Fixed Income

Excel Problem Set 3 *Due: Wednesday, November 10, 2021, 17:00 Arizona time*

Individual problem set – do not work on with classmates. Submit each question in a separate worksheet in a single Excel file. Let Excel do all the math – don't enter intermediate results. Show everything in one place with the final answer highlighted.

1. A family purchased a a house for $750,000 and made a 20% down payment, financing the balance with a standard 30-year, fixed-rate mortgage at 4%, with monthly payments.
   (a) What are the monthly payments of this mortgage?
   (b) Construct an amortization table showing the amount of principal and interest paid each month over the term of the mortgage, as well as the remaining balance each month.
   (c) Suppose that 160 months after they obtained this mortgage their bank advises them that mortgage rates have fallen to 3.75%. For a fee of $5,000, the bank would refinance the mortgage at this lower rate. This would retire the old mortgage and create a new 30-year mortgage. Does this refinancing make sense financially? Show all work, and discuss your recommendation.
   (d) Suppose that this mortgage is not assumable, and our family thinks that it is likely to sell this house (and move) in 18 months. How does that affect your advice to the family?
2. You have a 10-year student loan that is 5 years old (and has 5 years remaining) with monthly payments of $430, and an interest rate of 5.5%. You have made all payments on time and have not pre-paid any of the balance. What is the remaining balance on this loan?
3. Suppose that you would like to have a monthly cash flow of $10,000 when you retire. You hope to retire at age 65, and expect to live until age 90. You are currently 25.
   (a) Assuming that the yield on 25-year annuities in 40 years, when you retire is 3% on a continuously-compounded basis, how much will you have to have in your pension at age 65 to achieve your goal?
   (b) Assuming that the yield on 25-year annuities in 40 years, when you retire is 5% on a continuously-compounded basis, how much will you have to have in your pension at age 65 to achieve your goal?
   (c) Explain the effect of the annuity rate on the cost of this annuity.
4. You hope to retire at age 67, and expect to live until age 90. You are currently 27. You expect that the average return your savings will earn over the next 40 years is 3.5% on a continuously compounded basis. Your goal is to have a a single payment each quarter of $35,000 after retirement from your savings. You expect that the yield on 23-year annuities in 40 years, when you retire will be 4% on an annually compounded basis. How much money should you save each month for the next 40 years to achieve your goal under these assumptions?