UNIVERSITY OF COLOMBO, SRI LANKA

FACULTY OF MANAGEMENT AND FINANCE

Postgraduate and Mid-Career Development Unit

Master of Business Administration in International Business 2016/2018 Programme

(Trimester III) Examination – August, 2017

MBAIB 5109 – Financial Management

Three (03) Hours

Answer **All** questions

This paper consists of **FIVE (05)** questions printed in **Five (05)** pages

Instructions:

1. The use of **calculators** is permitted
2. Some useful **formulas** are given at the end of the question paper
3. Time value of money **tables** are annexed

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1. Can the goal of maximizing the value of shareholder wealth through maximizing the value of the company clash with other goals, such as avoiding unethical or illegal behavior in relation to business affairs? In particular, do you think subjects like customer and employee safety and the environmental concern, fit in this framework, or can they be fundamentally ignored? Think of some specific scenario to illustrate your answer.

(10 Marks)

2. i. You wish to have Rs. 10 million in 4 years. How much you need to **save today** in order to have 10 million in 4 years if the interest rate is 12 percent? How much you have to **save monthly** if you wish to save an equivalent amount of money at the end of every month under the same stated annual interest rate but monthly compounding?

(06 Marks)

ii. You will be retiring in 25 years. You want to build a retirement fund of Rs. 100,000,000 million over next 25 years. How much you have to save **at the end of each year** in order for you to have Rs. 100,000,000 at your retirement. The relevant rate of interest is 18%.

(04 Marks)

iii. Your actuarial consultant tells you that your expected life after retirement is 15 years. If you want to withdraw at the end of **each month** an equal amount of money after your retirement till end of expected life how much you can withdraw from your fund built under question ii above if you can get an annual percentage interest of 12% which will be compounding monthly for your fund after your retirement.

(04 Marks)

iv. What happened to the level of interest rate in an economy under the following circumstances? Explain your point through graphs and words. (Assume that everything else remain the same)

- Increase of Corporate tax rates by the government to bridge the government budget deficit.
- Reduction of the annual debt service payment (Loan and interest payments) by the government through some strategic investment arrangements with foreign investors.
- Drastically coming down of the level of savings due the increases in prices of goods and services

(06 Marks)
(Total 20 marks)

3. i. The most recent financial statements for Bradley PLC are shown here (assuming no income taxes):

Income Statement

	,000
Sales	Rs. 650,000
Costs	532,000
Net income	Rs. 118,000

Balance Sheet

	,000		,000
Equity	Rs. 900,000	Assets	Rs.1,740,000
Debt	840,000		
Total	Rs.1,740,000	Total	Rs.1,740,000

Assets and costs are proportional to sales. Debt and equity are not. No dividends are paid. Next year's sales are projected to be Rs.728 million. What is the external financing needed by the company?

(04 Marks)

ii. The Subaru Motor Company has an ROE of 13.1 percent and a payout ratio of 40 percent.

a) What is the company's sustainable growth rate?

b) Can the company's actual growth rate be different from its sustainable growth rate? Why or why not?

c) How can the company increase its sustainable growth rate?

(06 Marks)

iii. Matallica PLC is a young start-up company. No dividends will be paid on the stock over the next 5 years because the firm needs to reinvest its earnings to fuel growth. The company will pay a Rs. 8.00 per share dividend in 6 years and will increase the dividend by 6 percent per year thereafter. If the required return on this stock is 13 percent, what is the current share price?

(05 Marks)

iv. Five years ago, Bling Diamond PLC paid a dividend of Rs. 8.40 per share. Bling paid a dividend of Rs. 12.60 per share yesterday. Dividends will grow over the next five years at the same rate they grew over the last five years. Thereafter dividends will grow at 4 percent per year. The required return on the stock is 16 percent.

What will Bling Diamond's cash dividend be in seven years? (use geometric growth rate)

(05 Marks)

(Total 20 Marks)

4. i. Consider the following information

State of Economy	*Probability of State of Economy*	*Rate of Return if State Occurs (%)*	
		Stock A	*Stock B*
Boom	.30	08	15
Normal	.50	10	11
Bust	.20	12	06

a. What are the expected return and standard deviation of each security?

b. What are the covariance and correlation between pairs of securities?

c. You wish to invest 40% and 60% of your funds respectively in security A and B. What are the expected return and standard deviation of this portfolio?

(11 Marks)

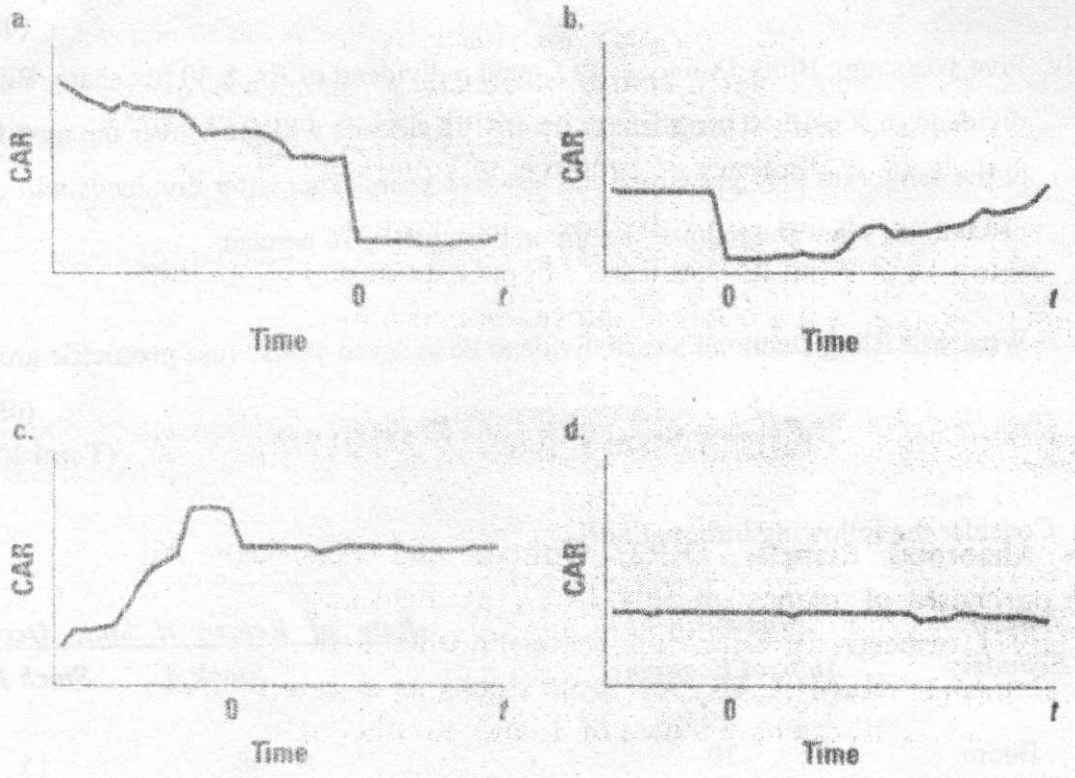
ii. Consider a world with only two risky assets, A and B, and a risk-free asset. The two risky assets are in equal supply in the market, i.e., the market portfolio $M = 0.5_A + 0.5_B$. It is known that $\overline{R}_M = 11\%$, $\sigma_A = 20\%$, $\sigma_B = 40\%$ and $\rho_{AB} = 0.75$. The risk-free rate is 2%. Assume CAPM holds.

a. What is the beta for each stock?

b. What are the values for $\overline{R}_A$ and $\overline{R}_B$?

(06 Marks)

iii. The following figures present the results of four cumulative abnormal returns (CAR) studies in relation to four different events.



Indicate whether the results of each study support, reject, or are inconclusive about the semi-strong form of the efficient market hypothesis. In each figure, time 0 is the date of an event.

(08 Marks)

(Total 25 marks)

poration and Beta Corporation are identical in every way except their capital structures. Alpha Corporation, an all-equity firm, has 15,000 shares of stock outstanding, currently worth of Rs.30 per share. Beta Corporation uses leverage in its capital structure. The market value of Beta's debt is Rs. 65,000, and its cost of debt is 9 percent. Each firm is expected to have earnings before interest of Rs.75,000 in perpetuity. Neither firm pays taxes. Assume that every investor can borrow at 9 percent per year.

a. What is the value of Alpha Corporation?

(02 Marks)

b. What is the total value of Beta Corporation?

(01 Marks)

c. What is the market value of Beta Corporation's equity?

(02 Marks)

d. How much will it cost to purchase 20 percent of each firm's equity?

(02 Marks)

e. Assuming each firm meets its earnings estimates, what will be the rupee return to each position in part (d) over the next year?

(03 Marks)

f. Construct an investment strategy in which an investor purchases 20 percent of Alpha's equity and replicates both the cost and rupee return of purchasing 20 percent of Beta's equity.

(04 Marks)

g. Is Alpha's equity more or less risky than Beta's equity? Explain.

(03 Marks)

Hint: *Note that $V_L = V_U$ as per the MM Preposition I with no taxes and you can take Alpha Corporation as levered firm and Beta Corporation as unlevered firm*

ii. Show that the cost of equity capital for Beta Corporation can be written as follows. Note that percentage returns of equity of two firms Alpha and Beta can be used as R_0 and R_s respectively.

$$R_S = R_0 + \frac{B}{S}(R_0 - R_B)$$

(04 Marks)

iii. What are the direct and indirect costs of bankruptcy? Briefly explain them.

(04 Marks)

(Total 25 marks)

1. **Present Value of an Annuity:**

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

2. **Future Value of an annuity**

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

3. **Variance of a portfolio with two securities *S* and *B***

$$\sigma_P^2 = (w_B\sigma_B)^2 + (w_S\sigma_S)^2 + 2(w_B\sigma_B)(w_S\sigma_S)\rho_{BS}$$

4. **Correlation between two securities *a* and *b***

$$\rho = \frac{Cov(a,b)}{\sigma_a\sigma_b}$$

5. **Beta of a security**

$$\beta = \frac{Cov(R_i, R_M)}{Var(R_M)} = \frac{\sigma_i^2}{\sigma_M^2}$$

6. **Expected return of a security as per CAPM**

$$\overline{R}_i = R_F + \beta_i \times (\overline{R}_M - R_F)$$

Appendix: Time Value of Money Tables

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Present Value Table

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.294	0.283	0.243	0.225	0.209	0.194
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247	0.227	0.206	0.191	0.176	0.162
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.136
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.870	0.758	0.661	0.577	0.506	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135	0.112	0.093	0.077	0.064	0.053	0.044	0.037	0.031	0.026	0.022
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123	0.101	0.083	0.068	0.056	0.046	0.038	0.032	0.026	0.022	0.018
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112	0.091	0.074	0.060	0.049	0.040	0.033	0.027	0.022	0.018	0.015
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102	0.082	0.066	0.053	0.043	0.035	0.028	0.023	0.019	0.015	0.013
25	0.780	0.610	0.478	0.375	0.296	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
26	0.772	0.598	0.464	0.361	0.281	0.220	0.172	0.135	0.106	0.084	0.066	0.053	0.042	0.033	0.026	0.021	0.017	0.014	0.011	0.009
27	0.764	0.586	0.450	0.347	0.268	0.207	0.161	0.125	0.098	0.076	0.060	0.047	0.037	0.029	0.023	0.018	0.014	0.011	0.009	0.007
28	0.757	0.574	0.437	0.333	0.255	0.196	0.150	0.116	0.090	0.069	0.054	0.042	0.033	0.026	0.020	0.016	0.012	0.010	0.008	0.006
29	0.749	0.583	0.424	0.321	0.243	0.185	0.141	0.107	0.082	0.063	0.048	0.037	0.029	0.022	0.017	0.014	0.011	0.008	0.006	0.005
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004
31	0.735	0.541	0.400	0.296	0.220	0.164	0.123	0.092	0.069	0.052	0.039	0.030	0.023	0.017	0.013	0.010	0.008	0.006	0.005	0.004
32	0.727	0.531	0.388	0.285	0.210	0.155	0.115	0.085	0.063	0.047	0.035	0.027	0.020	0.015	0.011	0.009	0.007	0.005	0.004	0.003
33	0.720	0.520	0.377	0.274	0.200	0.146	0.107	0.079	0.058	0.043	0.032	0.024	0.018	0.013	0.010	0.007	0.006	0.004	0.003	0.002
34	0.713	0.510	0.366	0.264	0.190	0.138	0.100	0.073	0.053	0.039	0.029	0.021	0.016	0.012	0.009	0.006	0.005	0.004	0.003	0.002
35	0.706	0.500	0.355	0.253	0.181	0.130	0.094	0.068	0.049	0.036	0.026	0.019	0.014	0.010	0.008	0.006	0.004	0.003	0.002	0.002
36	0.699	0.490	0.345	0.244	0.173	0.123	0.088	0.063	0.045	0.032	0.023	0.017	0.012	0.009	0.007	0.005	0.004	0.003	0.002	0.001
37	0.692	0.481	0.335	0.234	0.164	0.116	0.082	0.058	0.041	0.029	0.021	0.015	0.011	0.008	0.006	0.004	0.003	0.002	0.002	0.001
38	0.685	0.471	0.325	0.225	0.157	0.109	0.076	0.054	0.038	0.027	0.019	0.013	0.010	0.007	0.005	0.004	0.003	0.002	0.001	0.001
39	0.678	0.462	0.316	0.217	0.149	0.103	0.071	0.050	0.035	0.024	0.017	0.012	0.009	0.006	0.004	0.003	0.002	0.002	0.001	0.001
40	0.672	0.453	0.307	0.206	0.142	0.097	0.067	0.046	0.032	0.022	0.015	0.011	0.006	0.005	0.004	0.003	0.002	0.001	0.001	0.001

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Present Value of an Annuity Table

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	2
1	0.990	0.980	0.971	0.962	**0.962**	0.943	0.935	0.926	0.917	**0.909**	0.901	0.893	0.885	0.877	**0.870**	0.862	0.855	0.847	0.840	**0.**
2	1.970	1.942	1.913	1.885	**1.859**	1.833	1.808	1.783	1.759	**1.736**	1.713	1.690	1.668	1.647	**1.626**	1.605	1.585	1.566	1.547	**1.**
3	2.941	2.884	2.829	2.775	**2.723**	2.673	2.624	2.577	2.531	**2.487**	2.444	2.402	2.361	2.322	**2.283**	2.246	2.210	2.174	2.140	**2.**
4	3.902	3.808	3.717	3.630	**3.546**	3.465	3.387	3.312	3.240	**3.170**	3.102	3.037	2.974	2.914	**2.855**	2.798	2.743	2.690	2.639	**2.**
5	4.853	4.713	4.580	4.452	**4.329**	4.212	4.100	3.993	3.890	**3.791**	3.696	3.605	3.517	3.433	**3.352**	3.274	3.199	3.127	3.058	**2.**
6	5.795	5.601	5.417	5.242	**5.076**	4.917	4.767	4.623	4.486	**4.355**	4.231	4.111	3.998	3.889	**3.784**	3.685	3.589	3.498	3.410	**3.**
7	6.728	6.472	6.230	6.002	**5.796**	5.582	5.389	5.206	5.033	**4.968**	4.712	4.564	4.423	4.288	**4.160**	4.039	3.922	3.812	3.706	**3.**
8	7.652	7.325	7.020	6.733	**6.463**	6.210	5.971	5.747	5.535	**5.335**	5.146	4.968	4.799	4.639	**4.487**	4.344	4.207	4.078	3.954	**3.**
9	8.566	8.162	7.786	7.435	**7.108**	6.802	6.515	6.247	5.995	**6.759**	5.537	5.328	5.132	4.946	**4.772**	4.607	4.451	4.303	4.163	**4.**
10	**9.471**	**8.963**	**8.530**	**8.111**	**7.722**	**7.360**	**7.024**	**6.710**	**6.418**	**6.145**	**5.889**	**5.650**	**5.426**	**5.216**	**5.019**	**4.833**	**4.669**	**4.494**	**4.339**	**4.**
11	10.368	9.787	9.253	8.760	**8.306**	7.887	7.499	7.139	6.805	**6.496**	6.207	5.938	5.687	5.453	**5.234**	5.029	4.836	4.656	4.486	**4**
12	11.255	10.575	9.954	9.385	**9.863**	8.384	7.943	7.536	7.161	**6.914**	6.492	6.194	5.918	5.660	**5.421**	5.197	4.988	4.793	4.611	**4.**
13	12.134	11.348	10.635	9.986	**9.384**	8.853	8.358	7.904	7.487	**7.103**	6.750	6.424	6.122	5.842	**5.583**	5.342	5.118	4.910	4.715	**4.**
14	13.004	12.106	11.296	10.563	**9.800**	9.295	8.745	8.244	7.786	**7.387**	6.982	6.628	6.302	6.002	**5.724**	5.468	5.229	5.008	4.802	**4.**
15	13.865	12.849	11.938	11.118	**10.380**	9.712	9.108	8.559	8.061	**7.606**	7.191	6.811	6.462	6.142	**5.947**	5.575	5.324	5.092	4.876	**4.**
16	14.718	13.578	12.561	11.652	**10.838**	10.106	9.447	8.851	8.313	**7.824**	7.379	6.974	6.604	6.265	**5.964**	5.668	5.405	5.162	4.938	**4.**
17	15.582	14.292	13.166	12.166	**11.274**	10.477	9.763	9.122	8.544	**8.022**	7.549	7.120	6.729	6.373	**6.047**	5.749	5.475	5.222	4.990	**4.**
18	16.396	14.992	13.754	12.659	**11.690**	10.828	10.059	9.372	8.756	**8.201**	7.702	7.250	6.840	6.467	**6.128**	5.818	5.534	5.273	5.033	**4.**
19	17.226	15.678	14.324	13.134	**12.085**	11.158	10.336	9.604	8.950	**8.366**	7.839	7.366	6.938	6.550	**6.196**	5.877	5.584	5.316	5.070	**4.**
20	**18.046**	**16.351**	**14.877**	**13.590**	**12.462**	**11.470**	**10.594**	**9.818**	**9.129**	**8.514**	**7.963**	**7.489**	**7.025**	**6.623**	**6.259**	**5.929**	**5.628**	**5.363**	**5.101**	**4.**
21	18.857	17.011	15.415	14.029	**12.821**	11.764	10.836	10.017	9.292	**8.649**	8.075	7.562	7.102	6.687	**6.312**	5.973	5.665	5.384	5.127	**4.**
22	19.660	17.658	15.937	14.451	**13.163**	12.042	11.061	10.201	9.442	**8.772**	8.176	7.645	7.170	6.743	**6.359**	6.011	5.696	5.410	5.149	**4.**
23	20.456	18.292	16.444	14.857	**13.499**	12.303	11.272	10.371	9.580	**8.883**	8.266	7.718	7.230	6.792	**6.399**	6.044	5.723	5.432	5.167	**4.**
24	21.243	18.914	16.936	15.247	**13.799**	12.550	11.469	10.529	9.707	**8.965**	8.348	7.784	7.283	6.835	**6.434**	6.073	5.746	5.451	5.182	**4.**
25	22.023	19.523	17.413	15.622	**14.094**	12.783	11.654	10.675	9.823	**9.077**	8.422	7.843	7.330	6.873	**6.464**	6.097	5.766	5.467	5.195	**4.**
26	22.795	20.121	17.877	15.963	**14.375**	13.003	11.826	10.810	9.929	**9.161**	8.488	7.896	7.372	6.906	**6.491**	6.118	5.783	5.480	5.206	**4.**
27	23.560	20.707	18.327	16.330	**14.643**	13.211	11.987	10.935	10.027	**9.237**	8.546	7.943	7.409	6.935	**6.541**	6.136	5.796	5.492	5.215	**4.**
28	24.316	21.281	18.764	16.663	**14.996**	13.406	12.137	11.051	10.116	**9.307**	8.602	7.984	7.441	6.961	**6.534**	6.152	5.810	5.502	5.223	**4.**
29	25.066	21.844	19.188	16.984	**15.141**	13.591	12.278	11.158	10.198	**9.370**	8.650	8.022	7.470	6.983	**6.551**	6.166	5.820	5.510	5.229	**4.**
30	**25.806**	**22.396**	**19.800**	**17.292**	**15.372**	**13.765**	**12.409**	**11.258**	**10.274**	**9.427**	**8.694**	**8.055**	**7.496**	**7.003**	**6.566**	**6.177**	**5.829**	**5.517**	**5.236**	**4.**
31	26.542	22.938	20.000	17.588	**15.593**	13.929	12.532	11.350	10.343	**9.479**	8.733	8.085	7.518	7.020	**6.579**	6.187	5.837	5.523	5.239	**4.**
32	27.270	23.468	20.389	17.874	**15.803**	14.084	12.647	11.435	10.406	**9.526**	8.769	8.112	7.538	7.035	**6.591**	6.196	5.844	5.528	5.243	**4.**
33	27.990	23.989	20.766	18.148	**16.003**	14.230	12.754	11.514	10.464	**9.569**	8.801	8.135	7.556	7.048	**6.600**	6.203	5.846	5.532	5.246	**4.**
34	28.703	24.499	21.132	18.411	**16.193**	14.368	12.854	11.587	10.518	**9.609**	8.829	8.157	7.572	7.060	**6.609**	6.210	5.854	5.536	5.249	**4.**
35	29.409	24.999	21.487	18.665	**16.374**	14.498	12.948	11.655	10.587	**9.644**	8.855	8.176	7.588	7.070	**6.617**	6.215	5.858	5.539	5.251	**4.**
36	30.108	25.489	21.832	18.908	**16.547**	14.621	13.035	11.717	10.612	**9.677**	8.879	8.192	7.598	7.079	**6.623**	6.220	5.882	5.541	5.253	**4.**
37	30.800	25.969	22.167	19.143	**16.711**	14.737	13.117	11.775	10.653	**9.706**	8.900	8.208	7.609	7.087	**6.629**	6.224	5.865	5.543	5.255	**4.**
38	31.485	26.441	22.492	19.368	**16.968**	14.846	13.193	11.829	10.691	**9.733**	8.919	8.221	7.618	7.094	**6.634**	6.228	5.867	5.545	5.256	**4**
39	32.163	26.903	22.808	19.584	**17.017**	14.949	13.265	11.879	10.726	**9.757**	8.936	8.233	7.627	7.100	**6.638**	6.231	5.869	5.547	5.257	**4**
40	**32.835**	**27.355**	**23.115**	**19.793**	**17.169**	**15.046**	**13.332**	**11.925**	**10.757**	**9.779**	**8.961**	**8.244**	**7.634**	**7.106**	**6.642**	**6.233**	**5.871**	**5.548**	**5.258**	**4**

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Future Value of an Annuity Table

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.010	2.020	2.030	2.040	2.050	2.060	2.070	2.080	2.090	2.100	2.110	2.120	2.130	2.140	2.150	2.160	2.170	2.180	2.190	2.200
3	3.030	3.060	3.091	3.122	3.153	3.184	3.215	3.246	3.278	3.310	3.342	3.374	3.407	3.440	3.473	3.506	3.539	3.572	3.606	3.640
4	4.060	4.122	4.184	4.246	4.310	4.375	4.440	4.506	4.573	4.641	4.710	4.779	4.850	4.921	4.993	5.066	5.141	5.215	5.291	5.368
5	5.101	5.204	5.309	5.416	5.526	5.637	5.751	5.867	5.985	6.105	6.228	6.353	6.480	6.610	6.742	6.877	7.014	7.154	7.297	7.442
6	6.152	6.308	6.468	6.633	6.802	6.975	7.153	7.336	7.523	7.716	7.913	8.115	8.323	8.536	8.754	8.977	9.207	9.442	9.683	9.930
7	7.214	7.434	7.662	7.898	8.142	8.394	8.654	8.923	9.200	9.487	9.783	10.089	10.405	10.730	11.067	11.414	11.772	12.142	12.523	12.916
8	8.286	8.583	8.892	9.241	9.549	9.897	10.260	10.637	11.028	11.436	11.859	12.300	12.757	13.233	13.727	14.420	14.773	15.327	15.902	16.499
9	9.369	9.755	10.159	10.583	11.207	11.491	11.978	12.488	13.021	13.579	14.164	14.776	15.416	16.085	16.786	17.519	18.285	19.086	19.923	20.799
10	10.462	10.950	11.464	12.006	12.578	13.181	13.816	14.487	15.193	15.937	16.722	17.549	18.420	19.337	20.304	21.321	22.393	23.521	24.709	25.959
11	11.567	12.169	12.808	13.486	14.207	14.972	15.784	16.645	17.560	18.531	19.561	20.655	21.814	23.045	24.349	25.733	27.200	28.755	30.404	32.150
12	12.683	13.412	14.192	15.026	15.917	16.870	17.888	18.977	20.141	21.384	22.713	24.133	25.650	27.271	29.002	30.850	32.824	34.931	37.180	39.581
13	13.809	14.680	15.618	16.627	17.713	18.882	20.141	21.495	22.953	24.523	26.212	28.029	29.985	32.089	34.352	36.786	39.404	42.219	45.244	48.497
14	14.947	15.974	17.086	18.292	19.599	21.015	22.550	24.215	26.019	27.975	30.095	32.393	34.883	37.581	40.505	43.672	47.103	50.818	54.841	59.196
15	16.097	17.293	18.599	20.024	21.579	23.276	25.129	27.152	29.361	31.772	34.405	37.280	40.417	43.842	47.580	51.660	56.110	60.965	66.261	72.035
16	17.258	18.639	20.157	21.825	23.657	25.673	27.888	30.324	33.003	35.950	39.190	42.753	46.672	50.980	55.717	60.925	66.649	72.939	79.850	87.442
17	18.430	20.012	21.762	23.698	25.840	28.213	30.840	33.750	36.974	40.545	44.501	48.884	53.739	59.118	65.075	71.673	78.979	87.068	96.022	105.931
18	19.615	21.412	23.414	25.645	28.132	30.906	33.999	37.450	41.301	45.599	50.396	55.750	61.725	68.394	75.836	84.141	93.406	103.740	115.266	128.117
19	20.811	22.841	25.117	27.671	30.539	33.760	37.379	41.446	46.018	51.159	56.939	63.440	70.749	78.969	88.212	98.603	110.285	123.414	138.166	154.740
20	22.019	24.297	26.870	29.778	33.066	36.786	40.995	45.762	51.160	57.275	64.203	72.052	80.947	91.025	102.444	115.380	130.033	146.628	165.418	186.688
21	23.239	25.783	28.676	31.969	35.719	39.993	44.865	50.423	56.765	64.002	72.265	81.699	92.470	104.768	118.810	134.841	153.139	174.021	197.847	225.026
22	24.472	27.299	30.537	34.248	38.505	43.392	49.006	55.457	62.873	71.403	81.214	92.503	105.491	120.436	137.632	157.415	180.172	206.345	236.438	271.031
23	25.716	28.845	32.453	36.618	41.430	46.996	53.436	60.893	69.532	79.543	91.148	104.603	120.205	138.297	159.276	183.601	211.801	244.487	282.362	326.237
24	26.973	30.422	34.426	39.083	44.502	50.816	58.177	66.765	76.790	88.497	102.174	118.155	136.831	158.659	184.168	213.978	248.808	289.494	337.010	392.484
25	28.243	32.030	36.459	41.646	47.727	54.865	63.249	73.106	84.701	98.347	114.413	133.334	155.620	181.871	212.793	249.214	292.105	342.063	402.042	471.981
26	29.526	33.671	38.553	44.312	51.113	59.156	68.676	79.954	93.324	109.182	127.999	150.334	176.850	208.333	245.712	290.088	342.763	405.272	479.431	567.377
27	30.821	35.344	40.710	47.084	54.669	63.706	74.484	87.351	102.723	121.100	143.079	169.374	200.841	238.499	283.569	337.502	402.032	479.221	571.522	681.853
28	32.129	37.051	42.931	49.968	58.403	68.528	80.698	95.339	112.968	134.210	159.817	190.699	227.950	272.889	327.104	392.503	471.378	566.481	681.112	819.223
29	33.450	38.792	45.219	52.966	62.323	73.640	87.347	103.966	124.135	148.631	178.397	214.583	258.583	312.094	377.170	456.303	552.512	669.447	811.523	984.068
30	34.785	40.568	47.575	56.085	66.439	79.058	94.461	113.283	136.308	164.494	199.021	241.333	293.199	356.787	434.745	530.312	647.439	790.948	966.712	1181.882
31	36.133	42.379	50.003	59.328	70.761	84.802	102.073	123.346	149.575	181.943	221.913	271.293	332.315	407.737	500.957	616.162	758.504	934.319	1151.387	1419.258
32	37.494	44.227	52.503	62.701	75.299	90.890	110.218	134.214	164.037	201.138	247.324	304.848	376.516	465.820	577.100	715.747	888.449	1103.496	1371.15	1704.109
33	38.869	46.112	55.078	66.210	80.064	97.343	118.933	145.951	179.800	222.252	275.529	342.429	426.463	532.035	664.666	831.267	1040.486	1303.125	1632.670	2045.931
34	40.258	48.034	57.730	69.858	85.067	104.184	128.259	158.627	196.982	245.477	306.837	384.521	482.903	607.520	765.365	965.270	1218.368	1538.688	1943.877	2456.118
35	41.660	49.994	60.462	73.652	90.320	111.435	138.237	172.317	215.711	271.024	341.590	431.663	546.681	693.573	881.170	1120.713	1426.491	1816.652	2314.214	2948.341
36	43.077	51.994	63.276	77.598	95.836	119.121	148.913	187.102	236.125	299.127	380.164	484.463	618.749	791.673	1014.346	1301.027	1669.994	2144.649	2754.914	3539.009
37	44.508	54.034	66.174	81.702	101.628	127.268	160.337	203.070	258.376	330.039	422.982	543.599	700.187	903.507	1167.498	1510.191	1954.894	2531.686	3279.348	4247.811
38	45.953	56.115	69.159	85.970	107.710	135.904	172.561	220.316	282.630	364.043	470.511	609.831	792.211	1030.998	1343.622	1752.822	2288.225	2988.389	3903.424	5098.373
39	47.412	58.237	72.234	90.409	114.095	145.058	185.640	238.941	309.066	401.448	523.267	684.010	896.198	1176.338	1546.165	2034.273	2678.224	3527.299	4646.075	6119.048
40	48.886	60.402	75.401	95.026	120.800	154.762	199.635	259.057	337.882	442.593	581.826	767.091	1013.704	1342.025	1779.090	2360.757	3134.522	4163.213	5529.829	7343.858

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Future Value Tabl

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277	1.300	1.323	1.346	1.369	1.392	1.416	1.440
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331	1.368	1.405	1.443	1.482	1.521	1.561	1.602	1.643	1.685	1.728
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464	1.518	1.574	1.630	1.689	1.749	1.811	1.874	1.939	2.005	2.074
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611	1.685	1.762	1.842	1.925	2.011	2.100	2.192	2.288	2.386	2.488
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772	1.870	1.974	2.082	2.195	2.313	2.436	2.565	2.700	2.840	2.986
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949	2.076	2.211	2.353	2.502	2.660	2.826	3.001	3.185	3.379	3.583
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144	2.305	2.476	2.658	2.853	3.059	3.278	3.511	3.759	4.021	4.300
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358	2.558	2.773	3.004	3.252	3.518	3.803	4.108	4.435	4.785	5.160
10	1.105	1.218	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594	2.839	3.106	3.395	3.707	4.046	4.411	4.807	5.234	5.695	6.192
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853	3.152	3.479	3.836	4.226	4.652	5.117	5.624	6.176	6.777	7.430
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138	3.498	3.896	4.335	4.818	5.350	5.936	6.580	7.288	8.064	8.916
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452	3.883	4.363	4.898	5.492	6.153	6.886	7.699	8.599	9.596	10.669
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797	4.310	4.887	5.535	6.261	7.076	7.988	9.007	10.147	11.420	12.839
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177	4.785	5.474	6.254	7.138	8.137	9.266	10.539	11.974	13.590	15.407
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595	5.311	6.130	7.067	8.137	9.358	10.748	12.330	14.129	16.172	18.488
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054	5.895	6.866	7.986	9.276	10.761	12.468	14.426	16.672	19.244	22.186
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560	6.544	7.690	9.024	10.575	12.375	14.463	16.879	19.673	22.901	26.623
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116	7.263	8.613	10.197	12.056	14.232	16.777	19.748	23.214	27.252	31.948
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727	8.062	9.646	11.523	13.743	16.367	19.461	23.106	27.393	32.429	38.338
21	1.232	1.516	1.860	2.279	2.786	3.400	4.141	5.034	6.109	7.400	8.949	10.804	13.021	15.668	18.822	22.574	27.034	32.324	38.591	46.005
22	1.245	1.546	1.916	2.370	2.925	3.604	4.430	5.437	6.659	8.140	9.934	12.100	14.714	17.861	21.645	26.186	31.629	38.142	45.923	55.206
23	1.257	1.577	1.974	2.465	3.072	3.820	4.741	5.871	7.258	8.954	11.026	13.552	16.627	20.362	24.891	30.376	37.006	45.008	54.649	66.247
24	1.270	1.608	2.033	2.563	3.225	4.049	5.072	6.341	7.911	9.850	12.239	15.179	18.788	23.212	28.625	35.236	43.297	53.109	65.032	79.497
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.835	13.585	17.000	21.231	26.462	32.919	40.874	50.658	62.669	77.388	95.396
26	1.295	1.673	2.157	2.772	3.556	4.549	5.807	7.396	9.399	11.918	15.080	19.040	23.991	30.167	37.857	47.414	59.270	73.949	92.092	114.475
27	1.308	1.707	2.221	2.883	3.733	4.822	6.214	7.988	10.245	13.110	16.739	21.325	27.109	34.390	43.535	55.000	69.345	87.260	109.589	137.371
28	1.321	1.741	2.288	2.999	3.920	5.112	6.649	8.627	11.167	14.421	18.580	23.884	30.633	39.204	50.066	63.800	81.134	102.967	130.411	164.845
29	1.335	1.776	2.357	3.119	4.116	5.418	7.114	9.317	12.172	15.863	20.624	26.750	34.616	44.693	57.575	74.009	94.927	121.501	155.189	197.814
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.063	13.268	17.449	22.892	29.960	39.116	50.950	66.212	85.850	111.065	143.371	184.675	237.376
31	1.361	1.848	2.500	3.373	4.538	6.088	8.145	10.868	14.462	19.194	25.410	33.555	44.201	58.083	76.144	99.586	129.946	169.177	219.764	284.852
32	1.375	1.885	2.575	3.508	4.765	6.453	8.715	11.737	15.763	21.114	28.206	37.582	49.947	66.215	87.565	115.520	152.036	199.629	261.519	341.822
33	1.389	1.922	2.652	3.648	5.003	6.841	9.325	12.676	17.182	23.225	31.308	42.092	56.440	75.485	100.700	134.003	177.883	235.563	311.207	410.186
34	1.403	1.961	2.732	3.794	5.253	7.251	9.978	13.690	18.728	25.548	34.752	47.143	63.777	86.053	115.805	155.443	208.123	277.964	370.337	492.224
35	1.417	2.000	2.814	3.946	5.516	7.686	10.677	14.785	20.414	28.102	38.575	52.800	72.069	98.100	133.176	180.314	243.503	327.997	440.701	590.668
36	1.431	2.040	2.898	4.104	5.792	8.147	11.424	15.968	22.251	30.913	42.818	59.136	81.437	111.834	153.152	209.164	284.899	387.037	524.434	708.802
37	1.445	2.081	2.985	4.268	6.081	8.636	12.224	17.246	24.254	34.004	47.528	66.232	92.024	127.491	176.125	242.631	333.332	456.703	624.076	850.562
38	1.460	2.122	3.075	4.439	6.385	9.154	13.079	18.625	26.437	37.404	52.756	74.180	103.987	145.340	202.543	281.452	389.998	538.910	742.651	1020.675
39	1.474	2.165	3.167	4.616	6.705	9.704	13.995	20.115	28.816	41.145	58.559	83.081	117.506	165.687	232.925	326.484	456.298	635.914	883.754	1224.810
40	1.489	2.208	3.262	4.801	7.040	10.286	14.947	21.725	31.409	45.259	65.001	93.051	132.782	188.884	267.864	378.721	533.869	750.378	1051.668	1469.772

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