PRACTICE EXERCISES LECTURE 2

Q1. **Suppose your employer offers you a choice between a $5,700 cash bonus and 120 shares of the company stock. Whichever one you choose will be awarded today. The stock is currently trading for $58 per share. Suppose that if you receive the stock bonus, you are free to trade it. Which form of the bonus should you choose? What is its value?**

Q2. **An American Depositary Receipt (ADR) is security issued by a U.S. bank and traded on a U.S. stock exchange that represents a specific number of shares of a foreign stock. For example, Nokia Corporation trades as an ADR with symbol NOK on the NYSE. Each ADR represents one share of Nokia Corporation stock, which trades with symbol NOK1V on the Helsinki stock exchange. If the U.S. ADR for Nokia (NOK) is trading for $5.76 per share, and Nokia stock is trading on the Helsinki exchange (NOKIV) for €5.24 per share, use the Law of One Price to determine the current $/€ exchange rate. Round the exchange rate to four decimal places (e.g. 1.2349987 should be rounded to 1.2345)**

Q3. **Suppose a security with a risk-free cash flow of $154 in one year trades for $137 today. If there are no arbitrage opportunities, what is the current risk-free interest rate? Round the answer to two decimal places.**

Q4. **Your buddy in mechanical engineering has invented a money machine. The machine can be built immediately, but it will cost $9,000 to build. The main drawback of the machine is that it is too slow. It takes one year to manufacture $900. However, once built, the machine will last forever and will require no maintenance. Your buddy wants to know if he should invest the money to construct it. (Round the answers to two decimal places)**
a. If the interest rate is 9.5% per year, what should your buddy do? What is the NPV?
b. If the machine takes one year to build, what is the NPV and should your buddy build the machine?

Q5. **A rich relative has bequeathed you a growing perpetuity. The first payment will occur in one year and will be $2,000. Each year after that, on the anniversary of the last payment you will receive a payment that is 8% larger than the last payment. This pattern of payments will go on forever. If the interest rate is 15% per year (Round the answers to two decimal places):**
a. What is today's value of the bequest?
b. What is the value of the bequest immediately after the first payment is made?

Q6. **You are thinking of building a new machine that will save you $4,000 in the first year. The machine will then begin to wear out so that the savings *decline* at a rate of 4% per year forever. What is the present value of the savings if the interest rate is 10% per year? (Round the answers to two decimal places).**

Q7. **You are thinking of buying a house. The house costs $250,000. You have $36,000 in cash that you can use as a down payment on the house, but you need to borrow the rest of the purchase price. The bank is offering a 30-year mortgage that requires annual payments and has an interest rate of 5% per year. What will your annual payment be if you sign up for this mortgage?**

Q8. **You are running a hot Internet company. Your company has just announced earnings of $5 million. Analysts predict that its earnings will grow at 40% per year for the next five years. After that, as competition increases, earnings growth is expected to slow to 3% per year and continue at that level forever. What is the present value of all future earnings if the interest rate is 7%? (Assume all cash flows occur at the end of the year). (Round the end result to two decimal places)**

Q9. **Which do you prefer: a bank account that pays 6% per year for three years or an account that pays 9% every 18 months for three years?**

Q10. **In 1975, interest rates were 7.98% and the rate of inflation was 12.26% in the United States. What was the real interest rate in 1975? How would the purchasing power of your savings have changed over the year?**

Q11. **You are considering investing in a start-up company. The founder asked you for $290,000 today and you expect to get $1,070,000 in eight years. Given the riskiness of the investment opportunity, your cost of capital is 21%.**

a. **What is the NPV of the investment opportunity? Should you undertake the investment opportunity?**

b. **Calculate the IRR and use it to determine the maximum deviation allowable in the cost of capital estimate to leave the decision unchanged.**

Q12. Natasha's Flowers, a local florist, purchases fresh flowers each day at the local flower market. Natasha, the owner, has a budget of $970 per day to spend. Different flowers have different profit margins, and also a maximum amount the shop can sell. Based on past experience the shop has estimated the following NPV of purchasing each type:

	NPV per bunch	Cost per bunch	Max. bunches
Roses	$2.00	$15.00	25
Lilies	$9.00	$24.00	10
Pansies	$6.00	$31.00	10
Orchids	$20.00	$84.00	5

What combination of flowers should Natasha purchase each day?

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