MATH 134 – Calculus with Fundamentals 2
Practice Days on "Time Value of Money" Concepts
April 24 and 26, 2018

Background

Refer to the formulas on the second sheet as needed.

(A) Mary deposits $3000 in an interest-bearing checking account but never writes any checks on it. What will be the balance in the account after 8 years if the nominal annual interest rate is 1.1% and the compounding is done

   (a) monthly

   (b) continuously

   (c) daily (*Don't* ignore leap years now. How many of them are there in an 8 year period? Is it always the same number?)

   (d) What is the effective annual interest rate in each case?

(B) How much would new parents have to set aside in one lump sum at the birth of a child in order to have $60000 on hand for the first year tuition bill when the child turns 18 years old and goes off to college? Assume they can realize a return of 7% per year compounded continuously on the investment instrument they choose.

(C) In the situation of question (B), suppose the parents make payments of $350 per month into an investment account earning 7% per year every month between the birth of the child and when the child turns 18. How much money will be in the account at that time?

(D) You are a lender making small business loans.

   (1) A potential customer comes to you and asks for a loan of $50000 to be repaid by a stream of monthly payments over 4 years. If you *didn't* make the loan you could invest the $50000 at a 5% annual interest rate for four years. So you need to consider the future value of $50000 at 5% to think about how to set up the loan. What is that future value?

(2) How should you set the monthly payment on a loan to make the future value of the income stream consisting of monthly payments over 4 years equal to the future value of the $50000?

(3) You write a check for $50000 to the borrower at the start of the loan and then collect the payments for 4 years. At the end of the four years, how much money have you made on the deal? Be sure to explain how you are thinking about this.