



UNIVERSITI KUALA LUMPUR
BUSINESS SCHOOL

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE : **EIB 10603**
COURSE TITLE : **FINANCE 1**
COURSE LEVEL : **BACHELOR**
DATE : **26th MAY 2016**
TIME : **9.00 AM - 12.00 P.M**
DURATION : **3 HOURS**

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consists of FIVE (5) questions. Answer only FOUR (4) questions.
4. Please SHOW ALL YOUR WORKINGS.
5. Please write your answers on the answer booklet provided.
6. All questions must be answered in English (any other language is not allowed).
7. This question paper must not be removed from the examination hall.

**THERE ARE SEVEN (7) PAGES OF QUESTIONS, EXCLUDING THIS PAGE
AND
FOUR (4) PAGES OF ATTACHMENT**

INSTRUCTION: Answer any FOUR (4) questions.

Please use answer booklet provided.

Question 1

Below are the financial statements for Star5 Company:

Profit and Loss Statement for the year Ended 30 December 2014

| | RM |
|-----------------------|-----------------------|
| Sales (60% on credit) | 3,393,000 |
| Cost of Sales | 2,482,000 |
| Gross Profit | <u>911,000</u> |
| General Expenses | 492,000 |
| Depreciation | 147,000 |
| Operating Income | <u>272,000</u> |
| Other Income | 48,000 |
| EBIT | <u>320,000</u> |
| Interest | 75,000 |
| Profit before tax | <u>245,000</u> |
| Corporation Tax | 74,000 |
| Net Profit | <u><u>171,000</u></u> |

Statement of Financial Positions as at 30 December 2014

| Assets | RM | Liabilities | RM |
|---------------------|------------------|-------------------------------------|------------------|
| Stocks | 435,000 | Account Payable | 321,000 |
| Account Receivable | 441,000 | Accruals | 80,000 |
| Prepayments | 90,000 | Short Term Loan | 335,000 |
| Cash | 216,000 | | |
| Plant & Equipment | 2,135,000 | Long Term Loan | 883,000 |
| Less: Depreciation | 810,000 | Ordinary Shares | 100,000 |
| | | Preference Shares | 48,000 |
| | | Capital Reserves | 552,000 |
| | | Retained Earnings | 563,000 |
| Total Assets | 2,882,000 | Total Liabilities and Equity | 2,882,000 |

Industry Average Ratios:

| | | | |
|---------------------------|---------|-----------------------|------|
| Current ratio | 3 x | Debt equity ratio | 50% |
| Inventory turnover | 4 x | Times interest earned | 3x |
| Average collection period | 30 days | Net Profit Margin | 4% |
| Fixed assets turnover | 4 x | Return on equity | 10% |
| Debt ratio | 40% | Price earnings ratio | 25 x |

- a) Given the company market price is RM20 per share and they had issued 200,000 shares, calculate the indicated ratios for Star5 Company.
(10 marks)
- b) Compare and comment the performance of the ratios calculated in (a).
(10 marks)
- c) Explain and illustrate Aggressive Approach in working capital management policy.
(5 marks)

Total: 25 marks

Question 2

Mountain Berhad wishes to know the cash requirement for first quarter of 2016. The actual and forecasted sales are as follows:

| Month | Sales (RM 000) |
|---------------|----------------|
| October 2015 | 2,000 |
| November 2015 | 2,500 |
| December 2015 | 3,200 |
| January 2016 | 2,000 |
| February 2016 | 3,000 |
| March 2016 | 2,500 |
| April 2016 | 3,500 |

- i. Cash sales are 50% of the monthly sales with 60% of the balance are collected one month after the sales and remaining 40% collected two months after sales.
- ii. Purchases of materials are representing 40% of sales and are made one month before sales occur.
- iii. Payment of material are 50% cash and the balance is paid equally in the next two months.
- iv. Other fixed monthly expenses are depreciation RM300, rent RM400, selling & administration RM200 and interest on long term debt of RM100.
- v. The company also plans to acquire a new machine worth RM2,300 in January to increase its operating efficiency. It is agreed that 20% is on cash payment and the balance will be paid in the February and March.
- vi. The ending cash balance in December is RM500 while cash reserve requirement is RM500.

You are required to:

- a) Prepare the cash budget for first quarter of 2016.

(20 marks)

- b) Explain the benefits of preparing a cash budget.

(5 marks)

Total: 25 marks

Question 3

- a) Zawra have deposited RM1,000 today and the bank offers a 7% interest rate per annum. Determine the future values if she plan to save her money for 3 years.
(3 marks)
- b) A Malaysian investor may invest in a property sector, expecting to gain RM54,000 after seven years. Based on a careful study of other investment alternatives, he believes that a 20% annual return compounded quarterly is a reasonable return to earn on this investment. How much should he pay for it today?
(3 marks)
- c) Roslan has invited in a special government bond that provides income on investment of RM100 per annum in perpetuity. Determine the present values of this perpetuity if you are told that the time value of money is 8% per annum.
(3 marks)
- d) Sherry borrow RM100,000 with interest charged 8% per annum. She need to repay RM146,932 after 5 years. Calculate how much interest rate are charged by the lending institution.
(3 marks)
- e) Bakri plan to put aside RM5,000 per year so that he can make a nice down payment on a BMW car in 6 years' time. If he makes the payments at the end of each year and earns 8% on his deposits, how much will he have accumulated at the end of Year 6?
(4 marks)
- f) Dila want to buy a car costing RM40,000 in 5 years. She plan to save her money by making equal saving (monthly) in her bank account, which pays 12% compounded monthly. How much must she deposit each month?
(4 marks)
- g) Differentiate between simple interest and compound interest.
(5 marks)

[Total: 25 marks]

Question 4

Mesra Permai Sdn Bhd needs to raise RM750,000 in short term loan for five months. The company has the following alternatives:

- a) Compute the effective cost of financing for each alternatives.
- i. Forego trade credit with the credit terms of 3/15 net 60. (4 marks)
 - ii. A line of credit of RM950,000 with 5% commitment fee on the unused fund and a 8% stated interest rate. (4 marks)
 - iii. Issue commercial paper with a face value of RM150,000 each at 15% per annum. The issuing cost is RM4,000 per paper. (4 marks)
 - iv. A loan from XYZ Bank at a discounted interest rate of 7% per annum and 12% compensating balance. The present account balance in the company is RM25,000. (4 marks)
- b) Which of the alternatives should Mesra Permai choose? Provide your reasons. (3 marks)
- c) Explain the management of account payable. (6 marks)

[Total: 25 marks]

Question 5

Super 5 Bhd proposes to raise RM20 million funds for business expansion and is seeking your financial advice to determine the firm's cost of long-term financing. The following data are available for the various alternatives of raising funds:

Alternative 1:

The bond price is 8% annual coupon, 30 year maturity of bond, issued 15 years ago is RM950. Corporate tax is 30%. Floatation cost of issuing new bond is 5% of the par value.

Alternative 2:

The current price of its preferred stock is RM95 per share. It pays 10% dividend. Floatation cost of new issue is 5% of its current price.

Alternative 3:

The current price of common stock is RM25 per share. The last dividend paid was RM2.50 per share. Dividends are expected to grow at 6% per year. Floatation cost of issuing new common stock is 5% of the market price.

a) Calculate the cost of capital for following alternatives:

- i. Alternative 1 (4 marks)
- ii. Alternative 2 (3 marks)
- iii. Alternative 3 (3 marks)
- iv. Calculate weighted average cost of capital (WACC) for the project, if the company issues RM10,000,000 bond, RM5,000,000 common stocks and RM5,000,000 preferred stocks. (7 marks)
- v. If the required rate of return (IRR) is 12% should the company accept the project? Provide your reasons. (2 marks)

b) Identify the factors affecting cost of capital.

(6 marks)

[Total: 25 marks]

END OF QUESTION PAPER

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Table 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 | 1.8106 | 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 | 3.6352 | 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 | 1.1953 | 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 | 1.5396 | 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 | 4.8980 | 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 | 31.243 | 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 | 7.9861 | 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 | 5.599 | 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 | 7.2333 | 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 | 190.050 |
| 21 | 1.2324 | 1.5157 | 1.8603 | 2.2788 | 2.7860 | 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 | 13.552 | 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 | 66.272 | 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 | * | * | * |
| 40 | 1.4859 | 2.2080 | 3.2620 | 4.8010 | 7.0400 | 10.286 | 14.974 | 21.725 | 31.409 | 45.259 | 65.001 | 93.051 | 132.782 | 188.884 | 267.864 | 378.724 | 1088.802 | * | * | * |
| 50 | 1.6446 | 2.6916 | 4.3839 | 7.1067 | 11.467 | 18.420 | 29.457 | 46.902 | 74.358 | 117.391 | 184.555 | 289.002 | 450.736 | 700.233 | * | * | * | * | * | * |

Table2 PresentValueInterestFactorsforOneDollarDiscounted atkPercentformrPeriods:PVIF_{k,n} = 1/(1+r)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 | 0.8980 | 0.8535 | 0.8131 | 0.7759 | 0.7402 | 0.7050 | 0.6693 | 0.6302 | 0.5963 | 0.5645 | 0.5066 | 0.4803 | 0.4556 | 0.4323 | 0.4104 | 0.3349 | 0.2751 | 0.2621 | 0.2072 |
| 7 | 0.9327 | 0.8906 | 0.8455 | 0.8056 | 0.7684 | 0.7324 | 0.6963 | 0.6592 | 0.6222 | 0.5855 | 0.5513 | 0.4523 | 0.4251 | 0.3996 | 0.3759 | 0.3538 | 0.2791 | 0.2218 | 0.2097 | 0.1594 |
| 8 | 0.9235 | 0.8835 | 0.8375 | 0.7973 | 0.7602 | 0.7234 | 0.6863 | 0.6483 | 0.6103 | 0.5735 | 0.5385 | 0.4039 | 0.3762 | 0.3506 | 0.3269 | 0.3050 | 0.2326 | 0.1789 | 0.1678 | 0.1226 |
| 9 | 0.9143 | 0.8768 | 0.8298 | 0.7893 | 0.7512 | 0.7134 | 0.6754 | 0.6364 | 0.5974 | 0.5594 | 0.5243 | 0.3606 | 0.3329 | 0.3075 | 0.2843 | 0.2630 | 0.1938 | 0.1443 | 0.1342 | 0.0943 |
| 10 | 0.9053 | 0.8703 | 0.8224 | 0.7815 | 0.7424 | 0.7034 | 0.6643 | 0.6252 | 0.5861 | 0.5470 | 0.5132 | 0.2875 | 0.2607 | 0.2366 | 0.2149 | 0.1954 | 0.1346 | 0.0938 | 0.0859 | 0.0558 |
| 11 | 0.8963 | 0.8635 | 0.8146 | 0.7733 | 0.7334 | 0.6934 | 0.6534 | 0.6134 | 0.5734 | 0.5334 | 0.4934 | 0.2567 | 0.2307 | 0.2076 | 0.1869 | 0.1685 | 0.1122 | 0.0757 | 0.0687 | 0.0429 |
| 12 | 0.8874 | 0.8568 | 0.8069 | 0.7652 | 0.7244 | 0.6834 | 0.6424 | 0.6014 | 0.5604 | 0.5194 | 0.4784 | 0.2292 | 0.2042 | 0.1821 | 0.1625 | 0.1452 | 0.0935 | 0.0610 | 0.0550 | 0.0330 |
| 13 | 0.8787 | 0.8498 | 0.7999 | 0.7579 | 0.7164 | 0.6744 | 0.6324 | 0.5904 | 0.5484 | 0.5064 | 0.4644 | 0.2046 | 0.1807 | 0.1597 | 0.1413 | 0.1252 | 0.0779 | 0.0492 | 0.0440 | 0.0254 |
| 14 | 0.8700 | 0.8428 | 0.7929 | 0.7506 | 0.7084 | 0.6664 | 0.6244 | 0.5824 | 0.5404 | 0.4984 | 0.4564 | 0.1827 | 0.1599 | 0.1401 | 0.1229 | 0.1079 | 0.0649 | 0.0397 | 0.0352 | 0.0195 |
| 15 | 0.8613 | 0.8358 | 0.7859 | 0.7433 | 0.7004 | 0.6584 | 0.6164 | 0.5744 | 0.5324 | 0.4904 | 0.4484 | 0.1631 | 0.1415 | 0.1229 | 0.1069 | 0.0930 | 0.0541 | 0.0320 | 0.0281 | 0.0150 |
| 16 | 0.8528 | 0.8288 | 0.7789 | 0.7359 | 0.6924 | 0.6494 | 0.6064 | 0.5634 | 0.5204 | 0.4774 | 0.4344 | 0.1456 | 0.1252 | 0.1078 | 0.0929 | 0.0802 | 0.0451 | 0.0258 | 0.0225 | 0.0116 |
| 17 | 0.8444 | 0.8218 | 0.7719 | 0.7286 | 0.6844 | 0.6404 | 0.5964 | 0.5524 | 0.5084 | 0.4644 | 0.4204 | 0.1300 | 0.1108 | 0.0946 | 0.0808 | 0.0691 | 0.0376 | 0.0208 | 0.0180 | 0.0089 |
| 18 | 0.8360 | 0.8148 | 0.7649 | 0.7213 | 0.6764 | 0.6324 | 0.5884 | 0.5444 | 0.5004 | 0.4564 | 0.4124 | 0.1161 | 0.0981 | 0.0829 | 0.0703 | 0.0596 | 0.0313 | 0.0168 | 0.0144 | 0.0068 |
| 19 | 0.8277 | 0.8078 | 0.7579 | 0.7139 | 0.6684 | 0.6234 | 0.5784 | 0.5334 | 0.4884 | 0.4434 | 0.3984 | 0.1037 | 0.0868 | 0.0728 | 0.0611 | 0.0514 | 0.0261 | 0.0135 | 0.0115 | 0.0053 |
| 20 | 0.8195 | 0.7998 | 0.7499 | 0.7056 | 0.6594 | 0.6134 | 0.5674 | 0.5214 | 0.4754 | 0.4294 | 0.3834 | 0.0926 | 0.0768 | 0.0638 | 0.0531 | 0.0443 | 0.0217 | 0.0109 | 0.0092 | 0.0040 |
| 21 | 0.8114 | 0.7928 | 0.7429 | 0.6983 | 0.6514 | 0.6044 | 0.5574 | 0.5104 | 0.4634 | 0.4164 | 0.3694 | 0.0826 | 0.0680 | 0.0560 | 0.0462 | 0.0382 | 0.0181 | 0.0088 | 0.0074 | 0.0031 |
| 22 | 0.8034 | 0.7858 | 0.7359 | 0.6911 | 0.6434 | 0.5964 | 0.5494 | 0.5024 | 0.4554 | 0.4084 | 0.3614 | 0.0738 | 0.0601 | 0.0491 | 0.0402 | 0.0329 | 0.0151 | 0.0071 | 0.0059 | 0.0024 |
| 23 | 0.7954 | 0.7788 | 0.7289 | 0.6839 | 0.6364 | 0.5894 | 0.5424 | 0.4954 | 0.4484 | 0.4014 | 0.3544 | 0.0659 | 0.0532 | 0.0431 | 0.0349 | 0.0284 | 0.0126 | 0.0057 | 0.0047 | 0.0018 |
| 24 | 0.7876 | 0.7718 | 0.7219 | 0.6766 | 0.6294 | 0.5824 | 0.5354 | 0.4884 | 0.4414 | 0.3944 | 0.3474 | 0.0588 | 0.0471 | 0.0378 | 0.0304 | 0.0245 | 0.0105 | 0.0046 | 0.0038 | 0.0014 |
| 25 | 0.7798 | 0.7648 | 0.7149 | 0.6693 | 0.6214 | 0.5744 | 0.5274 | 0.4804 | 0.4334 | 0.3864 | 0.3394 | 0.0534 | 0.0426 | 0.0334 | 0.0266 | 0.0216 | 0.0042 | 0.0016 | 0.0012 | * |
| 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 | 0.0356 | 0.0259 | 0.0189 | 0.0139 | 0.0102 | 0.0075 | 0.0055 | 0.0017 | 0.0005 | * | * |
| 36 | 0.6989 | 0.4902 | 0.3450 | 0.2437 | 0.1727 | 0.1227 | 0.0875 | 0.0626 | 0.0449 | 0.0323 | 0.0234 | 0.0169 | 0.0123 | 0.0089 | 0.0065 | 0.0048 | 0.0014 | * | * | * |
| 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 | 0.0002 | * | * | * |

Table 3 Future Value Interest Factors for a One-Dollar Annuity Compounded at k Percent for n Periods: $FVIFA_{k,n} = \frac{1}{k} [(1+k)^n - 1]$

| 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 | 2.0200 | 2.0300 | 2.0400 | 2.0500 | 2.0600 | 2.0700 | 2.0800 | 2.0900 | 2.1000 | 2.1100 | 2.1200 | 2.1300 | 2.1400 | 2.1500 | 2.1600 | 2.2000 | 2.2400 | 2.2500 | 2.3000 |
| 3 | 3.0301 | 3.0604 | 3.0909 | 3.1216 | 3.1525 | 3.1836 | 3.2149 | 3.2464 | 3.2781 | 3.3100 | 3.3421 | 3.3744 | 3.4069 | 3.4396 | 3.4725 | 3.5056 | 3.6400 | 3.7776 | 3.8125 | 3.9900 |
| 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 | 5.3680 | 5.6842 | 5.7656 | 6.1870 |
| 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 | 7.4416 | 8.0484 | 8.2070 | 9.0431 |
| 6 | 6.1520 | 6.3087 | 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 | 9.9299 | 10.980 | 11.259 | 12.756 |
| 7 | 7.2135 | 7.4343 | 7.6625 | 7.8983 | 8.1420 | 8.3938 | 8.6540 | 8.9228 | 9.2004 | 9.4872 | 9.7833 | 10.089 | 10.405 | 10.730 | 11.067 | 11.414 | 12.916 | 14.615 | 15.073 | 17.583 |
| 8 | 8.2857 | 8.5830 | 8.8928 | 9.2142 | 9.5491 | 9.8975 | 10.260 | 10.637 | 11.028 | 11.436 | 11.859 | 12.300 | 12.757 | 13.233 | 13.727 | 14.240 | 16.499 | 19.123 | 19.842 | 23.858 |
| 9 | 9.3685 | 9.7546 | 10.159 | 10.583 | 11.027 | 11.491 | 11.978 | 12.488 | 13.021 | 13.579 | 14.164 | 14.776 | 15.416 | 16.085 | 16.786 | 17.519 | 20.799 | 24.712 | 25.802 | 32.015 |
| 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 | 25.959 | 31.643 | 33.253 | 42.619 |
| 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 | 32.150 | 40.238 | 42.566 | 56.405 |
| 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 | 39.581 | 50.895 | 54.208 | 74.327 |
| 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 | 48.497 | 64.110 | 68.760 | 97.625 |
| 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 | 59.196 | 80.496 | 86.949 | 127.913 |
| 15 | 16.097 | 17.293 | 18.599 | 20.024 | 21.579 | 23.276 | 25.129 | 27.159 | 29.361 | 31.772 | 34.405 | 37.280 | 40.417 | 43.842 | 47.580 | 51.660 | 72.035 | 100.815 | 109.687 | 167.286 |
| 16 | 17.258 | 18.639 | 20.157 | 21.825 | 23.657 | 25.673 | 27.888 | 30.324 | 32.903 | 35.950 | 39.190 | 42.753 | 46.672 | 50.980 | 55.717 | 60.925 | 87.442 | 126.011 | 138.109 | 218.472 |
| 17 | 18.430 | 20.012 | 21.762 | 23.698 | 25.840 | 28.213 | 30.840 | 33.750 | 36.941 | 40.545 | 44.501 | 48.884 | 53.739 | 59.118 | 65.075 | 71.673 | 105.931 | 157.253 | 173.636 | 285.014 |
| 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 | 128.117 | 195.994 | 218.045 | 371.518 |
| 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 | 154.740 | 244.033 | 273.556 | 483.973 |
| 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 | 186.688 | 303.601 | 342.945 | 630.165 |
| 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 | 225.026 | 377.465 | 429.681 | 820.215 |
| 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 | 271.031 | 469.056 | 538.101 | * |
| 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 | 326.237 | 582.630 | 673.626 | * |
| 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 | 392.484 | 723.461 | 843.033 | * |
| 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 | 471.981 | 898.092 | * | * |
| 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 | * | * | * | * |
| 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 | * | * | * | * | * |
| 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 | * | * | * | * | * | * |
| 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 | * | * | * | * | * | * | * | * |
| 50 | 64.463 | 84.579 | 112.797 | 152.667 | 209.348 | 290.336 | 406.529 | 573.770 | 815.034 | * | * | * | * | * | * | * | * | * | * | * |

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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 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 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 | 2.1665 | 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 | 2.3654 | 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 | 2.4356 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7655 | 4.6229 | 4.4859 | 4.3533 | 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 | 6.7371 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 | 5.3349 | 5.1461 | 4.9676 | 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 | 9.3851 | 8.8633 | 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 | 11.118 | 10.380 | 9.7122 | 9.1079 | 8.5595 | 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 | 3.2832 |
| 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 | 3.2948 |
| 18 | 16.398 | 14.992 | 13.754 | 12.659 | 11.690 | 10.828 | 10.059 | 9.3719 | 8.7556 | 8.2014 | 7.7016 | 7.2497 | 6.8399 | 6.4674 | 6.1280 | 5.8178 | 4.8122 | 4.0799 | 3.9279 | 3.3037 |
| 19 | 17.226 | 15.678 | 14.324 | 13.134 | 12.085 | 11.158 | 10.336 | 9.6036 | 8.9501 | 8.3648 | 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 | 8.0721 | 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 | 9.5802 | 8.8832 | 8.2664 | 7.7184 | 7.2297 | 6.7921 | 6.3988 | 6.0442 | 4.9245 | 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 |
| 30 | 25.808 | 22.396 | 19.600 | 17.292 | 15.372 | 13.765 | 12.409 | 11.258 | 10.274 | 9.4269 | 8.6938 | 8.0552 | 7.4957 | 7.0027 | 6.5660 | 6.1772 | 4.9789 | 4.1601 | 3.9950 | 3.3321 |
| 35 | 29.409 | 24.999 | 21.487 | 18.665 | 16.374 | 14.498 | 12.948 | 11.655 | 10.567 | 9.6442 | 8.8552 | 8.1755 | 7.5856 | 7.0700 | 6.6166 | 6.2153 | 4.9915 | 4.1644 | 3.9984 | 3.3330 |
| 36 | 30.108 | 25.489 | 21.832 | 18.908 | 16.547 | 14.621 | 13.035 | 11.717 | 10.612 | 9.6765 | 8.8786 | 8.1924 | 7.5979 | 7.0790 | 6.6231 | 6.2201 | 4.9929 | 4.1649 | 3.9987 | 3.3331 |
| 40 | 32.835 | 27.355 | 23.115 | 19.793 | 17.159 | 15.046 | 13.332 | 11.925 | 10.757 | 9.7791 | 8.9511 | 8.2438 | 7.6344 | 7.1050 | 6.6418 | 6.2395 | 4.9966 | 4.1659 | 3.9995 | 3.3332 |
| 50 | 39.196 | 31.424 | 25.730 | 21.482 | 18.256 | 15.762 | 13.801 | 12.233 | 10.962 | 9.9148 | 9.0417 | 8.3045 | 7.6752 | 7.1327 | 6.6605 | 6.2463 | 4.9995 | 4.1666 | 3.9999 | 3.3333 |

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