Lesson 2: Stated Annual Interest Rates, Compounding Frequency, Effective Annual Rates and Illustrations of TVM Problems

Example 2-1: Compute the FV after 5 years of $5,000 invested at 13% assuming quarterly compounding.

Example 2-2: Calculate the FV after 3 years of an investment of $5,000 at an interest rate of 7% assuming continuous compounding.

Example 2-3: Calculate the PV of a payment of $7,000 that will be received after 9 years if the interest rate is 6% compounded monthly.

Continuous Compounding and Present Value

Example 2-4: Calculate the PV of a payment of $7,000 that will be received after 9 years if the interest rate is 5% compounded continuously.

Calculate the PV of $100 to be received in one year using different compounding frequencies.

Example 2-5: **Loan Payment Calculations with Annual Payments**

A company borrows $75,000 at a rate of 10%. The loan will be paid off in three equal end-of-year instalments. Calculate the amount of the annual payment.

Example 2-6: Loan Payment Calculations with Monthly Payments

A company borrows $75,000 at a rate of 10%. The loan will be paid off through equal monthly instalments over three years. Calculate the monthly payment required to pay off the loan.

Example 2-7: Constructing and Amortization Schedule

Ben Company borrows $25,000 at an interest rate of 7%. The amount will be paid back in semiannual instalments over 14 years. Calculate the outstanding balance of the loan after the second payment is made.

Example 2-10: Computing the Number of Periods in an Annuity

Jack needs to accumulate at least $1,000 with annual deposits of $80 into his bank account. If the annual interest rate is 10%, how many end-of-year payments are required?

Example 2-13: **Computing the Discount Rate for an Annuity**

What rate of return will we earn on an ordinary annuity that requires a $900 deposit today and promises to pay $150 at the end of every year for the next 10 years?

Example 2-14: **Computing the Required Payment to Fund an Annuity Due**

Suppose we have to make 5 annual payments of $1,500 starting at the beginning of Year 5. To accumulate the money to meet these obligations, we want to make 4 equal annual deposits beginning at the end of Year 1. Assuming a 12% rate of return, what amount must be deposited for 4 years to satisfy the eventual payment obligations?

Example 2-15: Funding a Retirement Plan

Assume that 20-year old Janet wants to retire in 40 years at the age of 60. She expects to earn 10% on deposits prior to retirement and 8% thereafter. How much must she deposit at the end of each of the next 40 years in order to be able to withdraw $15,000 every year at the beginning of each year for 30 years from the age of 60 to 90?

Example 2-16: **Additivity Principle**

Robin will make the following payments in the next 4 years: $150, $500, $150 and $150. Calculate the PV of the cash flows using the concept of present value of an annuity assuming that the discount rate equals 8%.