

Math 110
Home Mortgage Project
Fall 2006

For the questions on page 3, email your (one!) Excel file to allenr@elmhurst.edu on or before Thursday, October 12, 2006. Submit your written answers on or before Friday, October 13, 2006. Please start the name of your Excel file with your own last name (example: `SmithMortgage.xls`).

We will start with this problem:

Suppose you take out a home loan of \$150000. You must pay back the loan by making equal payments at the end of each month. You will make these monthly payments for several years. (The number of years could be 15 or 30, for example. We will start with 2 years to see how mortgages work. Then we'll change to 15 or 30 years.) You must pay interest, of course. The interest is 9% (and this interest is compounded monthly).

Questions we could ask: How big is your monthly payment? How much of your first monthly payment must be used to pay the one month's worth of interest from your loan? How much of your first monthly payment is actually used to reduce the unpaid balance on your loan? After one month, how much do you still owe? What about after two months? After one year? After two years?

In this lab you will create a table to show the answers to these questions. Once you have created your table, it will be easy to change the amount of the loan, the interest rate, and the number of years in the loan.

Type the following table. Note: Cell E8 has a long formula. It is $+E3 * A8 / (1 - (1 + A8)^{-C8})$

	A	B	C	D	E
1	Interest		Number of		Amount
2	Rate		Years		of Loan
3	0.09		2		150000.00
4					
5	Interest		Number of		Monthly
6	Rate per		Months		Payment
7	Month				
8	+A3/12		+C3*12		"See Above"
9					
10		Monthly		Balance	Unpaid
11	Month #	Payment	Interest	Reduction	Balance
12					
13	Start				+E3
14	1	+\$E\$8	+E13*\$A\$8	+B14-C14	+E13-D14
15	2				
16	3				
17	4				

18	5
19	6
20	7
21	8
22	9
23	10
24	11
25	12
26	13
27	14
28	15
29	16
30	17
31	18
32	19
33	20
34	21
35	22
36	23
37	24

The formulas in row B14..E14 should be copied to rows 15 through 37. Excel will automatically adjust the formulas for the correct row number. Exception: Some formulas have a dollar sign in the cell reference. Dollar signs are used like this when you don't want the cell reference to be adjusted when copied.

Format columns B through E so that those figures will always be rounded to 2 decimal places.

Figure out how to make columns (like E) wider, if necessary, to show the amounts.

If you have done everything correctly, there should be 6852.71 in every row of the monthly payment column. There should be 6801.70 in E36 and 0.00 in E37.

Questions to answer

Answer these questions on separate paper. For questions 1, 2, 3, 5, and 6, submit your Excel file. You should submit one Excel file that has five different sheets. Email them to allenr@elmhurst.edu on or before Thursday, October 12, 2006. Submit your written answers on or before Friday, October 13, 2006. Please start the name of your Excel file with your own last name (example: `SmithMortgage.xls`).

1. Answer the following questions for this 2 year “home loan” of \$150000.00 at 9%.
 - (a) How big is your monthly payment?
 - (b) How much of your first monthly payment must be used to pay the one month’s worth of interest from your loan?
 - (c) How much of your first monthly payment is actually used to reduce the unpaid balance on your loan?
 - (d) After one month, how much do you still owe?
 - (e) After two months, how much do you still owe?
 - (f) How much do you owe after one year?
 - (g) How much do you owe after two years?
 - (h) How much money will you actually pay back over the life of the loan? (Hints: You can use you calculator for this one. For how many months will you make monthly payments? How much is each monthly payment?)
 - (i) Using the answer from (h), and using the fact that the loan is for \$150000, how much total interest will you pay over the life of the loan?
2. Suppose that you take out a home loan of \$150000.00 at 9%, but this time you will pay it back over the course of 15 years. Answer questions (a) through (i) above.
3. Suppose that you take out a home loan of \$150000.00 at 9%, but this time you will pay it back over the course of 30 years. Answer questions (a) through (i) above.
4. Suppose you want to take out a home loan of \$350000.00 for 30 years. Find the monthly payment in each of the following cases.
 - (a) The interest is 5%.
 - (b) The interest is 6%.
 - (c) The interest is 7%.
5. Suppose you take out a home loan of \$225000.00 for 30 years at 9% interest. Write out the amortization table for the first four months. (Include labels for each column.)
6. Suppose you take out a home loan of \$275000.00 for 30 years at 5.5% interest. Find out the monthly payment and write it down. Now add \$100 to this payment, and suppose that you use this larger amount EVERY MONTH as your monthly payment instead of the calculated one. Instead of 30 years, now how long will it take for you to completely pay off this loan?