PROJECT THREE

The objective of this project is to utilize finance formulas to investigate several factors related to purchasing a home. This project will require performing calculations within a spreadsheet program and analyzing and discussing the results of these calculations.

A spreadsheet file implementing preliminary features of the calculations required for this project must be downloaded from the NAU MAT 114 course website.

Answers to the following questions must be compiled into a single word-processing document (Microsoft Word, etc.), including necessary explanatory text and supporting “lines” from the calculations performed within the spreadsheet. **DO NOT PRINT OUT AND SUBMIT YOUR ENTIRE SPREADSHEET.** Explanations and discussions of answers must be in complete, grammatically correct sentences. The final document must be neat and organized, with answers to individual problems clearly labeled. The method of submission of the final document (i.e. printed out, submitted electronically, etc.) will be determined by individual instructors.

This project must be submitted at the start of your Class Meeting during **Week 13** of this semester.
**PURCHASING A HOME**

For this project, each student will simulate finding and purchasing a home. The loan amount each student can “afford” will be based on a simulated annual income which will be calculated below. Having selected a home to purchase within the appropriate price range, each student will create an amortization table in a spreadsheet program detailing the repayment of the home mortgage. Modifications will then be made to the amortization table to explore the effects of various repayment options.

The problems below guide the sequence of calculations needed to answer all of the required questions.

*Each answer which is based on values from the amortization table should be accompanied by three to four pertinent rows from the amortization table which display the values relevant to the particular problem. For example, if a question asked about the balance of the loan in the 124th month, the following rows should accompany the required answer:*

<table>
<thead>
<tr>
<th></th>
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<th>124</th>
<th>125</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1090.35</td>
</tr>
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</tr>
<tr>
<td>3</td>
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<td>478.25</td>
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<tr>
<td>4</td>
<td>175721.17</td>
<td>175242.92</td>
<td>174763.00</td>
</tr>
</tbody>
</table>

The first several problems provide an approximate (simulated) price range which each student “can afford.”

1. **Personal Annual Income**

   For this project, each student will have an individual simulated annual income – annual gross income will equal the student’s current WeBWorK percentage multiplied by $58,000.

   Calculate and state your (simulated) annual income.

2. **Monthly Payment**

   Several factors influence how much an individual can afford to pay each month toward a home loan.

   a) Find and state your *monthly income* by dividing your annual income by 12.

   It is recommended that your housing payment never exceed 33% of your gross monthly income.

   b) Find and state 33% of your monthly income.

   Home mortgage payments usually include several fees which are not directly related to repaying the actual home loan – mortgage insurance, homeowner’s insurance, property taxes, etc.

   c) To simulate the effect of these fees (which often are as high as 15% of the actual monthly payment required by the home loan), divide the value found in part b by 1.15. This is the maximum (simulated) amount which you can afford to pay each month toward a home loan.
3. **Loan Amount**

A typical home loan has a term of 30 years and a fixed APR. Using the monthly payment calculated in the previous problem, calculate and state the loan amount you can afford assuming an APR of 4.18% compounded monthly.

4. **Down Payment**

Suppose you have been saving money to purchase this home since your 14th birthday. Calculate the amount you would have saved if you have been investing $95 each month (since your 14th birthday) into a savings account with an APR of 2.4%. This amount can be used as a down payment on your house.

5. **Purchase Price**

Calculate and state your total maximum (simulated) purchase price by adding the loan amount and down payment calculated above.

6. **Find a Home**

Search the internet to find a current home listing within an area which you are familiar with that is below the maximum purchase price you just calculated. State the important identifying properties of the house you choose – asking price, location (city, neighborhood, address (if possible)), square footage, notable amenities (pool, garage, etc.), etc. If you prefer, simply include the entire “listing” for the house.

The next several problems involve setting up and modifying an amortization table for a loan which would enable you to purchase the home you have selected. The beginning structure of the amortization table is provided in the accompanying spreadsheet.

Perform the following steps to complete the amortization table in the accompanying spreadsheet.

:: Input the actual asking price of the home you selected (Purchase Price) as well as the down payment calculated previously into the accompanying spreadsheet. The spreadsheet will automatically calculate the corresponding monthly payment.

:: Input the monthly payment into the table (in the “Month 1” row).

:: Calculate the amount which the bank charges in interest by multiplying the previous month’s Balance by the monthly interest rate (that is, the APR divided by 12).

:: Calculate the amount which is applied to the principal of the loan by subtracting the amount To Interest from the Payment.

:: Calculate the new Balance by subtracting the amount To Principal from the previous month’s Balance.

Once the calculations have been properly performed for “Month 1,” the formulas input into the spreadsheet can be “filled” to complete the table for the remainder of the life of the loan.
Answer the following questions based on the completed amortization table, modifying entries as necessary for the individual questions.

7. If you keep the house for the entire life of the loan, how much total will you pay for the house? What is the total amount of interest paid on the loan?

8. If you want to sell your house in 5 years, how much will you still owe? What if you wanted to sell in 10 years? (Assuming you’ve only made the required payments.)

9. When (in which month) will you have 20% equity in the house? (Base this calculation on the original purchase price of the house; assume you’ve only made the required payments.)

10. If you pay an extra $100 every month, how many payments will you cut off the end of the loan? How much money will that save you?

11. How many payments and how much money will paying an extra $250 each month save you?

12. How many payments and how much money will you save if you pay the required monthly payment for the first 3 years of the loan but pay an extra $200 each month after that?

13. If the bank offers a 15 year loan (with the same APR), what would the required monthly payment be and how much would you pay overall for the house over the life of the loan?