

Practice problems for Chapter 2

1. You have VND 100 mil, and intend to save the money in a term-deposit account in 5 years. The bank offered you an interest rate of 14% per annum. How much money will you get back next 5 years? If:
 - a. The bank uses the simple interest.
 - b. The bank uses the compound interest.
2. You invest in a project with an initial investment of \$200, and hope to earn \$300 in 3 years. What is your required rate of return?
3. Your term deposit account has a quoted interest of 12%, the term is 1 month. How much money will you have in 3 years if now you put VND 100 mil into your account?
4. You take out a loan at an APR of 12% with monthly compounding. What is the effective annual rate on your loan?
5. A bank quotes a rate of 5.89% with an effective annual interest rate of 6.05%. Does the bank use annual, quarterly, or monthly compounding?
6. Like question 4 but what is the effective annual rate on your loan if the loan is continuous compounding?
7. Compute the present value of a \$100 cash flow for the following combinations of discount rates and times:
 - a. $r = 8\%$, $t = 10$ years;
 - b. $r = 8\%$, $t = 20$ years;
 - c. $i = 4\%$, $t = 10$ years;
 - d. $i = 4\%$, $t = 20$ years;
8. Compute the future value of a \$100 cash flow for the same combinations of the rates and times as in question 7.
9. You deposit \$1000 in your bank account. If the bank pays 4% simple interest, how much will you accumulate in your account after 10 years? What if the bank pays compound interest? How much of your earning will be interest on interest?
10. You will require \$700 in 5 years. If you earn 5% interest on your funds, how much will you need to invest today in order to reach your savings goal?
11. Find the interest rate implied by the following combinations of present and future values:

Present value	Years	Future value
\$400	11	\$684
183	4	249
300	7	300

12. Would you rather receive \$1,000 a year for 10 years or \$800 a year for 15 years if
- The interest rate is 5%
 - The interest rate is 15%

Why do answers to (a) and (b) differ?

13. What is the present value of the following cash-flow stream if the interest rate is 6%?

Year	Cash flow
1	\$200
2	400
3	300

14. How long will it take for \$400 to grow to \$1,000 at the interest rate specified?
- 4%
 - 8%
 - 16%
15. If you earn 6% per year on your bank account, how long will it take an account with \$100 to double to \$200?
16. Annuity values
- What is the present value of a 3-year annuity of \$100 if the discount rate is 6%?
 - What is the present value of the annuity in (a) if you have to wait 2 years instead of 1 year for the first payment?
17. Professor's Annuity Corp. offers a lifetime annuity to retiring professors. For a payment of \$80,000 at age 65, the firm will pay the retiring professor \$600 a month until death.
- If the professor's remaining life expectancy is 20 years, what is the monthly rate on this annuity? What is the effective annual rate?
 - If the monthly interest rate is 5%, what monthly annuity payment can the firm offer to the retiring professor?
18. A store offers two payment plans. Under the installment plan, you pay 25% down and 25% of the purchase price in each of the next 3 years. If you pay the entire bill immediately, you can take a 10% discount from the purchase price. Which is a better deal if you can borrow or lend funds at a 5% interest rate?
19. Suppose that you will receive annual payments of \$10,000 for a period of 10 years. The first payment will be made 4 years from now. If the interest rate is 5%, what is the present value of this stream of payments?
20. How much will \$100 grow to if invested at a continuously compounded interest rate of 10% for 8 years? What if it is invested for 10 years at 8%?
21. Now I have \$20,000 in the bank earning interest of 0.5% per month. I need \$30,000 to make a down payment on a house. I can save an additional \$100 per month. How long will it take me to accumulate the \$30,000?

22. A local bank advertises the following deal: “Pay us \$100 a year for 10 years and then we will pay you (or your beneficiaries) \$100 a year forever”. Is this a good deal if the interest rate available on other deposit is 6%?
23. A local bank will pay you \$100 a year for your lifetime if you deposit \$2,500 in the bank today. If you plan to live forever, what interest rate is the bank paying?

24. There are two projects with the following cash flows:

Year	Project A	Project B
0	-\$200	-\$200
1	80	100
2	80	100
3	80	100
4	80	

- If the opportunity cost of capital is 11%, which of these projects is worth pursuing?
 - Suppose that you can choose only one of these projects. Which would you choose? The discount rate is still 11%.
 - Which project would you choose if the opportunity cost of capital were 16%?
 - What are the internal rates of return on project A and B?
 - In light of your answers to question b-d, is there any reason to believe that the project with the higher IRR is the better project?
 - If the opportunity cost of capital is 11%, what is the profitability index for each project? Does the profitability index rank the project correctly?
25. A project that costs \$3,000 to install will provide annual cash flows of \$800 for each of the next 6 years. Is this project worth pursuing if the discount rate is 10%? How high can the discount rate be before you could reject the project?
26. A proposed nuclear power plant will cost \$2.2 billion to build and then will produce cash flows of \$300 million a year for 15 years. After that period (in year 15), it must be decommissioned at a cost of \$900 million. What is project NPV if the discount rate is 5%? What if it is 18%?

Answers:

1. a: VND170 mil, b: VND192.54 mil
2. 14.47%
3. VND143.076mil
4. 12.68%
5. monthly
6. 12.75%

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