Tanner Day

April 17, 2013

Math 1090 Mortgage Project

This project taught me how to examine a home loan or mortgage by laying out different scenarios. At first, I was to assume that I found a home for sale and agreed to a purchase price of $201,000. Then I made a 10%/$20,100 down payment on the house, leaving a $180,900 mortgage amount remaining. Next, I was to calculate the monthly payment for a 30 year loan by using the amortization payment formula. After plugging in the numbers, the monthly payment came out to $968.35. The next step in this process was to go online and enter the numbers into an amortization spreadsheet to get more information. Doing this showed the total interest paid over 30 years was $167,706, and the total amount paid was $348,606. When looking at the spreadsheet, one thing I observed was that the amount of the payment that goes towards the principal increases monthly and the amount of the payment that goes towards the interest decreases monthly. I then discovered that the first payment when more of the payment was going toward principal rather than interest was number 194.

After noting that these monthly payments are for principal and interest only, I decided that my monthly principal and interest payment should not exceed 35% of my monthly take home pay. To figure out what minimum monthly take-home pay I should have in order to meet this goal I used the formula 968.35 > .35X, then solved for X. Doing this showed that the minimum monthly take home pay would need to be at least $2,766.71. Another thing to consider is that my net or take-home pay (after taxes) is less than my gross pay (before taxes). After assuming that my net pay is 73% of my gross pay, I need to find the minimum gross annual salary I will need to make to have the monthly net salary of $2,766.71. The most effective way to do this is by setting up the equation in this form, 2,766.71 = .73 X Gross. The gross monthly pay ends up being $3,790.01, which I then multiplied this number by 12 to get a minimum gross annual salary of $45,480.16.

The second part of this project deals with selling the house after living in it for 10 years. To calculate the value of an investment such as real estate, it is best to use the continuously compounded interest formula (A = Pert). I found the value of the home 10 years after the purchase by assuming a continuous interest rate of 4%. The formula was set up to look like this, A = 201,000e.04(10). The total amount calculated out to be $299,856.76. Assuming that I can sell the house for this amount, I can calculate my gains or losses. I had to take into consideration all of the following: The selling price of the house is $299,856.76, original down payment was $20,100, mortgage paid over the ten years was $116,202, and the principle balance on my loan after ten years is $147,036.48. The final calculations ($299,856.76 - $283,238.48) show that by selling the house after 10 years I would gain exactly $16,618.28.

In the third part of this project, I was required to do the same thing as in part one, except using a 15 year mortgage instead of a 30 year mortgage. This time I applied a 15 year loan, interest rate of 4.735%, and a principle of $180,900 to the amortization payment formula. The calculations resulted in a $1,405.70 monthly payment for a 15 year mortgage. Once again, I used an amortization spreadsheet on the web to acquire more information and help develop an amortization schedule. After entering the numbers, I found out that the total interest paid over the 15 years was $72,125.51, and the total amount paid was $253,025.51. One major difference between the results in part one and part three was the number of the first payment when more of the payment goes towards principal than interest, which in part three was number 5.

The next step addresses the idea of paying an additional $100 towards the principal each month. I was then required to figure out how long it would take to pay off the loan with this additional payment, and how it would affect the total amount of interest paid on the loan. All it took was a little rearranging of the numbers on the online spreadsheet to find out that it would take 13.5 years (1.5 years less than 15 year mortgage) to pay off the loan with additional payments of $100 per month. The spreadsheet also showed that the total interest paid over the life of the loan with additional $100 monthly payments would be $64,713.29. The total amount paid with the additional $100 monthly payments would be $245,613.29. By comparing this total amount paid with the total amount paid without extra montly payments, I can see that I would spend approximately $7,500 less by paying $100 additional payments a month.

In the long run, I can see how the things I learned by doing this project are going to be very applicable. Even if it is not about purchasing a home, this project teaches how to look at your finances from various different viewpoints. In my opinion, setting up real life scenarios is the most effective way to teach students how to come up with the best possible solution to a problem. This project changed the way I think about buying a home and really made me analyze my future plans. I have always known that all loans deal with a lot of math, but I never realized how many different possibilities there are. It surprises me to see how much there is to gain by handling your finances right, and it surprises me more that not a lot of people can figure it out. All in all, this project made me feel confident about my future with mortgages, loans, and other finances.