MBA 803 – FUNDAMENTALS OF FINANCE

Time Value of Money Practice Problems

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Note: Some of the problems below came from *Corporate Finance*, 6th edition by Ross, Westerfield, and Jaffee.

In solving the following problems, I strongly encourage you to write out time lines to keep the cash flows straight. In addition, you may find it useful to use the mathematical formulae to help you understand the intuition behind the problems.

1) Calculate the following future values and answer the associated questions:
   a) Compute the future value of $500 compounded annually for 6 years at 5 percent.
   b) Compute the future value of $500 compounded annually for 12 years at 5 percent.
   c) Why is the interest earned in part *b* not twice the interest earned in part *a*?
   d) Compute the future value of $500 compounded *quarterly* for 6 years at 5 percent.
   e) Explain briefly the difference between your answers for parts *a* and *d*.
2) Calculate the present values of the following cash flows assuming a 12 percent discount rate, compounded annually:
   a) $1,000 to be received in five years.
   b) $45,000 to be received in three years.
   c) $14,000 to be received in twelve years.
3) Would you rather receive $4,000 today or $5,000 five years from now if your discount rate is 6 percent?
4) How long will it take for a $3,000 investment to grow to $10,000 if invested at 5 percent interest
   a) compounded annually?
   b) compounded quarterly?
5) What annual interest rate would you have to earn to provide the same return as an account that paid 4 percent interest compounded quarterly?
6) You have been offered an investment that will pay you $500 per month for the next ten years. This investment will cost you $30,000 to undertake.
   a) If your required rate of return is 12 percent (compounded monthly), should you make this investment?
   b) At this discount rate, what is the most you would be willing to pay for this investment?

7) You want to lease a car for three years. The original value of the car is $30,000 and at the end of three years you expect it to be worth $10,000. If the required interest rate is 6.50 percent (compounded monthly), how large will your monthly lease payment be?

8) What is the present value of a bond that promises to pay $100 per year forever into the future if your discount rate is 15 percent, compounded annually?

9) Consider a stock that will begin paying annual dividends three years from today. Its initial dividend is expected to be $2 per share, and this divided is expected to grow by 4 percent per year forever into the future. What is the value of this stock if your discount rate is 13 percent?

10) You would like to make monthly payments into a savings account to fund a three-year trip around the world that you plan to take in five years. You will need $40,000 per year to make this trip, which you expect to withdraw on a quarterly basis over the three year trip (12 withdrawals of $10,000 each). Your savings account pays 7.50 percent interest, compounded monthly. Your payments will be made at the end of each month, while your withdrawals during the trip will occur at the beginning of each quarter. How large must your monthly payments be to achieve your goal?

11) When Marilyn Monroe died, ex-husband Joe-DiMaggio vowed to place fresh flowers on her grave every Sunday as long as he lived. A bunch of fresh flowers that the former baseball player thought appropriate for the star cost about $5 when she died in 1962. Based on actuarial tables, "Jolton' Joe" could expect to live for 30 years after the actress died. Assume that the stated annual interest rate, compounded weekly, is 10.4 percent. Also, assume that the rate of inflation is 3.9 percent per year, when expressed as a stated annual inflation rate, compounded weekly. Assuming that each year has exactly 52 weeks, what is the present value of this commitment?