

Time-Value-Money

Problems

To answer the questions, use [Chapter 1 Problem Spreadsheet – Template.xls](#)

PART A

- 1.1. What is the future value of \$2,000 after 2 years if the interest rate is 10% compounded annually?
- 1.2. Suppose your grandfather deposited \$1,000 at 5% interest into a savings account 100 years ago. How much would the investment be worth today?
- 1.3. A company just reported revenues of \$100 million. If revenues increase 5%, how much revenue will the company report 10 years from now (two decimals)?
- 1.4. You borrow \$40,000 in student loans your freshman year, at an annual interest rate of 4% per year. If you don't service the debt while you are attending college, and start paying back the loan the day you graduate, how much money do you owe 4 years later?
- 1.5. If the stock price of Facebook is \$200 and it is expected to have an 8% return per year, how much will it be worth in 3 years?
- 1.6. What is the PV of \$100 due in 5 years, if the discount rate is 5%?
- 1.7. How much money must you invest in an account that earns 10% today if you want to have \$10,000 in 5 years?
- 1.8. How much money must you invest today if you can earn 10% and you would like to have \$100,000 in 10 years?
- 1.9. Suppose you buy Facebook stock for \$180 and sell it for \$220 at the end of the year. How much gain did you earn in \$ amount and in rate percentage?
- 1.10. You are looking at an investment that will pay \$10,000 in 5 years if you invest \$6,000 today. What is the rate of return of this investment?
- 1.11. Suppose you buy a home for \$400,000 and sell it 5 years later for \$500,000. What yearly interest rate did you earn?
- 1.12. If you buy a stock for \$65 and sell it for \$70 one year later, what yearly interest rate did you earn?
- 1.13. You buy a stock for \$30, which you expect to grow at a rate of 7% each year. How long will it be before the stock is worth \$60?
- 1.14. If you can earn 10% annual interest, how long does it take for your investment to double?
- 1.15. How much will an ordinary annuity be worth in 3 years, if it pays \$100 per year and earns 10% annual interest?

- 1.16. You decide that, starting when you are 20 years old, you will save \$5 a day for retirement. At the end of the year, you invest the accumulated savings (\$1,825) in a brokerage account with an expected annual return of 8%. If you continue the practice every year until you are 65, how much money will you have?
- 1.17. If you would like to have \$120,000 in your child's college account in 18 years and you can earn 5% per year, how much must you invest each year?
- 1.18. How much money do you need to save each year to be a millionaire by the time you are 65 if you can earn an interest rate of 8% and you start saving when you are a) 45 years old, b) 30 years old, c) 20 years old, d) when you are born
- 1.19. What interest rate must you earn to have \$500,000 in a savings account in 20 years if you contribute \$2,500 per year?
- 1.20. How large a mortgage can you get if you can afford payments of \$24,000 per year for the next 30 years and the interest rate is 3.5%?
- 1.21. After you retire, you want to withdraw \$80,000 a year from your savings account, which earns 5% annual interest for 25 years. How much money do you need in your savings account when you retire?
- 1.22. At retirement you have \$750,000 in your savings account. You intend to withdraw \$65,000 per year. What interest rate must you earn to make your money last for the next 30 years?