Mathematics 105          Project #2         Due: Wednesday, March 6, 2002

In the problems below, # stands for a digit determined as follows: If your last name begins with A-C, # = 2; if D-F, # = 3; if G-I, # = 4; if J-L, # = 5; if M-O, # = 6; if P-R, # = 7; if S-U, # = 8; if V-Z, # = 9.  (Use the last name of the Project Leader.)

1. In a recent Real Estate Section of the Courier Journal, one lender offered a 30-year mortgage loan at 6.75%, a 30-year loan at 6.45% with 2.5 points, and a 15-year loan at 6.30%.  (Each is compounded monthly.) Suppose that you wish to purchase a house costing $1#7,000.  Each loan has closing costs of $1,600.  You will pay 20% of the purchase price as a down payment. Your loan amount L will include the rest of the purchase price and the closing costs, and any points required for the loan. (Remember, points are computed so as to be a percentage of the total loan amount L.)

i)    For each of the three mortgages, find:
 a) the loan amount L,
 b) the monthly payment,
 c) the approximate total amount of interest paid over the life of the mortgage, and
 d) the amount of interest and of principal repayment included in the first mortgage payment.

ii)  How much would you save in total payments over the life of the loan by choosing the 15-year mortgage rather than the 30-year mortgage with no points?

iii) Suppose you decide on the 30-year mortgage with no points, but also decide to pay an extra $2#5 each month in addition to the monthly payment in i) b).

 a) How long will it take to pay off the loan if you continued to make the increased payments, beginning with the very first payment?  [See Section 2.5 of the text.]
 b) How much will you save in total payments over the life of this 30-year loan by paying the extra $2#5 each month?  Why does this difference in total payments also equal the difference in the total amounts of interest paid on the two mortgages?

2. This problem concerns saving for retirement, and subsequently making withdrawals from your retirement account.  (Ignore taxes in your calculations.)

A. Suppose that at age 25 you begin to make contributions of $2#0 at the end of each month into a Traditional IRA. Assume that account continues to pay interest at 4.8% compounded monthly for the foreseeable future. Suppose you continue to make the payments until you reach age 50, and then stop, leaving the money in the same account until you retire at age 65. How much money will you have in the retirement account when you retire?

B. When you retire, you are offered the following two options:

(i) You could plan to make equal withdrawals at the end of each month for the first 2# years of your retirement. Assuming the account continues to pay 4.8% compounded monthly, what monthly withdrawal amount over those 2# years will completely exhaust the account at the end of that time?

(ii) You could plan to withdraw $2#00 from the account at the end of each month. If you do so, how long will it take for these withdrawals to completely exhaust the account (assuming the account continues to earn 4.8% compounded monthly)?

In a cogent paragraph or two discuss the pros and cons of each option, tell which you recommend, and why.

Reminder: The ground rules for this project are the same as those for Project 1 and can be found on the cover sheet for this project on the reverse of this page.