



*"Investing in Africa's Future"*

**COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND  
GOVERNANCE**

**MFN 501 - FINANCIAL MANAGEMENT**

**END OF SECOND SEMESTER EXAMINATIONS**

**MARCH 2017**

**Ms. N E CHIRIMA**

**DURATION: 3 (Three)HRS**

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***INSTRUCTIONS***

Follow the instructions indicated at the beginning of each section.

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Answers are to be presented clearly and neatly.

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Answer each question on a new page.

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## SECTION A (TOTAL POSSIBLE MARKS = 20 MARKS)

Answer any two questions.

### Question 1 (10 possible marks)

How can the efficiency with which a company measures its working capital be measured? 10 marks

### Question 2 (10 possible marks)

- a) The value of a company is the present value of future dividends. How is this inconsistent with the proposition that dividends are irrelevant? 7 marks
- b) What factors affect a dividend decision? 3 marks

### Question 3 (10 possible marks)

Kops Ltd has budgeted to produce 5 000 units of product Alpha. Each unit requires 20kg of material 'K' whose cost per kilogram is \$7 500. Holding cost per unit per year is estimated at \$320. Ordering cost per order is \$10 000.

Required:

- a) Determine the Economic Order Quantity and the total stock management cost. 4 marks
- b) After how many days should an order be placed? 1 mark
- c) Compute the average dollar investment in stock. 2 marks
- d) What are the objectives of a debtor's credit policy? 3 marks

### Question 4 [10 possible marks]

- a) Compare and contrast the Net Present Value with the Internal Rate of Return. 5 marks
- b) Specify which of the two methods mentioned in (a) will, in your opinion; take precedence should the two methods have conflicting results. Explain. 5 marks

## SECTION B (TOTAL POSSIBLE MARKS = 55 MARKS)

Answer ALL Questions

### Question 5 (10 possible marks)

Joan Limited wishes to invest in equipment worth \$20 000. The cost of capital has been estimated at 12%. The following economic condition estimates have been made:

In the first year – There is an even chance of the economy being bad or good

In the second year – there is a 70% chance of the economy being good if it was good in the first year; there is a 30% chance of the economy being bad if it was good in the first year; there is a 25% chance of the economy being good if it was bad in the first year; there is a 75% chance of the economy being bad if it was bad in the first year;

If the economy is good in the first year, demand is estimated at \$25 000,

If the economy is bad in the first year, demand is estimated at \$5 000,

If the economy is good in the second year, provided it was good in the first year, demand is estimated at \$30 000,

If the economy is good in the second year, provided it was bad in the first year, demand is estimated at \$3 000,

If the economy is bad in the second year, provided it was bad in the first year, demand is estimated at \$1 000,

If the economy is bad in the second year, provided it was good in the first year, demand is estimated at \$15 000.

### Required

- Compute the Expected Net Present Value of the equipment. *6 marks*
- Recommend to Joan Limited whether or not to invest in the equipment, giving your reasons. *1 mark*
- What is the probability of the project operating at a loss? *1 mark*
- Briefly explain how the Breakeven Analysis is used to try and ascertain the risk levels of a project to be implemented. *2 marks*

**Question 6 (10 possible marks)**

Big Boy Limited has provided you with the following information as on 31 December 2011:

|                                   | \$000         |
|-----------------------------------|---------------|
| 12% Bonds (\$1 000 par value)     | 10 000        |
| 15% Preference Shares (\$50 par)  | 8 000         |
| Ordinary Share Capital (\$10 par) | 50 000        |
| Retained Profit                   | 12 000        |
|                                   | <u>80 000</u> |

The management of the company considers the current capital structure to be optimal and Big Boy Limited can raise \$50 million required for investment as below:

**Bonds**

New 14% bonds (\$1 000 par value) can be issued at a price of \$920.

**Preference Shares**

Current market price per share is \$75. 15% preference shares can be issued at the same market price. Floatation costs will be 12%.

**Ordinary Shares**

The ordinary shares, whose Beta factor is 1.4, are currently trading at \$64. Dividends of \$5 per share for the year to 31 December 2011 have just been paid. Dividends have been growing at a constant rate of 9% and management believes that new shares can be issued at \$60 per share. The risk – free rate is 8%, expected market returns 15% and corporate tax is at a rate of 30%.

**Required**

- i. Compute the cost of each of the three sources of finance. Determine the cost of equity using both the dividend growth model. *6 marks*
- ii. Determine the weighted average cost of capital of the company. *1 mark*
- iii. Clearly explain its importance *3 marks*

**Question 7 (10 possible marks)**

Kupa Limited wants to raise \$324 million for investment. The management does not wish to consider the option of raising the money through borrowing due to the current high level of interest rates on debt. The managing director has suggested that the funds be raised through a rights issue of 2 ordinary shares for every 5 shares currently in issue. Currently Kupa Limited has 6 million share (par value \$20) in issue, with a current market value of \$240 per share.

**Required:**

- i. Determine the price at which the shares are to be issued in order to raise the funds. *2 marks*
- ii. Compute the theoretical ex – right price. *4 marks*
- iii. What factors should be considered when choosing a source of finance for a project? *4 marks*

**Question 8 (25 possible marks)**

Nelly Ltd has identified 3 projects for investment. Details of the projects are as follows:

|                           | Project X           | Project Y | Project Z |
|---------------------------|---------------------|-----------|-----------|
| <b>Initial investment</b> | \$40 000            | \$40 000  | \$40 000  |
| <b>Year</b>               | <b>Cash Inflows</b> |           |           |
| <i>1</i>                  | \$13 000            | \$7 000   | \$19 000  |
| <i>2</i>                  | \$13 000            | \$10 000  | \$16 000  |
| <i>3</i>                  | \$13 000            | \$13 000  | \$13 000  |
| <i>4</i>                  | \$13 000            | \$16 000  | \$10 000  |
| <i>5</i>                  | \$13 000            | \$19 000  | \$7 000   |

**Required:**

- i. Calculate each project's discounted payback period. Which project is preferred according to this method? *7 marks*
- ii. Calculate the Net Present Value (NPV) of each project. Which project is preferred according to this method? *10 marks*  
Comment on your findings in (a) and (b) and Evaluate which project is desirable. *2 marks*
- iii. Explain why the use of cash flows is preferred to the use of accounting profits in making investment decisions. *6 marks*

**SECTION C (TOTAL POSSIBLE MARKS = 25 MARKS)**

Answer ALL questions

- a) Briefly state the following terms:
- i. Debt Factoring 1/2 marks
  - ii. Credit policy 1/2 marks
  - iii. Split Issue 1/2 marks
  - iv. Capital Rationing 1/2 marks
- b) Briefly state 2 ways in which a public issue can be made. 2 marks
- c) The Financial Manager uses Financial Reports prepared by accountants to make decisions.
- i. Outline three financial analysis techniques s/he can use. 3 marks
  - ii. Indicate three limitations of Financial Reports. 3 marks
- d) Distinguish between risk and uncertainty. 1 mark
- e) Comment (and illustrate) on the view that the risk an investor faces by investing in a single asset differs from the risk he faces by investing in a portfolio. 5 marks
- f) Following extensive analysis and forecasting, you have established that an investment in Mills Limited offers the following probability distribution of returns, given different states of the economy:

| State of the economy | Probability of state of economy | Conditional return |
|----------------------|---------------------------------|--------------------|
| Super - boom         | 10%                             | 50%                |
| Boom                 | 20%                             | 35%                |
| Normal               | 45%                             | 20%                |
| Recession            | 15%                             | 10%                |
| Severe Recession     | 10%                             | -5% (negative)     |

**Required:**

- i. Compute the Expected Return 1 mark
- ii. Compute risk using standard variance 5 marks
- iii. Compute risk using the coefficient of variation 2 marks
- iv. Which measure of risk is more favorable? 1 marks

End of Paper

Present Value and Future Value Tables

Table A-1 Future Value Interest Factors for One Dollar Compounded at  $k$  Percent for  $n$  Periods:  $FVIF_{k,n} = (1 + k)^n$

| Period | 1%     | 2%     | 3%     | 4%     | 5%     | 6%     | 7%     | 8%     | 9%     | 10%     | 11%     | 12%     | 13%     | 14%     | 15%     | 16%     | 20%     | 24%     | 25%     | 30%     |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1      | 1.0100 | 1.0200 | 1.0300 | 1.0400 | 1.0500 | 1.0600 | 1.0700 | 1.0800 | 1.0900 | 1.1000  | 1.1100  | 1.1200  | 1.1300  | 1.1400  | 1.1500  | 1.1600  | 1.2000  | 1.2400  | 1.2500  | 1.3000  |
| 2      | 1.0201 | 1.0404 | 1.0609 | 1.0816 | 1.1025 | 1.1236 | 1.1449 | 1.1664 | 1.1881 | 1.2100  | 1.2321  | 1.2544  | 1.2769  | 1.2996  | 1.3225  | 1.3456  | 1.4400  | 1.5376  | 1.5625  | 1.6900  |
| 3      | 1.0303 | 1.0612 | 1.0927 | 1.1249 | 1.1576 | 1.1910 | 1.2250 | 1.2597 | 1.2950 | 1.3310  | 1.3676  | 1.4049  | 1.4429  | 1.4815  | 1.5209  | 1.5609  | 1.7280  | 1.9066  | 1.9531  | 2.1970  |
| 4      | 1.0406 | 1.0824 | 1.1255 | 1.1699 | 1.2155 | 1.2625 | 1.3108 | 1.3605 | 1.4116 | 1.4641  | 1.5181  | 1.5735  | 1.6305  | 1.6890  | 1.7490  | 1.8105  | 2.0736  | 2.3642  | 2.4414  | 2.8561  |
| 5      | 1.0510 | 1.1041 | 1.1593 | 1.2167 | 1.2763 | 1.3382 | 1.4026 | 1.4693 | 1.5386 | 1.6105  | 1.6851  | 1.7623  | 1.8424  | 1.9254  | 2.0114  | 2.1003  | 2.4883  | 2.9316  | 3.0518  | 3.7129  |
| 6      | 1.0615 | 1.1262 | 1.1941 | 1.2653 | 1.3401 | 1.4185 | 1.5007 | 1.5869 | 1.6771 | 1.7716  | 1.8704  | 1.9738  | 2.0820  | 2.1950  | 2.3131  | 2.4364  | 2.9860  | 3.5352  | 3.8147  | 4.8268  |
| 7      | 1.0721 | 1.1487 | 1.2299 | 1.3159 | 1.4071 | 1.5036 | 1.6058 | 1.7138 | 1.8280 | 1.9487  | 2.0762  | 2.2107  | 2.3526  | 2.5023  | 2.6600  | 2.8262  | 3.5832  | 4.5077  | 4.7684  | 6.2749  |
| 8      | 1.0829 | 1.1717 | 1.2668 | 1.3686 | 1.4775 | 1.5938 | 1.7182 | 1.8509 | 1.9926 | 2.1436  | 2.3045  | 2.4760  | 2.6584  | 2.8526  | 3.0590  | 3.2784  | 4.2998  | 5.5895  | 5.9605  | 8.1573  |
| 9      | 1.0937 | 1.1951 | 1.3048 | 1.4233 | 1.5513 | 1.6895 | 1.8385 | 1.9990 | 2.1719 | 2.3579  | 2.5580  | 2.7731  | 3.0040  | 3.2519  | 3.5179  | 3.8030  | 5.1598  | 6.9310  | 7.4506  | 10.604  |
| 10     | 1.1046 | 1.2190 | 1.3439 | 1.4802 | 1.6289 | 1.7908 | 1.9672 | 2.1589 | 2.3674 | 2.5937  | 2.8394  | 3.1058  | 3.3946  | 3.7072  | 4.0456  | 4.4114  | 6.1917  | 8.5944  | 9.3132  | 13.786  |
| 11     | 1.1157 | 1.2434 | 1.3842 | 1.5395 | 1.7103 | 1.8983 | 2.1049 | 2.3316 | 2.5804 | 2.8531  | 3.1518  | 3.4785  | 3.8359  | 4.2262  | 4.6524  | 5.1173  | 7.4301  | 10.657  | 11.642  | 17.922  |
| 12     | 1.1268 | 1.2682 | 1.4258 | 1.6010 | 1.7959 | 2.0122 | 2.2522 | 2.5182 | 2.8127 | 3.1384  | 3.4985  | 3.8960  | 4.3345  | 4.8179  | 5.3503  | 5.9360  | 8.9161  | 13.215  | 14.552  | 23.298  |
| 13     | 1.1381 | 1.2936 | 1.4685 | 1.6651 | 1.8856 | 2.1329 | 2.4098 | 2.7196 | 3.0658 | 3.4523  | 3.8833  | 4.3635  | 4.8960  | 5.4924  | 6.1528  | 6.8858  | 10.699  | 16.386  | 18.190  | 30.288  |
| 14     | 1.1495 | 1.3195 | 1.5126 | 1.7317 | 1.9799 | 2.2609 | 2.5785 | 2.9372 | 3.3417 | 3.7975  | 4.3104  | 4.8871  | 5.5348  | 6.2613  | 7.0757  | 7.9875  | 12.839  | 20.319  | 22.737  | 39.374  |
| 15     | 1.1610 | 1.3459 | 1.5580 | 1.8009 | 2.0789 | 2.3966 | 2.7590 | 3.1722 | 3.6425 | 4.1772  | 4.7846  | 5.4736  | 6.2543  | 7.1379  | 8.1371  | 9.2655  | 15.407  | 25.196  | 28.422  | 51.186  |
| 16     | 1.1726 | 1.3728 | 1.6047 | 1.8730 | 2.1829 | 2.5404 | 2.9522 | 3.4259 | 3.9703 | 4.5950  | 5.3109  | 6.1304  | 7.0673  | 8.1372  | 9.3576  | 10.748  | 18.488  | 31.343  | 35.527  | 66.542  |
| 17     | 1.1843 | 1.4002 | 1.6528 | 1.9479 | 2.2920 | 2.6928 | 3.1588 | 3.7000 | 4.3276 | 5.0545  | 5.8951  | 6.8660  | 7.9811  | 9.2765  | 10.761  | 12.468  | 22.186  | 38.741  | 44.409  | 86.504  |
| 18     | 1.1961 | 1.4282 | 1.7024 | 2.0258 | 2.4066 | 2.8543 | 3.3799 | 3.9960 | 4.7171 | 5.5599  | 6.5436  | 7.6900  | 9.0243  | 10.575  | 12.375  | 14.463  | 26.623  | 48.039  | 55.511  | 112.455 |
| 19     | 1.2081 | 1.4568 | 1.7535 | 2.1068 | 2.5270 | 3.0256 | 3.6165 | 4.3157 | 5.1417 | 6.1159  | 7.2633  | 8.6128  | 10.197  | 12.056  | 14.232  | 16.777  | 31.948  | 59.568  | 69.389  | 146.192 |
| 20     | 1.2202 | 1.4859 | 1.8061 | 2.1911 | 2.6533 | 3.2071 | 3.8697 | 4.6610 | 5.6044 | 6.7275  | 8.0623  | 9.6463  | 11.523  | 13.743  | 16.367  | 19.461  | 38.338  | 73.864  | 86.736  | 190.090 |
| 21     | 1.2324 | 1.5157 | 1.8603 | 2.2788 | 2.7660 | 3.3996 | 4.1406 | 5.0338 | 6.1088 | 7.4002  | 8.9492  | 10.804  | 13.021  | 15.668  | 18.822  | 22.574  | 46.005  | 91.592  | 108.420 | 247.065 |
| 22     | 1.2447 | 1.5460 | 1.9161 | 2.3699 | 2.9253 | 3.6035 | 4.4304 | 5.4365 | 6.6586 | 8.1403  | 9.9336  | 12.100  | 14.714  | 17.861  | 21.645  | 26.186  | 55.206  | 113.574 | 135.525 | 321.184 |
| 23     | 1.2572 | 1.5769 | 1.9736 | 2.4647 | 3.0715 | 3.8197 | 4.7405 | 5.8715 | 7.2579 | 8.9543  | 11.026  | 13.562  | 16.627  | 20.362  | 24.891  | 30.376  | 66.247  | 140.831 | 169.407 | 417.539 |
| 24     | 1.2697 | 1.6084 | 2.0328 | 2.5633 | 3.2251 | 4.0489 | 5.0724 | 6.3412 | 7.9111 | 9.8497  | 12.239  | 15.179  | 18.788  | 23.212  | 28.625  | 35.236  | 79.497  | 174.631 | 211.758 | 542.801 |
| 25     | 1.2824 | 1.6406 | 2.0938 | 2.6658 | 3.3864 | 4.2919 | 5.4274 | 6.8485 | 8.6231 | 10.835  | 13.585  | 17.000  | 21.231  | 26.462  | 32.919  | 40.874  | 95.396  | 216.542 | 264.698 | 705.641 |
| 30     | 1.3478 | 1.8114 | 2.4273 | 3.2434 | 4.3219 | 5.7435 | 7.6123 | 10.063 | 13.268 | 17.449  | 22.892  | 29.960  | 39.116  | 50.950  | 66.212  | 85.850  | 237.376 | 634.820 | 807.794 | *       |
| 35     | 1.4166 | 1.9999 | 2.8139 | 3.9461 | 5.5160 | 7.6861 | 10.677 | 14.785 | 20.414 | 28.102  | 38.575  | 52.800  | 72.069  | 98.100  | 133.176 | 180.314 | 590.668 | *       | *       | *       |
| 36     | 1.4308 | 2.0399 | 2.8963 | 4.1039 | 5.7918 | 8.1473 | 11.424 | 15.968 | 22.251 | 30.913  | 42.818  | 59.136  | 81.437  | 111.834 | 153.152 | 209.164 | 708.602 | *       | *       | *       |
| 40     | 1.4889 | 2.2080 | 3.2620 | 4.8010 | 7.0400 | 10.286 | 14.974 | 21.725 | 31.409 | 45.289  | 65.001  | 93.051  | 132.782 | 188.884 | 267.864 | 378.721 | *       | *       | *       | *       |
| 50     | 1.6446 | 2.6916 | 4.3839 | 7.1067 | 11.467 | 18.420 | 29.457 | 46.902 | 74.358 | 117.391 | 184.965 | 289.002 | 450.736 | 700.233 | *       | *       | *       | *       | *       | *       |

Table A-2 Future Value Interest Factors for a One-Dollar Annuity Compounded at  $k$  Percent for  $n$  Periods:  $FVIFA_{k,n} = [(1 + k)^n - 1] / k$

| Period | 1%     | 2%     | 3%      | 4%      | 5%      | 6%      | 7%      | 8%      | 9%      | 10%     | 11%     | 12%     | 13%     | 14%     | 15%     | 16%     | 20%     | 24%     | 25%      | 30%      |
|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| 1      | 1.0000 | 1.0200 | 1.0300  | 1.0400  | 1.0500  | 1.0600  | 1.0700  | 1.0800  | 1.0900  | 1.1000  | 1.1100  | 1.1200  | 1.1300  | 1.1400  | 1.1500  | 1.1600  | 1.2000  | 1.2400  | 1.2500   | 1.3000   |
| 2      | 2.0100 | 2.0404 | 2.0609  | 2.0816  | 2.0950  | 2.1060  | 2.1149  | 2.1228  | 2.1297  | 2.1356  | 2.1405  | 2.1454  | 2.1503  | 2.1552  | 2.1601  | 2.1650  | 2.2000  | 2.2400  | 2.2500   | 2.3000   |
| 3      | 3.0301 | 3.0604 | 3.0909  | 3.1216  | 3.1425  | 3.1636  | 3.1847  | 3.2058  | 3.2269  | 3.2479  | 3.2689  | 3.2899  | 3.3109  | 3.3319  | 3.3529  | 3.3739  | 3.4000  | 3.4400  | 3.4500   | 3.6000   |
| 4      | 4.0604 | 4.1216 | 4.1836  | 4.2465  | 4.3101  | 4.3746  | 4.4399  | 4.5061  | 4.5731  | 4.6410  | 4.7097  | 4.7793  | 4.8498  | 4.9211  | 4.9934  | 5.0665  | 5.1600  | 5.2642  | 5.2750   | 5.5500   |
| 5      | 5.1010 | 5.2040 | 5.3091  | 5.4163  | 5.5256  | 5.6371  | 5.7507  | 5.8666  | 5.9847  | 6.1051  | 6.2278  | 6.3528  | 6.4803  | 6.6101  | 6.7424  | 6.8771  | 7.0416  | 7.2184  | 7.2300   | 7.6500   |
| 6      | 6.1520 | 6.3081 | 6.4684  | 6.6330  | 6.8019  | 6.9753  | 7.1533  | 7.3359  | 7.5233  | 7.7156  | 7.9129  | 8.1152  | 8.3227  | 8.5355  | 8.7537  | 8.9775  | 9.2989  | 9.5800  | 9.6000   | 10.1500  |
| 7      | 7.2125 | 7.4343 | 7.6625  | 7.8963  | 8.1359  | 8.3815  | 8.6333  | 8.8915  | 9.1563  | 9.4278  | 9.7061  | 9.9913  | 10.2835 | 10.5828 | 10.8891 | 11.1925 | 11.5960 | 11.9000 | 11.9200  | 12.5500  |
| 8      | 8.2857 | 8.5830 | 8.8923  | 9.2142  | 9.5491  | 9.8975  | 10.2600 | 10.6377 | 11.0208 | 11.4096 | 11.8043 | 12.2050 | 12.6118 | 13.0248 | 13.4441 | 13.8698 | 14.2920 | 14.6100 | 14.6300  | 15.3500  |
| 9      | 9.3685 | 9.7446 | 10.1389 | 10.5513 | 10.9727 | 11.4031 | 11.8428 | 12.2920 | 12.7508 | 13.2193 | 13.6976 | 14.1859 | 14.6843 | 15.1928 | 15.7115 | 16.2405 | 16.6600 | 16.9800 | 17.0000  | 17.8000  |
| 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  | 22.389  | 23.500  | 23.5200  | 24.5000  |
| 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  | 27.100  | 28.460  | 28.4800  | 29.5000  |
| 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  | 32.720  | 34.600  | 34.6200  | 35.7500  |
| 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  | 39.299  | 41.880  | 41.9000  | 43.1500  |
| 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  | 46.916  | 49.640  | 49.6600  | 50.9500  |
| 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  | 51.640  | 55.933  | 60.460  | 60.4800  | 61.8500  |
| 16     | 17.258 | 18.639 | 20.157  | 21.825  | 23.667  | 25.673  | 27.888  | 30.324  | 33.003  | 35.950  | 39.190  | 42.753  | 46.672  | 50.980  | 55.717  | 60.925  | 66.400  | 72.140  | 72.1600  | 73.6000  |
| 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  | 78.500  | 85.600  | 85.6200  | 87.1500  |
| 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  | 92.400  | 100.900 | 100.9200 | 102.5000 |
| 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  | 109.400 | 120.500 | 120.5200 | 122.1500 |
| 20     | 22.019 | 24.297 | 26.870  | 29.778  | 33.066  | 36.786  | 40.995  | 45.792  | 51.160  | 57.275  | 64.203  | 72.052  | 80.947  | 91.025  | 102.444 | 115.380 | 128.888 | 142.800 | 142.8200 | 144.5000 |
| 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 | 151.900 | 166.000 | 166.0200 | 167      |

Present Value and Future Value Tables

Table A-3 Present Value Interest Factors for One Dollar Discounted at  $k$  Percent for  $n$  Periods:  $PVIF_{k,n} = 1 / (1 + k)^n$

| Period | 1%     | 2%     | 3%     | 4%     | 5%     | 6%     | 7%     | 8%     | 9%     | 10%    | 11%    | 12%    | 13%    | 14%    | 15%    | 16%    | 20%    | 24%    | 25%    | 30%    |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1      | 0.9901 | 0.9804 | 0.9709 | 0.9615 | 0.9524 | 0.9434 | 0.9346 | 0.9259 | 0.9174 | 0.9091 | 0.9009 | 0.8929 | 0.8850 | 0.8772 | 0.8696 | 0.8621 | 0.8333 | 0.8065 | 0.8000 | 0.7692 |
| 2      | 0.9803 | 0.9612 | 0.9426 | 0.9246 | 0.9070 | 0.8900 | 0.8734 | 0.8573 | 0.8417 | 0.8264 | 0.8116 | 0.7972 | 0.7831 | 0.7695 | 0.7561 | 0.7432 | 0.6944 | 0.6504 | 0.6400 | 0.5917 |
| 3      | 0.9706 | 0.9423 | 0.9151 | 0.8890 | 0.8638 | 0.8396 | 0.8163 | 0.7938 | 0.7722 | 0.7513 | 0.7312 | 0.7118 | 0.6931 | 0.6750 | 0.6575 | 0.6407 | 0.5787 | 0.5245 | 0.5120 | 0.4552 |
| 4      | 0.9610 | 0.9238 | 0.8885 | 0.8548 | 0.8227 | 0.7921 | 0.7629 | 0.7350 | 0.7084 | 0.6830 | 0.6587 | 0.6355 | 0.6133 | 0.5921 | 0.5718 | 0.5523 | 0.4823 | 0.4230 | 0.4096 | 0.3501 |
| 5      | 0.9515 | 0.9057 | 0.8626 | 0.8219 | 0.7835 | 0.7473 | 0.7130 | 0.6806 | 0.6499 | 0.6209 | 0.5935 | 0.5674 | 0.5428 | 0.5194 | 0.4972 | 0.4761 | 0.4019 | 0.3411 | 0.3277 | 0.2693 |
| 6      | 0.9420 | 0.8880 | 0.8375 | 0.7903 | 0.7462 | 0.7050 | 0.6663 | 0.6302 | 0.5963 | 0.5645 | 0.5346 | 0.5066 | 0.4803 | 0.4556 | 0.4323 | 0.4104 | 0.3349 | 0.2751 | 0.2621 | 0.2072 |
| 7      | 0.9327 | 0.8706 | 0.8131 | 0.7599 | 0.7107 | 0.6651 | 0.6227 | 0.5835 | 0.5470 | 0.5132 | 0.4817 | 0.4523 | 0.4251 | 0.3996 | 0.3759 | 0.3538 | 0.2791 | 0.2218 | 0.2097 | 0.1594 |
| 8      | 0.9235 | 0.8535 | 0.7894 | 0.7307 | 0.6768 | 0.6274 | 0.5820 | 0.5403 | 0.5019 | 0.4665 | 0.4339 | 0.4039 | 0.3762 | 0.3506 | 0.3269 | 0.3050 | 0.2326 | 0.1789 | 0.1678 | 0.1226 |
| 9      | 0.9143 | 0.8368 | 0.7664 | 0.7026 | 0.6446 | 0.5919 | 0.5439 | 0.5002 | 0.4604 | 0.4241 | 0.3909 | 0.3606 | 0.3329 | 0.3075 | 0.2843 | 0.2630 | 0.1938 | 0.1443 | 0.1342 | 0.0943 |
| 10     | 0.9053 | 0.8203 | 0.7441 | 0.6756 | 0.6139 | 0.5584 | 0.5083 | 0.4632 | 0.4224 | 0.3855 | 0.3522 | 0.3220 | 0.2946 | 0.2697 | 0.2472 | 0.2267 | 0.1615 | 0.1164 | 0.1074 | 0.0725 |
| 11     | 0.8963 | 0.8043 | 0.7224 | 0.6496 | 0.5847 | 0.5268 | 0.4751 | 0.4289 | 0.3875 | 0.3505 | 0.3173 | 0.2875 | 0.2607 | 0.2366 | 0.2149 | 0.1954 | 0.1346 | 0.0938 | 0.0859 | 0.0558 |
| 12     | 0.8874 | 0.7885 | 0.7014 | 0.6246 | 0.5568 | 0.4970 | 0.4440 | 0.3971 | 0.3555 | 0.3186 | 0.2858 | 0.2567 | 0.2307 | 0.2076 | 0.1869 | 0.1685 | 0.1122 | 0.0757 | 0.0687 | 0.0429 |
| 13     | 0.8787 | 0.7730 | 0.6810 | 0.6006 | 0.5303 | 0.4688 | 0.4150 | 0.3677 | 0.3262 | 0.2897 | 0.2575 | 0.2292 | 0.2042 | 0.1821 | 0.1625 | 0.1452 | 0.0935 | 0.0610 | 0.0550 | 0.0330 |
| 14     | 0.8700 | 0.7579 | 0.6611 | 0.5775 | 0.5051 | 0.4423 | 0.3878 | 0.3405 | 0.2992 | 0.2633 | 0.2320 | 0.2046 | 0.1807 | 0.1597 | 0.1413 | 0.1252 | 0.0779 | 0.0492 | 0.0440 | 0.0254 |
| 15     | 0.8613 | 0.7430 | 0.6419 | 0.5553 | 0.4810 | 0.4173 | 0.3624 | 0.3152 | 0.2745 | 0.2394 | 0.2090 | 0.1827 | 0.1599 | 0.1401 | 0.1229 | 0.1079 | 0.0649 | 0.0397 | 0.0352 | 0.0195 |
| 16     | 0.8528 | 0.7284 | 0.6232 | 0.5339 | 0.4581 | 0.3936 | 0.3387 | 0.2919 | 0.2519 | 0.2176 | 0.1883 | 0.1631 | 0.1415 | 0.1229 | 0.1069 | 0.0930 | 0.0541 | 0.0320 | 0.0281 | 0.0150 |
| 17     | 0.8444 | 0.7142 | 0.6050 | 0.5134 | 0.4363 | 0.3714 | 0.3166 | 0.2703 | 0.2311 | 0.1978 | 0.1696 | 0.1456 | 0.1252 | 0.1079 | 0.0929 | 0.0802 | 0.0451 | 0.0258 | 0.0225 | 0.0116 |
| 18     | 0.8360 | 0.7002 | 0.5874 | 0.4936 | 0.4155 | 0.3503 | 0.2959 | 0.2502 | 0.2120 | 0.1799 | 0.1528 | 0.1300 | 0.1108 | 0.0946 | 0.0808 | 0.0691 | 0.0376 | 0.0208 | 0.0180 | 0.0089 |
| 19     | 0.8277 | 0.6864 | 0.5703 | 0.4746 | 0.3957 | 0.3305 | 0.2765 | 0.2317 | 0.1945 | 0.1635 | 0.1377 | 0.1161 | 0.0981 | 0.0829 | 0.0703 | 0.0596 | 0.0313 | 0.0168 | 0.0144 | 0.0068 |
| 20     | 0.8195 | 0.6730 | 0.5537 | 0.4564 | 0.3769 | 0.3118 | 0.2584 | 0.2145 | 0.1784 | 0.1486 | 0.1240 | 0.1037 | 0.0868 | 0.0728 | 0.0611 | 0.0514 | 0.0261 | 0.0135 | 0.0115 | 0.0053 |
| 21     | 0.8114 | 0.6598 | 0.5375 | 0.4388 | 0.3589 | 0.2942 | 0.2415 | 0.1987 | 0.1637 | 0.1351 | 0.1117 | 0.0926 | 0.0768 | 0.0638 | 0.0531 | 0.0443 | 0.0217 | 0.0109 | 0.0092 | 0.0040 |
| 22     | 0.8034 | 0.6468 | 0.5219 | 0.4220 | 0.3418 | 0.2775 | 0.2257 | 0.1839 | 0.1502 | 0.1238 | 0.1007 | 0.0826 | 0.0680 | 0.0560 | 0.0462 | 0.0382 | 0.0181 | 0.0088 | 0.0074 | 0.0031 |
| 23     | 0.7954 | 0.6342 | 0.5067 | 0.4057 | 0.3256 | 0.2618 | 0.2109 | 0.1703 | 0.1378 | 0.1117 | 0.0907 | 0.0738 | 0.0601 | 0.0491 | 0.0402 | 0.0329 | 0.0151 | 0.0071 | 0.0059 | 0.0024 |
| 24     | 0.7876 | 0.6217 | 0.4919 | 0.3901 | 0.3101 | 0.2470 | 0.1971 | 0.1577 | 0.1264 | 0.1015 | 0.0817 | 0.0659 | 0.0532 | 0.0431 | 0.0349 | 0.0284 | 0.0126 | 0.0067 | 0.0047 | 0.0018 |
| 25     | 0.7798 | 0.6095 | 0.4776 | 0.3751 | 0.2953 | 0.2330 | 0.1842 | 0.1460 | 0.1160 | 0.0923 | 0.0736 | 0.0588 | 0.0471 | 0.0378 | 0.0304 | 0.0245 | 0.0105 | 0.0046 | 0.0038 | 0.0014 |
| 30     | 0.7419 | 0.5521 | 0.4120 | 0.3083 | 0.2314 | 0.1741 | 0.1314 | 0.0994 | 0.0754 | 0.0573 | 0.0437 | 0.0334 | 0.0256 | 0.0196 | 0.0151 | 0.0116 | 0.0042 | 0.0016 | 0.0012 | *      |
| 35     | 0.7059 | 0.5000 | 0.3554 | 0.2534 | 0.1813 | 0.1301 | 0.0937 | 0.0676 | 0.0490 | 0.0366 | 0.0289 | 0.0219 | 0.0159 | 0.0113 | 0.0075 | 0.0055 | 0.0017 | 0.0005 | *      | *      |
| 40     | 0.6717 | 0.4529 | 0.3066 | 0.2083 | 0.1420 | 0.0972 | 0.0668 | 0.0460 | 0.0318 | 0.0221 | 0.0154 | 0.0107 | 0.0075 | 0.0053 | 0.0037 | 0.0026 | 0.0007 | *      | *      | *      |
| 50     | 0.6080 | 0.3715 | 0.2281 | 0.1407 | 0.0872 | 0.0543 | 0.0339 | 0.0213 | 0.0134 | 0.0085 | 0.0054 | 0.0035 | 0.0022 | 0.0014 | 0.0009 | 0.0006 | *      | *      | *      | *      |

Table A-4 Present Value Interest Factors for a One-Dollar Annuity Discounted at  $k$  Percent for  $n$  Periods:  $PVIFA = [1 - 1/(1 + k)^n] / k$

| Period | 1%     | 2%     | 3%     | 4%     | 5%     | 6%     | 7%     | 8%     | 9%     | 10%    | 11%    | 12%    | 13%    | 14%     | 15%     | 16%     | 20%    | 24%    | 25%    | 30%    |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|--------|--------|--------|
| 1      | 0.9901 | 0.9804 | 0.9709 | 0.9615 | 0.9524 | 0.9434 | 0.9346 | 0.9259 | 0.9174 | 0.9091 | 0.9009 | 0.8929 | 0.8850 | 0.8772  | 0.8696  | 0.8621  | 0.8333 | 0.8065 | 0.8000 | 0.7692 |
| 2      | 1.9704 | 1.9418 | 1.9135 | 1.8851 | 1.8584 | 1.8334 | 1.8080 | 1.7833 | 1.7591 | 1.7355 | 1.7125 | 1.6901 | 1.6681 | 1.6467  | 1.6257  | 1.6052  | 1.5278 | 1.4568 | 1.4400 | 1.3609 |
| 3      | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 | 2.4869 | 2.4437 | 2.4018 | 2.3612 | 2.3216  | 2.2832  | 2.2459  | 2.1065 | 1.9813 | 1.9520 | 1.8161 |
| 4      | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5460 | 3.4651 | 3.3872 | 3.3121 | 3.2397 | 3.1699 | 3.1024 | 3.0373 | 2.9745 | 2.9137  | 2.8550  | 2.7982  | 2.5887 | 2.4043 | 2.3616 | 2.1662 |
| 5      | 4.8534 | 4.7135 | 4.5797 | 4.4518 | 4.3295 | 4.2124 | 4.1002 | 3.9927 | 3.8897 | 3.7908 | 3.6959 | 3.6048 | 3.5172 | 3.4331  | 3.3522  | 3.2743  | 2.9906 | 2.7454 | 2.6893 | 2.4386 |
| 6      | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7655 | 4.6229 | 4.4859 | 4.3553 | 4.2305 | 4.1114 | 3.9975 | 3.8887  | 3.7845  | 3.6847  | 3.3255 | 3.0205 | 2.9514 | 2.6427 |
| 7      | 6.7282 | 6.4720 | 6.2303 | 6.0021 | 5.7864 | 5.5824 | 5.3893 | 5.2064 | 5.0330 | 4.8684 | 4.7122 | 4.5638 | 4.4226 | 4.2883  | 4.1604  | 4.0386  | 3.6046 | 3.2423 | 3.1611 | 2.8021 |
| 8      | 7.6517 | 7.3255 | 7.0197 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5349 | 5.3349 | 5.1461 | 4.9675 | 4.7988 | 4.6389  | 4.4873  | 4.3436  | 3.8372 | 3.4212 | 3.3289 | 2.9247 |
| 9      | 8.5660 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9952 | 5.7590 | 5.5370 | 5.3282 | 5.1317 | 4.9464  | 4.7716  | 4.6065  | 4.0310 | 3.5655 | 3.4631 | 3.0190 |
| 10     | 9.4713 | 8.9826 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4177 | 6.1446 | 5.8892 | 5.6502 | 5.4262 | 5.2161  | 5.0188  | 4.8332  | 4.1925 | 3.6819 | 3.5705 | 3.0915 |
| 11     | 10.368 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 | 6.4951 | 6.2065 | 5.9377 | 5.6869 | 5.4527  | 5.2337  | 5.0286  | 4.3271 | 3.7757 | 3.6564 | 3.1473 |
| 12     | 11.255 | 10.575 | 9.9540 | 9.3651 | 8.8133 | 8.3838 | 7.9427 | 7.5361 | 7.1607 | 6.8137 | 6.4924 | 6.1944 | 5.9176 | 5.6603  | 5.4206  | 5.1971  | 4.4392 | 3.8514 | 3.7251 | 3.1903 |
| 13     | 12.134 | 11.348 | 10.635 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | 7.9038 | 7.4869 | 7.1034 | 6.7499 | 6.4235 | 6.1218 | 5.8424  | 5.5831  | 5.3423  | 4.5327 | 3.9124 | 3.7801 | 3.2233 |
| 14     | 13.004 | 12.106 | 11.296 | 10.563 | 9.8986 | 9.2950 | 8.7455 | 8.2442 | 7.7862 | 7.3667 | 6.9819 | 6.6282 | 6.3025 | 6.0021  | 5.7245  | 5.4675  | 4.6106 | 3.9616 | 3.8241 | 3.2487 |
| 15     | 13.865 | 12.849 | 11.938 | 11.116 | 10.380 | 9.7122 | 9.1079 | 8.5995 | 8.0607 | 7.6061 | 7.1909 | 6.8109 | 6.4624 | 6.1422  | 5.8474  | 5.5755  | 4.6755 | 4.0013 | 3.8593 | 3.2682 |
| 16     | 14.718 | 13.578 | 12.561 | 11.652 | 10.838 | 10.106 | 9.4466 | 8.8514 | 8.3126 | 7.8237 | 7.3792 | 6.9740 | 6.6039 | 6.2651  | 5.9542  | 5.6685  | 4.7296 | 4.0333 | 3.8874 | 3.2632 |
| 17     | 15.562 | 14.292 | 13.166 | 12.166 | 11.274 | 10.477 | 9.7632 | 9.1216 | 8.5436 | 8.0216 | 7.5488 | 7.1196 | 6.7291 | 6.3729  | 6.0472  | 5.7487  | 4.7746 | 4.0591 | 3.9099 | 3.2848 |
| 18     | 16.398 | 14.992 | 13.754 | 12.659 | 11.690 | 10.828 | 10.059 | 9.3719 | 8.7556 | 8.2014 | 7.7015 | 7.2497 | 6.8399 | 6.4674  | 6.1280  | 5.8178  | 4.8122 | 4.0799 | 3.9279 | 3.3037 |
| 19     | 17.226 | 15.679 | 14.324 | 13.134 | 12.085 | 11.158 | 10.336 | 9.6036 | 8.9501 | 8.3649 | 7.8393 | 7.3658 | 6.9380 | 6.5504  | 6.1982  | 5.8775  | 4.8435 | 4.0967 | 3.9424 | 3.3105 |
| 20     | 18.046 | 16.351 | 14.877 | 13.590 | 12.462 | 11.470 | 10.594 | 9.8181 | 9.1285 | 8.5136 | 7.9633 | 7.4694 | 7.0248 | 6.6231  | 6.2593  | 5.9288  | 4.8696 | 4.1103 | 3.9539 | 3.3158 |
| 21     | 18.857 | 17.011 | 15.415 | 14.029 | 12.821 | 11.764 | 10.836 | 10.017 | 9.2922 | 8.6487 | 8.0751 | 7.5620 | 7.1016 | 6.6870  | 6.3125  | 5.9731  | 4.8913 | 4.1212 | 3.9631 | 3.3198 |
| 22     | 19.660 | 17.658 | 15.937 | 14.451 | 13.163 | 12.042 | 11.061 | 10.201 | 9.4424 | 8.7715 | 8.1757 | 7.6446 | 7.1695 | 6.7429  | 6.3587  | 6.0113  | 4.9094 | 4.1300 | 3.9705 | 3.3230 |
| 23     | 20.456 | 18.292 | 16.444 | 14.857 | 13.489 | 12.303 | 11.272 | 10.371 | 9.5902 | 8.8832 | 8.2664 | 7.7184 | 7.2297 | 6.7921  | 6.3988  | 6.0442  | 4.9345 | 4.1371 | 3.9764 | 3.3254 |
| 24     | 21.243 | 18.914 | 16.936 | 15.247 | 13.799 | 12.550 | 11.469 | 10.529 | 9.7066 | 8.9847 | 8.3481 | 7.7843 | 7.2829 | 6.8351  | 6.4338  | 6.0726  | 4.9371 | 4.1428 | 3.9811 | 3.3272 |
| 25     | 22.023 | 19.523 | 17.413 | 15.622 | 14.094 | 12.783 | 11.654 | 10.675 | 9.8226 | 9.0770 | 8.4217 | 7.8431 | 7.3300 | 6.8729  | 6.4641  | 6.0971  | 4.9476 | 4.1474 | 3.9849 | 3.3286 |
| 26     | 22.803 | 20.203 | 18.003 | 16.112 | 14.383 | 12.954 | 11.805 | 10.796 | 9.9127 | 9.1371 | 8.4717 | 7.8831 | 7.3600 | 6.9029  | 6.4841  | 6.1171  | 4.9676 | 4.1524 | 3.9898 | 3.3300 |
| 27     | 23.583 | 20.983 | 18.783 | 16.792 | 14.954 | 13.525 | 12.356 | 11.317 | 10.388 | 9.5732 | 8.8977 | 8.3091 | 7.7760 | 7.3189  | 6.8901  | 6.5231  | 4.9781 | 4.1572 | 3.9947 | 3.3314 |
| 28     | 24.363 | 21.763 | 19.563 | 17.401 | 15.563 | 14.034 | 12.836 | 11.757 | 10.798 | 9.9437 | 9.2122 | 8.6236 | 8.0905 | 7.6234  | 7.1945  | 6.8275  | 4.9831 | 4.1620 | 3.9996 | 3.3328 |
| 29     | 25.143 | 22.543 | 20.343 | 18.010 | 16.172 | 14.545 | 13.247 | 12.128 | 11.139 | 10.250 | 9.4882 | 8.9091 | 8.3760 | 7.9089  | 7.4700  | 7.0931  | 4.9881 | 4.1668 | 3.9999 | 3.3333 |
| 30     | 25.923 | 23.323 | 21.123 | 18.619 | 16.783 | 15.156 | 13.758 | 12.599 | 11.570 | 10.631 | 9.8127 | 9.2336 | 8.6905 | 8.1574  | 7.7185  | 7.3415  | 4.9931 | 4.1716 | 3.9999 | 3.3333 |
| 31     | 26.703 | 24.103 | 21.903 | 19.228 | 17.394 | 15.667 | 14.269 | 13.070 | 12.020 | 11.031 | 10.152 | 9.3832 | 8.8401 | 8.3070  | 7.8681  | 7.4291  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 32     | 27.483 | 24.883 | 22.683 | 19.837 | 18.005 | 16.278 | 14.880 | 13.681 | 12.631 | 11.642 | 10.713 | 9.9437 | 9.3941 | 8.8510  | 8.3181  | 7.8791  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 33     | 28.263 | 25.663 | 23.463 | 20.446 | 18.616 | 16.889 | 15.491 | 14.292 | 13.242 | 12.203 | 11.224 | 10.324 | 9.5946 | 9.0450  | 8.5060  | 8.0071  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 34     | 29.043 | 26.443 | 24.243 | 21.055 | 19.227 | 17.500 | 16.102 | 14.903 | 13.853 | 12.814 | 11.835 | 10.915 | 10.005 | 9.4559  | 8.9169  | 8.4180  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 35     | 29.823 | 27.223 | 25.023 | 21.664 | 19.838 | 18.111 | 16.713 | 15.514 | 14.465 | 13.425 | 12.446 | 11.467 | 10.527 | 9.9562  | 9.4172  | 8.9183  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 36     | 30.603 | 28.003 | 25.803 | 22.273 | 20.449 | 18.722 | 17.324 | 16.325 | 15.076 | 14.036 | 13.057 | 12.078 | 11.138 | 10.5869 | 10.0481 | 9.5492  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 37     | 31.383 | 28.783 | 26.583 | 22.882 | 21.060 | 19.333 | 17.935 | 16.936 | 15.687 | 14.647 | 13.668 | 12.689 | 11.709 | 10.7976 | 10.2592 | 9.7603  | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 38     | 32.163 | 29.563 | 27.363 | 23.491 | 21.671 | 19.944 | 18.546 | 17.547 | 16.298 | 15.258 | 14.279 | 13.299 | 12.320 | 11.4187 | 10.8703 | 10.3708 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 39     | 32.943 | 30.343 | 28.143 | 24.100 | 22.282 | 20.555 | 19.157 | 18.158 | 16.909 | 15.869 | 14.890 | 13.910 | 12.941 | 12.0304 | 11.0814 | 10.4819 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 40     | 33.723 | 31.123 | 28.923 | 24.709 | 22.893 | 21.166 | 19.768 | 18.769 | 17.520 | 16.480 | 15.501 | 14.521 | 13.552 | 12.5811 | 11.2925 | 10.6934 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 41     | 34.503 | 31.903 | 29.703 | 25.318 | 23.504 | 21.777 | 20.379 | 19.380 | 18.131 | 17.091 | 16.112 | 15.132 | 14.163 | 13.2018 | 11.5040 | 10.9049 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 42     | 35.283 | 32.683 | 30.483 | 25.927 | 24.115 | 22.388 | 20.990 | 19.991 | 18.742 | 17.702 | 16.723 | 15.743 | 14.774 | 13.8125 | 11.7155 | 11.1164 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 43     | 36.063 | 33.463 | 31.263 | 26.536 | 24.726 | 22.999 | 21.601 | 20.602 | 19.353 | 18.313 | 17.334 | 16.354 | 15.385 | 14.4232 | 11.9270 | 11.3279 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 44     | 36.843 | 34.243 | 32.043 | 27.145 | 25.337 | 23.610 | 22.212 | 21.213 | 20.004 | 18.924 | 17.945 | 16.966 | 15.997 | 15.0739 | 12.1385 | 11.5394 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 45     | 37.623 | 35.023 | 32.823 | 27.754 | 25.948 | 24.221 | 22.823 | 21.824 | 20.615 | 19.535 | 18.556 | 17.577 | 16.608 | 15.6846 | 12.3500 | 11.7509 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 46     | 38.403 | 35.803 | 33.603 | 28.363 | 26.559 | 24.832 | 23.434 | 22.435 | 21.226 | 20.146 | 19.167 | 18.188 | 17.209 | 16.2953 | 12.5615 | 11.9624 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 47     | 39.183 | 36.583 | 34.383 | 28.972 | 27.170 | 25.443 | 24.045 | 23.045 | 21.837 | 20.757 | 19.778 | 18.799 | 17.820 | 16.9060 | 12.7730 | 12.1739 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 48     | 39.963 | 37.363 | 35.163 | 29.581 | 27.781 | 26.054 | 24.656 | 23.656 | 22.448 | 21.368 | 20.389 | 19.410 | 18.431 | 17.5167 | 12.9845 | 12.3854 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 49     | 40.743 | 38.143 | 35.943 | 30.190 | 28.392 | 26.665 | 25.267 | 24.267 | 23.059 | 22.000 | 21.021 | 20.042 | 19.063 | 18.1074 | 13.1960 | 12.5969 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 50     | 41.523 | 38.923 | 36.723 | 30.799 | 29.003 | 27.276 | 25.878 | 24.878 | 23.670 | 22.611 | 21.632 | 20.653 | 19.674 | 18.7181 | 13.4075 | 12.8084 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 51     | 42.303 | 39.703 | 37.503 | 31.408 | 29.614 | 27.887 | 26.489 | 25.489 | 24.281 | 23.222 | 22.243 | 21.264 | 20.285 | 19.3168 | 13.6190 | 13.0199 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 52     | 43.083 | 40.483 | 38.283 | 32.017 | 30.225 | 28.498 | 27.100 | 26.100 | 24.892 | 23.833 | 22.854 | 21.875 | 20.896 | 19.9275 | 13.8305 | 13.2314 | 4.9981 | 4.1764 | 3.9999 | 3.3333 |
| 53     | 43.863 | 41.263 | 39.063 | 32.626 | 30.836 | 29.109 | 27.711 | 26.711 | 25.504 | 24.445 | 23.466 | 22.487 | 21.508 | 20.5382 | 14.0420 | 13.4429 |        |        |        |        |