·190 35	85·067 0	16·192 9	·061 755	34
35	5·516 02	·181 29	90·320 3	16·374 2	·061 072	35
36	5·791 82	·172 66	95·836 3	16·546 9	·060 434	36
37	6·081 41	·164 44	101·628 1	16·711 3	·059 840	37
38	6·385 48	·156 61	107·709 5	16·867 9	·059 284	38
39	6·704 75	·149 15	114·095 0	17·017 0	·058 765	39
40	7·039 99	·142 05	120·799 8	17·159 1	·058 278	40
41	7·391 99	·135 28	127·839 8	17·294 4	·057 822	41
42	7·761 59	·128 84	135·231 8	17·423 2	·057 395	42
43	8·149 67	·122 70	142·993 3	17·545 9	·056 993	43
44	8·557 15	·116 86	151·143 0	17·662 8	·056 616	44
45	8·985 01	·111 30	159·700 2	17·774 1	·056 262	45
46	9·434 26	·106 00	168·685 2	17·880 1	·055 928	46
47	9·905 97	·100 95	178·119 4	17·981 0	·055 614	47
48	10·401 27	·096 14	188·025 4	18·077 2	·055 318	48
49	10·921 33	·091 56	198·426 7	18·168 7	·055 040	49
50	11·467 40	·087 20	209·348 0	18·255 9	·054 777	50
60	18·679 19	·053 54	353·583 7	18·929 3	·052 828	60
70	30·426 43	·032 87	588·528 5	19·342 7	·051 699	70
80	49·561 44	·020 18	971·228 8	19·596 5	·051 030	80
90	80·730 37	·012 39	1 594·607 3	19·752 3	·050 627	90
100	131·501 26	·007 60	2 610·025 2	19·847 9	·050 383	100

5½ per cent

n	$(1+i)^n$	v^n	$s_{\overline{n}\rceil}$	$a_{\overline{n}\rceil}$	$(a_{\overline{n}\rceil})^{-1}$	n
1	1·055 00	·947 87	1·000 0	0·947 9	1·055 000	1
2	1·113 02	·898 45	2·055 0	1·846 3	0·541 618	2
3	1·174 24	·851 61	3·168 0	2·697 9	·370 654	3
4	1·238 82	·807 22	4·342 3	3·505 2	·285 294	4
5	1·306 96	·765 13	5·581 1	4·270 3	·234 176	5
6	1·378 84	·725 25	6·888 1	4·995 5	·200 179	6
7	1·454 68	·687 44	8·266 9	5·683 0	·175 964	7
8	1·534 69	·651 60	9·721 6	6·334 6	·157 864	8
9	1·619 09	·617 63	11·256 3	6·952 2	·143 839	9
10	1·708 14	·585 43	12·875 4	7·537 6	·132 668	10
11	1·802 09	·554 91	14·583 5	8·092 5	·123 571	11
12	1·901 21	·525 98	16·385 6	8·618 5	·116 029	12
13	2·005 77	·498 56	18·286 8	9·117 1	·109 684	13
14	2·116 09	·472 57	20·292 6	9·589 6	·104 279	14
15	2·232 48	·447 93	22·408 7	10·037 6	·099 626	15
16	2·355 26	·424 58	24·641 1	10·462 2	·095 583	16
17	2·484 80	·402 45	26·996 4	10·864 6	·092 042	17
18	2·621 47	·381 47	29·481 2	11·246 1	·088 920	18
19	2·765 65	·361 58	32·102 7	11·607 7	·086 150	19
20	2·917 76	·342 73	34·868 3	11·950 4	·083 679	20
21	3·078 23	·324 86	37·786 1	12·275 2	·081 465	21
22	3·247 54	·307 93	40·864 3	12·583 2	·079 471	22
23	3·426 15	·291 87	44·111 8	12·875 0	·077 670	23
24	3·614 59	·276 66	47·538 0	13·151 7	·076 036	24
25	3·813 39	·262 23	51·152 6	13·413 9	·074 549	25
26	4·023 13	·248 56	54·966 0	13·662 5	·073 193	26
27	4·244 40	·235 60	58·989 1	13·898 1	·071 952	27
28	4·477 84	·223 32	63·233 5	14·121 4	·070 814	28
29	4·724 12	·211 68	67·711 4	14·333 1	·069 769	29
30	4·983 95	·200 64	72·435 5	14·533 7	·068 805	30
31	5·258 07	·190 18	77·419 4	14·723 9	·067 917	31
32	5·547 26	·180 27	82·677 5	14·904 2	·067 095	32
33	5·852 36	·170 87	88·224 8	15·075 1	·066 335	33
34	6·174 24	·161 96	94·077 1	15·237 0	·065 630	34
35	6·513 83	·153 52	100·251 4	15·390 6	·064 975	35
36	6·872 09	·145 52	106·765 2	15·536 1	·064 366	36
37	7·250 05	·137 93	113·637 3	15·674 0	·063 800	37
38	7·648 80	·130 74	120·887 3	15·804 7	·063 272	38
39	8·069 49	·123 92	128·536 1	15·928 7	·062 780	39
40	8·513 31	·117 46	136·605 6	16·046 1	·062 320	40
41	8·981 54	·111 34	145·118 9	16·157 5	·061 891	41
42	9·475 53	·105 54	154·100 5	16·263 0	·061 489	42
43	9·996 68	·100 03	163·576 0	16·363 0	·061 113	43
44	10·546 50	·094 82	173·572 7	16·457 9	·060 761	44
45	11·126 55	·089 88	184·119 2	16·547 7	·060 431	45
46	11·738 51	·085 19	195·245 7	16·632 9	·060 122	46
47	12·384 13	·080 75	206·984 2	16·713 7	·059 831	47
48	13·065 26	·076 54	219·368 4	16·790 2	·059 559	48
49	13·783 85	·072 55	232·433 6	16·862 8	·059 302	49
50	14·541 96	·068 77	246·217 5	16·931 5	·059 061	50
60	24·839 77	·040 26	433·450 4	17·449 9	·057 307	60
70	42·429 92	·023 57	753·271 2	17·753 3	·056 328	70
80	72·476 43	·013 80	1 299·571 4	17·931 0	·055 769	80
90	123·800 21	·008 08	2 232·731 0	18·035 0	·055 448	90
100	211·468 64	·004 73	3 826·702 5	18·095 8	·055 261	100

Constants	
Function	Value
i	·055 000
$i^{(2)}$	·054 264
$i^{(4)}$	·053 901
$i^{(12)}$	·053 660
δ	·053 541
$(1+i)^{\frac{1}{2}}$	1·027 132
$(1+i)^{\frac{1}{4}}$	1·013 475
$(1+i)^{\frac{1}{12}}$	1·004 472
v	·947 867
$v^{\frac{1}{2}}$	·973 585
$v^{\frac{1}{4}}$	·986 704
$v^{\frac{1}{12}}$	·995 548
d	·052 133
$d^{(12)}$	·052 830
$d^{(4)}$	·053 184
$d^{(12)}$	·053 422
$i/i^{(2)}$	1·013 566
$i/i^{(4)}$	1·020 395
$i/i^{(12)}$	1·024 965
i/δ	1·027 255
$i/d^{(2)}$	1·041 066
$i/d^{(4)}$	1·034 145
$i/d^{(12)}$	1·029 548
$\log_{10}(1+i)$	·023 252 5

ACTUARIAL TABLES

6 per cent

Constants	
Function	Value
i	·060 000
$i^{(2)}$	·059 126
$i^{(4)}$	·058 695
$i^{(12)}$	·058 411
δ	·058 269
$(1+i)^{\frac{1}{2}}$	1·029 563
$(1+i)^{\frac{1}{4}}$	1·014 674
$(1+i)^{\frac{1}{12}}$	1·004 868
v	·943 396
$v^{\frac{1}{2}}$	·971 286
$v^{\frac{1}{4}}$	·985 538
$v^{\frac{1}{12}}$	·995 156
d	·056 604
$d^{(2)}$	·057 428
$d^{(4)}$	·057 847
$d^{(12)}$	·058 128
$i/i^{(2)}$	1·014 782
$i/i^{(4)}$	1·022 227
$i/i^{(12)}$	1·027 211
i/δ	1·029 709
$i/d^{(2)}$	1·044 782
$i/d^{(4)}$	1·037 227
$i/d^{(12)}$	1·032 211
$\log_{10}(1+i)$	·025 305 9

n	$(1+i)^n$	v^n	$s_{\overline{n}}$	$a_{\overline{n}}$	$(a_{\overline{n}})^{-1}$	n
1	1·060 00	·943 40	1·000 0	0·943 4	1·060 000	1
2	1·123 60	·890 00	2·060 0	1·833 4	0·545 437	2
3	1·191 02	·839 62	3·183 6	2·673 0	·374 110	3
4	1·262 48	·792 09	4·374 6	3·465 1	·288 591	4
5	1·338 23	·747 26	5·637 1	4·212 4	·237 396	5
6	1·418 52	·704 96	6·975 3	4·917 3	·203 363	6
7	1·503 63	·665 06	8·393 8	5·582 4	·179 135	7
8	1·593 85	·627 41	9·897 5	6·209 8	·161 036	8
9	1·689 48	·591 90	11·491 3	6·801 7	·147 022	9
10	1·790 85	·558 39	13·180 8	7·360 1	·135 868	10
11	1·898 30	·526 79	14·971 6	7·886 9	·126 793	11
12	2·012 20	·496 97	16·869 9	8·383 8	·119 277	12
13	2·132 93	·468 84	18·882 1	8·852 7	·112 960	13
14	2·260 90	·442 30	21·015 1	9·295 0	·107 585	14
15	2·396 56	·417 27	23·276 0	9·712 2	·102 963	15
16	2·540 35	·393 65	25·672 5	10·105 9	·098 952	16
17	2·692 77	·371 36	28·212 9	10·477 3	·095 445	17
18	2·854 34	·350 34	30·905 7	10·827 6	·092 357	18
19	3·025 60	·330 51	33·760 0	11·158 1	·089 621	19
20	3·207 14	·311 80	36·785 6	11·469 9	·087 185	20
21	3·399 56	·294 16	39·992 7	11·764 1	·085 005	21
22	3·603 54	·277 51	43·392 3	12·041 6	·083 046	22
23	3·819 75	·261 80	46·995 8	12·303 4	·081 278	23
24	4·048 93	·246 98	50·815 6	12·550 4	·079 679	24
25	4·291 87	·233 00	54·864 5	12·783 4	·078 227	25
26	4·549 38	·219 81	59·156 4	13·003 2	·076 904	26
27	4·822 35	·207 37	63·705 8	13·210 5	·075 697	27
28	5·111 69	·195 63	68·528 1	13·406 2	·074 593	28
29	5·418 39	·184 56	73·639 8	13·590 7	·073 580	29
30	5·743 49	·174 11	79·058 2	13·764 8	·072 649	30
31	6·088 10	·164 25	84·801 7	13·929 1	·071 792	31
32	6·453 39	·154 96	90·889 8	14·084 0	·071 002	32
33	6·840 59	·146 19	97·343 2	14·230 2	·070 273	33
34	7·251 03	·137 91	104·183 8	14·368 1	·069 598	34
35	7·686 09	·130 11	111·434 8	14·498 2	·068 974	35
36	8·147 25	·122 74	119·120 9	14·621 0	·068 395	36
37	8·636 09	·115 79	127·268 1	14·736 8	·067 857	37
38	9·154 25	·109 24	135·904 2	14·846 0	·067 358	38
39	9·703 51	·103 06	145·058 5	14·949 1	·066 894	39
40	10·285 72	·097 22	154·762 0	15·046 3	·066 462	40
41	10·902 86	·091 72	165·047 7	15·138 0	·066 059	41
42	11·557 03	·086 53	175·950 5	15·224 5	·065 683	42
43	12·250 45	·081 63	187·507 6	15·306 2	·065 333	43
44	12·985 48	·077 01	199·758 0	15·383 2	·065 006	44
45	13·764 61	·072 65	212·743 5	15·455 8	·064 700	45
46	14·590 49	·068 54	226·508 1	15·524 4	·064 415	46
47	15·465 92	·064 66	241·098 6	15·589 0	·064 148	47
48	16·393 87	·061 00	256·564 5	15·650 0	·063 898	48
49	17·377 50	·057 55	272·958 4	15·707 6	·063 664	49
50	18·420 15	·054 29	290·335 9	15·761 9	·063 444	50
60	32·987 69	·030 31	533·128 2	16·161 4	·061 876	60
70	59·075 93	·016 93	967·932 2	16·384 5	·061 033	70
80	105·795 99	·009 45	1 746·599 9	16·509 1	·060 573	80
90	189·464 51	·005 28	3 141·075 2	16·578 7	·060 318	90
100	339·302 08	·002 95	5 638·368 1	16·617 5	·060 177	100

7 per cent

n	$(1+i)^n$	v^n	$s_{\overline{n}}$	$a_{\overline{n}}$	$(a_{\overline{n}})^{-1}$	n
1	1·070 00	·934 58	1·000 0	0·934 6	1·070 000	1
2	1·144 90	·873 44	2·070 0	1·808 0	0·553 092	2
3	1·225 04	·816 30	3·214 9	2·624 3	·381 052	3
4	1·310 80	·762 90	4·439 9	3·387 2	·295 228	4
5	1·402 55	·712 99	5·750 7	4·100 2	·243 891	5
6	1·500 73	·666 34	7·153 3	4·766 5	·209 796	6
7	1·605 78	·622 75	8·654 0	5·389 3	·185 553	7
8	1·718 19	·582 01	10·259 8	5·971 3	·167 468	8
9	1·838 46	·543 93	11·978 0	6·515 2	·153 486	9
10	1·967 15	·508 35	13·816 4	7·023 6	·142 378	10
11	2·104 85	·475 09	15·783 6	7·498 7	·133 357	11
12	2·252 19	·444 01	17·888 5	7·942 7	·125 902	12
13	2·409 84	·414 96	20·140 6	8·357 7	·119 651	13
14	2·578 53	·387 82	22·550 5	8·745 5	·114 345	14
15	2·759 03	·362 45	25·129 0	9·107 9	·109 795	15
16	2·952 16	·338 73	27·888 1	9·446 6	·105 858	16
17	3·158 82	·316 57	30·840 2	9·763 2	·102 425	17
18	3·379 93	·295 86	33·999 0	10·059 1	·099 413	18
19	3·616 53	·276 51	37·379 0	10·335 6	·096 753	19
20	3·869 68	·258 42	40·995 5	10·594 0	·094 393	20
21	4·140 56	·241 51	44·865 2	10·835 5	·092 289	21
22	4·430 40	·225 71	49·005 7	11·061 2	·090 406	22
23	4·740 53	·210 95	53·436 1	11·272 2	·088 714	23
24	5·072 37	·197 15	58·176 7	11·469 3	·087 189	24
25	5·427 43	·184 25	63·249 0	11·653 6	·085 811	25
26	5·807 35	·172 20	68·676 5	11·825 8	·084 561	26
27	6·213 87	·160 93	74·483 8	11·986 7	·083 426	27
28	6·648 84	·150 40	80·697 7	12·137 1	·082 392	28
29	7·114 26	·140 56	87·346 5	12·277 7	·081 449	29
30	7·612 26	·131 37	94·460 8	12·409 0	·080 586	30
31	8·145 11	·122 77	102·073 0	12·531 8	·079 797	31
32	8·715 27	·114 74	110·218 2	12·646 6	·079 073	32
33	9·325 34	·107 23	118·933 4	12·753 8	·078 408	33
34	9·978 11	·100 22	128·258 8	12·854 0	·077 797	34
35	10·676 58	·093 66	138·236 9	12·947 7	·077 234	35
36	11·423 94	·087 54	148·913 5	13·035 2	·076 715	36
37	12·223 62	·081 81	160·337 4	13·117 0	·076 237	37
38	13·079 27	·076 46	172·561 0	13·193 5	·075 795	38
39	13·994 82	·071 46	185·640 3	13·264 9	·075 387	39
40	14·974 46	·066 78	199·635 1	13·331 7	·075 009	40
41	16·022 67	·062 41	214·609 6	13·394 1	·074 660	41
42	17·144 26	·058 33	230·632 2	13·452 4	·074 336	42
43	18·344 35	·054 51	247·776 5	13·507 0	·074 036	43
44	19·628 46	·050 95	266·120 9	13·557 9	·073 758	44
45	21·002 45	·047 61	285·749 3	13·605 5	·073 500	45
46	22·472 62	·044 50	306·751 8	13·650 0	·073 260	46
47	24·045 71	·041 59	329·224 4	13·691 6	·073 037	47
48	25·728 91	·038 87	353·270 1	13·730 5	·072 831	48
49	27·529 93	·036 32	378·999 0	13·766 8	·072 639	49
50	29·457 03	·033 95	406·528 9	13·800 7	·072 460	50
60	57·946 43	·017 26	813·520 4	14·039 2	·071 229	60
70	113·989 39	·008 77	1 614·134 2	14·160 4	·070 620	70
80	224·234 39	·004 46	3 189·062 7	14·222 0	·070 314	80
90	441·102 98	·002 27	6 287·185 4	14·253 3	·070 159	90
100	867·716 33	·001 15	12 381·661 8	14·269 3	·070 081	100

Constants	
Function	Value
i	·070 000
$i^{(2)}$	·068 816
$i^{(4)}$	·068 234
$i^{(12)}$	·067 850
δ	·067 659
$(1+i)^{\frac{1}{2}}$	1·034 408
$(1+i)^{\frac{1}{4}}$	1·017 059
$(1+i)^{\frac{1}{12}}$	1·005 654
v	·934 579
$v^{\frac{1}{2}}$	·966 736
$v^{\frac{1}{4}}$	·983 228
$v^{\frac{1}{12}}$	·994 378
d	·065 421
$d^{(2)}$	·066 527
$d^{(4)}$	·067 090
$d^{(12)}$	·067 468
$i/i^{(2)}$	1·017 204
$i/i^{(4)}$	1·025 880
$i/i^{(12)}$	1·031 691
i/δ	1·034 605
$i/d^{(2)}$	1·052 204
$i/d^{(4)}$	1·043 380
$i/d^{(12)}$	1·037 524
$\log_{10}(1+i)$	·029 383 8

ACTUARIAL TABLES

8 per cent

Constants	
Function	Value
i	·080 000
$i^{(2)}$	·078 461
$i^{(4)}$	·077 706
$i^{(12)}$	·077 208
δ	·076 961
$(1+i)^{\frac{1}{2}}$	1·039 230
$(1+i)^{\frac{1}{4}}$	1·019 427
$(1+i)^{\frac{1}{12}}$	1·006 434
v	·925 926
$v^{\frac{1}{2}}$	·962 250
$v^{\frac{1}{4}}$	·980 944
$v^{\frac{1}{12}}$	·993 607
d	·074 074
$d^{(2)}$	·075 499
$d^{(4)}$	·076 225
$d^{(12)}$	·076 714
$i/i^{(2)}$	1·019 615
$i/i^{(4)}$	1·029 519
$i/i^{(12)}$	1·036 157
i/δ	1·039 487
$i/d^{(2)}$	1·059 615
$i/d^{(4)}$	1·049 519
$i/d^{(12)}$	1·042 824
$\log_{10}(1+i)$	·033 423 8

n	$(1+i)^n$	v^n	$s_{\overline{n}\rceil}$	$a_{\overline{n}\rceil}$	$(a_{\overline{n}\rceil})^{-1}$	n
1	1·080 00	·925 93	1·000 0	0·925 9	1·080 000	1
2	1·166 40	·857 34	2·080 0	1·783 3	0·560 769	2
3	1·259 71	·793 83	3·246 4	2·577 1	·388 034	3
4	1·360 49	·735 03	4·506 1	3·312 1	·301 921	4
5	1·469 33	·680 58	5·866 6	3·992 7	·250 456	5
6	1·586 87	·630 17	7·335 9	4·622 9	·216 315	6
7	1·713 82	·583 49	8·922 8	5·206 4	·192 072	7
8	1·850 93	·540 27	10·636 6	5·746 6	·174 015	8
9	1·999 00	·500 25	12·487 6	6·246 9	·160 080	9
10	2·158 92	·463 19	14·486 6	6·710 1	·149 029	10
11	2·331 64	·428 88	16·645 5	7·139 0	·140 076	11
12	2·518 17	·397 11	18·977 1	7·536 1	·132 695	12
13	2·719 62	·367 70	21·495 3	7·903 8	·126 522	13
14	2·937 19	·340 46	24·214 9	8·244 2	·121 297	14
15	3·172 17	·315 24	27·152 1	8·559 5	·116 830	15
16	3·425 94	·291 89	30·324 3	8·851 4	·112 977	16
17	3·700 02	·270 27	33·750 2	9·121 6	·109 629	17
18	3·996 02	·250 25	37·450 2	9·371 9	·106 702	18
19	4·315 70	·231 71	41·446 3	9·603 6	·104 128	19
20	4·660 96	·214 55	45·762 0	9·818 1	·101 852	20
21	5·033 83	·198 66	50·422 9	10·016 8	·099 832	21
22	5·436 54	·183 94	55·456 8	10·200 7	·098 032	22
23	5·871 46	·170 32	60·893 3	10·371 1	·096 422	23
24	6·341 18	·157 70	66·764 8	10·528 8	·094 978	24
25	6·848 48	·146 02	73·105 9	10·674 8	·093 679	25
26	7·396 35	·135 20	79·954 4	10·810 0	·092 507	26
27	7·988 06	·125 19	87·350 8	10·935 2	·091 448	27
28	8·627 11	·115 91	95·338 8	11·051 1	·090 489	28
29	9·317 27	·107 33	103·965 9	11·158 4	·089 619	29
30	10·062 66	·099 38	113·283 2	11·257 8	·088 827	30
31	10·867 67	·092 02	123·345 9	11·349 8	·088 107	31
32	11·737 08	·085 20	134·213 5	11·435 0	·087 451	32
33	12·676 05	·078 89	145·950 6	11·513 9	·086 852	33
34	13·690 13	·073 05	158·626 7	11·586 9	·086 304	34
35	14·785 34	·067 63	172·316 8	11·654 6	·085 803	35
36	15·968 17	·062 62	187·102 1	11·717 2	·085 345	36
37	17·245 63	·057 99	203·070 3	11·775 2	·084 924	37
38	18·625 28	·053 69	220·315 9	11·828 9	·084 539	38
39	20·115 30	·049 71	238·941 2	11·878 6	·084 185	39
40	21·724 52	·046 03	259·056 5	11·924 6	·083 860	40
41	23·462 48	·042 62	280·781 0	11·967 2	·083 561	41
42	25·339 48	·039 46	304·243 5	12·006 7	·083 287	42
43	27·366 64	·036 54	329·583 0	12·043 2	·083 034	43
44	29·555 97	·033 83	356·949 6	12·077 1	·082 802	44
45	31·920 45	·031 33	386·505 6	12·108 4	·082 587	45
46	34·474 09	·029 01	418·426 1	12·137 4	·082 390	46
47	37·232 01	·026 86	452·900 2	12·164 3	·082 208	47
48	40·210 57	·024 87	490·132 2	12·189 1	·082 040	48
49	43·427 42	·023 03	530·342 7	12·212 2	·081 886	49
50	46·901 61	·021 32	573·770 2	12·233 5	·081 743	50
60	101·257 06	·009 88	1 253·213 3	12·376 6	·080 798	60
70	218·606 41	·004 57	2 720·080 1	12·442 8	·080 368	70
80	471·954 83	·002 12	5 886·935 4	12·473 5	·080 170	80
90	1 018·915 09	·000 98	12 723·938 6	12·487 7	·080 079	90
100	2 199·761 26	·000 45	27 484·515 7	12·494 3	·080 036	100

9 per cent

n	$(1+i)^n$	v^n	$s_{\overline{n}\rceil}$	$a_{\overline{n}\rceil}$	$(a_{\overline{n}\rceil})^{-1}$	n
1	1·090 00	·917 43	1·000 0	0·917 4	1·090 000	1
2	1·188 10	·841 68	2·090 0	1·759 1	0·568 469	2
3	1·295 03	·772 18	3·278 1	2·531 3	·395 055	3
4	1·411 58	·708 43	4·573 1	3·239 7	·308 669	4
5	1·538 62	·649 93	5·984 7	3·889 7	·257 092	5
6	1·677 10	·596 27	7·523 3	4·485 9	·222 920	6
7	1·828 04	·547 03	9·200 4	5·033 0	·198 691	7
8	1·992 56	·501 87	11·028 5	5·534 8	·180 674	8
9	2·171 89	·460 43	13·021 0	5·995 2	·166 799	9
10	2·367 36	·422 41	15·192 9	6·417 7	·155 820	10
11	2·580 43	·387 53	17·560 3	6·805 2	·146 947	11
12	2·812 66	·355 53	20·140 7	7·160 7	·139 651	12
13	3·065 80	·326 18	22·953 4	7·486 9	·133 567	13
14	3·341 73	·299 25	26·019 2	7·786 2	·128 433	14
15	3·642 48	·274 54	29·360 9	8·060 7	·124 059	15
16	3·970 31	·251 87	33·003 4	8·312 6	·120 300	16
17	4·327 63	·231 07	36·973 7	8·543 6	·117 046	17
18	4·717 12	·211 99	41·301 3	8·755 6	·114 212	18
19	5·141 66	·194 49	46·018 5	8·950 1	·111 730	19
20	5·604 41	·178 43	51·160 1	9·128 5	·109 546	20
21	6·108 81	·163 70	56·764 5	9·292 2	·107 617	21
22	6·658 60	·150 18	62·873 3	9·442 4	·105 905	22
23	7·257 87	·137 78	69·531 9	9·580 2	·104 382	23
24	7·911 08	·126 40	76·789 8	9·706 6	·103 023	24
25	8·623 08	·115 97	84·700 9	9·822 6	·101 806	25
26	9·399 16	·106 39	93·324 0	9·929 0	·100 715	26
27	10·245 08	·097 61	102·723 1	10·026 6	·099 735	27
28	11·167 14	·089 55	112·968 2	10·116 1	·098 852	28
29	12·172 18	·082 15	124·135 4	10·198 3	·098 056	29
30	13·267 68	·075 37	136·307 5	10·273 7	·097 336	30
31	14·461 77	·069 15	149·575 2	10·342 8	·096 686	31
32	15·763 33	·063 44	164·037 0	10·406 2	·096 096	32
33	17·182 03	·058 20	179·800 3	10·464 4	·095 562	33
34	18·728 41	·053 39	196·982 3	10·517 8	·095 077	34
35	20·413 97	·048 99	215·710 8	10·566 8	·094 636	35
36	22·251 23	·044 94	236·124 7	10·611 8	·094 235	36
37	24·253 84	·041 23	258·375 9	10·653 0	·093 870	37
38	26·436 68	·037 83	282·629 8	10·690 8	·093 538	38
39	28·815 98	·034 70	309·066 5	10·725 5	·093 236	39
40	31·409 42	·031 84	337·882 4	10·757 4	·092 960	40
41	34·236 27	·029 21	369·291 9	10·786 6	·092 708	41
42	37·317 53	·026 80	403·528 1	10·813 4	·092 478	42
43	40·676 11	·024 58	440·845 7	10·838 0	·092 268	43
44	44·336 96	·022 55	481·521 8	10·860 5	·092 077	44
45	48·327 29	·020 69	525·858 7	10·881 2	·091 902	45
46	52·676 74	·018 98	574·186 0	10·900 2	·091 742	46
47	57·417 65	·017 42	626·862 8	10·917 6	·091 595	47
48	62·585 24	·015 98	684·280 4	10 933 6	·091 461	48
49	68·217 91	·014 66	746·865 6	10·948 2	·091 339	49
50	74·357 52	·013 45	815·083 6	10·961 7	·091 227	50
60	176·031 29	·005 68	1 944·792 1	11·048 0	·090 514	60
70	416·730 09	·002 40	4 619·223 2	11·084 4	·090 216	70
80	986·551 67	·001 01	10 950·574 1	11·099 8	·090 091	80
90	2 335·526 58	·000 43	25 939·184 2	11·106 4	·090 039	90
100	5 529·040 79	·000 18	61 422·675 5	11·109 1	·090 016	100

Constants	
Function	Value
i	·090 000
$i^{(2)}$	·088 061
$i^{(4)}$	·087 113
$i^{(12)}$	·086 488
δ	·086 178
$(1+i)^{\frac{1}{2}}$	1·044 031
$(1+i)^{\frac{1}{4}}$	1·021 778
$(1+i)^{\frac{1}{12}}$	1·007 207
v	·917 431
$v^{\frac{1}{2}}$	·957 826
$v^{\frac{1}{4}}$	·978 686
$v^{\frac{1}{12}}$	·992 844
d	·082 569
$d^{(2)}$	·084 347
$d^{(4)}$	·085 256
$d^{(12)}$	·085 869
$i/i^{(2)}$	1·022 015
$i/i^{(4)}$	1·033 144
$i/i^{(12)}$	1·040 608
i/δ	1·044 354
$i/d^{(2)}$	1·067 015
$i/d^{(4)}$	1·055 644
$i/d^{(12)}$	1·048 108
$\log_{10}(1+i)$	·037 426 5

ACTUARIAL TABLES

10 per cent

Constants	
Function	Value
i	·100 000
$i^{(2)}$	·097 618
$i^{(4)}$	·096 455
$i^{(12)}$	·095 690
δ	·095 310
$(1+i)^{\frac{1}{2}}$	1·048 809
$(1+i)^{\frac{1}{4}}$	1·024 114
$(1+i)^{\frac{1}{12}}$	1·007 974
v	·909 091
$v^{\frac{1}{2}}$	·953 463
$v^{\frac{1}{4}}$	·976 454
$v^{\frac{1}{12}}$	·992 089
d	·090 909
$d^{(2)}$	·093 075
$d^{(4)}$	·094 184
$d^{(12)}$	·094 933
$i/i^{(2)}$	1·024 404
$i/i^{(4)}$	1·036 755
$i/i^{(12)}$	1·045 045
i/δ	1·049 206
$i/d^{(2)}$	1·074 404
$i/d^{(4)}$	1·061 756
$i/d^{(12)}$	1·053 378
$\log_{10}(1+i)$	·041 392 7

n	$(1+i)^n$	v^n	$s_{\overline{n}\rceil}$	$a_{\overline{n}\rceil}$	$(a_{\overline{n}\rceil})^{-1}$	n
1	1·100 00	·909 09	1·000 0	0·909 1	1·100 000	1
2	1·210 00	·826 45	2·100 0	1·735 5	0·576 190	2
3	1·331 00	·751 31	3·310 0	2·486 9	·402 115	3
4	1·464 10	·683 01	4·641 0	3·169 9	·315 471	4
5	1·610 51	·620 92	6·105 1	3·790 8	·263 797	5
6	1·771 56	·564 47	7·715 6	4·355 3	·229 607	6
7	1·948 72	·513 16	9·487 2	4·868 4	·205 405	7
8	2·143 59	·466 51	11·435 9	5·334 9	·187 444	8
9	2·357 95	·424 10	13·579 5	5·759 0	·173 641	9
10	2·593 74	·385 54	15·937 4	6·144 6	·162 745	10
11	2·853 12	·350 49	18·531 2	6·495 1	·153 963	11
12	3·138 43	·318 63	21·384 3	6·813 7	·146 763	12
13	3·452 27	·289 66	24·522 7	7·103 4	·140 779	13
14	3·797 50	·263 33	27·975 0	7·366 7	·135 746	14
15	4·177 25	·239 39	31·772 5	7·606 1	·131 474	15
16	4·594 97	·217 63	35·949 7	7·823 7	·127 817	16
17	5·054 47	·197 84	40·544 7	8·021 6	·124 664	17
18	5·559 92	·179 86	45·599 2	8·201 4	·121 930	18
19	6·115 91	·163 51	51·159 1	8·364 9	·119 547	19
20	6·727 50	·148 64	57·275 0	8·513 6	·117 460	20
21	7·400 25	·135 13	64·002 5	8·648 7	·115 624	21
22	8·140 27	·122 85	71·402 7	8·771 5	·114 005	22
23	8·954 30	·111 68	79·543 0	8·883 2	·112 572	23
24	9·849 73	·101 53	88·497 3	8·984 7	·111 300	24
25	10·834 71	·092 30	98·347 1	9·077 0	·110 168	25
26	11·918 18	·083 91	109·181 8	9·160 9	·109 159	26
27	13·109 99	·076 28	121·099 9	9·237 2	·108 258	27
28	14·420 99	·069 34	134·209 9	9·306 6	·107 451	28
29	15·863 09	·063 04	148·630 9	9·369 6	·106 728	29
30	17·449 40	·057 31	164·494 0	9·426 9	·106 079	30
31	19·194 34	·052 10	181·943 4	9·479 0	·105 496	31
32	21·113 78	·047 36	201·137 8	9·526 4	·104 972	32
33	23·225 15	·043 06	222·251 5	9·569 4	·104 499	33
34	25·547 67	·039 14	245·476 7	9·608 6	·104 074	34
35	28·102 44	·035 58	271·024 4	9·644 2	·103 690	35
36	30·912 68	·032 35	299·126 8	9·676 5	·103 343	36
37	34·003 95	·029 41	330·039 5	9·705 9	·103 030	37
38	37·404 34	·026 73	364·043 4	9·732 7	·102 747	38
39	41·144 78	·024 30	401·447 8	9·757 0	·102 491	39
40	45·259 26	·022 09	442·592 6	9·779 1	·102 259	40
41	49·785 18	·020 09	487·851 8	9·799 1	·102 050	41
42	54·763 70	·018 26	537·637 0	9·817 4	·101 860	42
43	60·240 07	·016 60	592·400 7	9·834 0	·101 688	43
44	66·264 08	·015 09	652·640 8	9·849 1	·101 532	44
45	72·890 48	·013 72	718·904 8	9·862 8	·101 391	45
46	80·179 53	·012 47	791·795 3	9·875 3	·101 263	46
47	88·197 49	·011 34	871·974 9	9·886 6	·101 147	47
48	97·017 23	·010 31	960·172 3	9·896 9	·101 041	48
49	106·718 96	·009 37	1 057·189 6	9·906 3	·100 946	49
50	117·390 85	·008 52	1 163·908 5	9·914 8	·100 859	50
60	304·481 64	·003 28	3 034·816 4	9·967 2	·100 330	60
70	789·746 96	·001 27	7 887·469 6	9·987 3	·100 127	70
80	2 048·400 21	·000 49	20 474·002 1	9·995 1	·100 049	80
90	5 313·022 61	·000 19	53 120·226 1	9·998 1	·100 019	90
100	13 780·612 34	·000 07	137 796·123 4	9·999 3	·100 007	100

12 per cent

n	$(1+i)^n$	v^n	$s_{\overline{n}\rceil}$	$a_{\overline{n}\rceil}$	$(a_{\overline{n}\rceil})^{-1}$	n
1	1·120 00	·892 86	1·000 0	0·892 9	1·120 000	1
2	1·254 40	·797 19	2·120 0	1·690 1	0·591 698	2
3	1·404 93	·711 78	3·374 4	2·401 8	·416 349	3
4	1·573 52	·635 52	4·779 3	3·037 3	·329 234	4
5	1·762 34	·567 43	6·352 8	3·604 8	·277 410	5
6	1·973 82	·506 63	8·115 2	4·111 4	·243 226	6
7	2·210 68	·452 35	10·089 0	4·563 8	·219 118	7
8	2·475 96	·403 88	12·299 7	4·967 6	·201 303	8
9	2·773 08	·360 61	14·775 7	5·328 2	·187 679	9
10	3·105 85	·321 97	17·548 7	5·650 2	·176 984	10
11	3·478 55	·287 48	20·654 6	5·937 7	·168 415	11
12	3·895 98	·256 68	24·133 1	6·194 4	·161 437	12
13	4·363 49	·229 17	28·029 1	6·423 5	·155 677	13
14	4·887 11	·204 62	32·392 6	6·628 2	·150 871	14
15	5·473 57	·182 70	37·279 7	6·810 9	·146 824	15
16	6·130 39	·163 12	42·753 3	6·974 0	·143 390	16
17	6·866 04	·145 64	48·883 7	7·119 6	·140 457	17
18	7·689 97	·130 04	55·749 7	7·249 7	·137 937	18
19	8·612 76	·116 11	63·439 7	7·365 8	·135 763	19
20	9·646 29	·103 67	72·052 4	7·469 4	·133 879	20
21	10·803 85	·092 56	81·698 7	7·562 0	·132 240	21
22	12·100 31	·082 64	92·502 6	7·644 6	·130 811	22
23	13·552 35	·073 79	104·602 9	7·718 4	·129 560	23
24	15·178 63	·065 88	118·155 2	7·784 3	·128 463	24
25	17·000 06	·058 82	133·333 9	7·843 1	·127 500	25

Constants	
Function	Value
i	·120 000
$i^{(2)}$	·116 601
$i^{(4)}$	·114 949
$i^{(12)}$	·113 866
δ	·113 329
$(1+i)^{\frac{1}{2}}$	1·058 301
$(1+i)^{\frac{1}{4}}$	1·028 737
$(1+i)^{\frac{1}{12}}$	1·009 489
v	·892 857
$v^{\frac{1}{2}}$	·944 911
$v^{\frac{1}{4}}$	·972 065
$v^{\frac{1}{12}}$	·990 600
d	·107 143
$d^{(2)}$	·110 178
$d^{(4)}$	·111 738
$d^{(12)}$	·112 795
$i/i^{(2)}$	1·029 150
$i/i^{(4)}$	1·043 938
$i/i^{(12)}$	1·053 875
i/δ	1·058 867
$i/d^{(2)}$	1·089 150
$i/d^{(4)}$	1·073 938
$i/d^{(12)}$	1·063 875
$\log_{10}(1+i)$	·049 218 0