Chapter 1: Risk-and-Return Analysis

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 and profits of $100 million and $10 million, respectively. If revenues increase 5% and profits increase 10% each year, how much revenue will the company report 10 years from now (two decimals)?

1.4. A company just reported revenues and profits of $100 million and $10 million, respectively. If revenues increase 5% and profits increase 10% each year, how much profit will the company report 10 years from now (two decimals)?

1.5. 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?

1.6. 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?

1.7. What is the PV of $100 due in 5 years, if the discount rate is 5%?

1.8. How much money must you invest in an account that earns 10% today if you want to have $10,000 in 5 years?

1.9. How much money must you invest today if you can earn 10% and you would like to have $100,000 in 10 years?

1.10.   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 (two decimals).

1.11.   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 rate (percentage and tow decimals)

1.12.   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?

1.13.   Suppose you buy a home for $400,000 and sell it 5 years later for $500,000. What yearly interest rate did you earn?

1.14.   If you buy a stock for $65 and sell it for $70 one year later, what yearly interest rate did you earn?

1.15.   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?

1.16.   If you can earn 10% annual interest, how long does it take for your investment to double?

1.17.   How much will an ordinary annuity be worth in 3 years, if it pays $100 per year and earns 10% annual interest?

1.18.   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?

1.19.   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?

1.20.   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 45 years old.

1.21.   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 30 years old.

1.22.   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 when you are 20 years (two decimals).

1.23.   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 when you were born (two decimals).

1.24.   What interest rate must you earn to have $500,000 in a savings account in 20 years if you contribute $2,500 per year?

1.25.   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%?

1.26.   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?

1.27.   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?

PART B

Given the following portfolio of historical returns,

Year	Rate of Return %
1	11.0
2	12.0
3	−6.0
4	−5.0
5	6.0
6	2.0
7	5.0

1. calculate the average historical return

2. standard deviation

Given the following historical stock information

Year	Stock Price
1	110
2	121
3	105
4	140
5	165
6	135
7	145

3. the average historical return

4. the standard deviation (use % and two decimals):

Given the following historical stock and dividend information

Year	Stock Price	Dividends
1	100	3.50
2	115	4.10
3	95	4.10

4	110	4.10
5	125	4.60
6	120	5.00
7	140	5.20

5. the average historical return

6. standard deviation (use percentage and two decimals)

Given the following scenario analysis:

Economic Scenario	Probability %	Rate of Return %
Recession	25	−10
Normal	50	12
Boom	25	25

7. the average historical return

8. standard deviation

Given the following scenario analysis of a single company that pays dividends. Please assume that the current stock price is $30:

Economic Scenario	Probability %	Average Stock Price $	Average Dividends $
Recession	20	25	1.00
Normal	50	36	2.40
Boom	30	56	3.00

9. average historical return

10. standard deviation