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Math 1030
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Math 1030

Group Project: Buying a House

(Work in groups of two or three.)

Select a house from a real estate booklet, newspaper, or website. Cut out the picture and/or description of this house and attach it to this lab. **Assume you are paying the asking price for the house.** (Pick something reasonable, between $80,000 and $200,000.)

Its listed selling price is $\$175,000^{00}$

Down Payment: Assume that you are going to make a 10% down payment on the house. Determine the amount of your down payment and the balance to finance.

Down Payment $\$17,500^{00}$ Mortgage Amount $\$157,500^{00}$

Interest Rates: Consult a lending institution and ask for its interest rates for both a 15_year and a 30_year fixed rate mortgages with no "points" or other charges for the loan.

Name of lending institution AmeriSave

Rate for a 15-yr mortgage 2.25% Rate for a 30-yr mortgage 3.00%

Monthly Payment: Calculate the monthly payment for both loans (rounding up to the nearest cent) by using the following formula from pg. 244 of your text. Show your work.

$$PMT = \frac{P \times \left(\frac{APR}{n}\right)}{1 - \left(1 + \frac{APR}{n}\right)^{-nY}}$$

15 Yr Mortgage

$$PMT = \frac{157{,}500^{00} \times \frac{.0225}{12}}{\left[1 - \left(1 + \frac{.0225}{12}\right)^{(-12 \times 15)}\right]} = \frac{295.3125}{.286222499}$$

$= \$1031.76$ monthly payment

15-yr Monthly Payment $\$1031.76$

30 Yr Mortgage

$$PMT = \frac{157{,}500^{00} \times \left(\frac{.03}{12}\right)}{\left[1 - \left(1 + \frac{.03}{12}\right)^{(-12 \times 30)}\right]} = \frac{393.75}{.592973454}$$

$= \$664.03$ monthly payment

30-yr Monthly Payment $\$664.03$

This monthly payment covers only the interest and the principal on the loan. It **does not cover** insurance or taxes on the property.

Amortization Schedule: In order to summarize all the information regarding the amortization of a loan, construct a schedule that keeps track of the period (month), the principle paid, the interest, and the unpaid balance. A spreadsheet program is an excellent tool to develop an amortization schedule. We can use a free amortization spreadsheet on the web.

The web address is: http://list.realestate.yahoo.com/re/calculators/amortization.html
Enter the amount of the loan, i.e. the selling price minus the down payment, the interest rate you've found, and the appropriate number of years. You should also view the results as "full."

Copy the appropriate information to your own amortization schedules below for each of your proposed loans and answer the questions. Of course you will know which month corresponds to the first and second pay periods, but you will need to think a bit to find the corresponding months for the other periods.

15_Year Mortgage

Period Payment #	$ Payment	$ Interest	Principle Paid	New Balance
1	$ 1,031.76	$ 295.31	$ 736.45	$156,763.55
2	$ 1,031.76	$ 293.93	$ 737.83	$156,025.73
50	$ 1,031.76	$ 224.52	$ 807.24	$ 118,934.29
90	$ 1,031.76	$ 161.71	$ 870.05	$ 85,372.63
130	$ 1,031.76	$ 94.01	$ 937.75	$ 49,199.59
150	$ 1,031.76	$ 58.21	$ 973.55	$ 30,070.91
180	$ 1,031.76	$ 1.93	$ 1029.83	$0.00
Total	$185,716.80	$28,216.53	$157,500.00	----------

Think about those totals.
The total principle paid is the same as the amount of the loan.
The total amount paid is the number of payments multiplied times the amount of each payment.
The total interest paid is the total amount paid minus the total principle paid.

Find the number of the first payment when more of the payment goes toward principal than interest.
Payment number #1

How does the total amount of interest paid compare with the amount of the mortgage?
Use sentences to give both the absolute comparison and the relative comparison.
The total amount of the interest paid is approximatly 1/5 of the mortgage amount. The absolute comparison between the interest paid and mortgage paid is $157,500^{00} - 28,216.53 = \$129,283.47$. The relative comparison is, interest paid is 18% of mortgage paid.
Suppose you could get an interest rate that is one-quarter of a percent less than the one you have. By how much would this lower the monthly payment on the 15 yr loan, and how much would it save on the total cost of the loan?
A 15 yr loan with an interest rate of 2.00% would lower the monthly payment by $18.23. The savings on the total cost of the loan is $3,281.81.

30_Year Mortgage

Period Payment #	$Payment	$Interest	Principle Paid	New Balance
1	$ 664.03	$393.75	$ 270.28	$157,229.72
2	$ 664.03	$393.07	$ 270.95	$156,958.77
90	$ 664.03	$ 326.49	$ 337.53	$130,259.26
150	$ 664.03	$ 271.94	$ 392.09	$ 108,384.23
250	$ 664.03	$ 160.74	$ 503.29	$ 63,790.93
300	$ 664.03	$ 93.81	$ 570.21	$ 36,954.63
360	$ 664.03	$ 1.66	$ 662.37	$0.00
Total	$ 239,050.80	$ 81,549.49	$ 157,500.00	----------

Find the number of the first payment when more of the payment goes toward principal than interest.

Payment number 84

How does the amount of total interest paid compare with the amount of the mortgage? Use sentences to give both the absolute comparison and the relative comparison.

The total amount of interest paid is approximately ½ of the mortgage amount. The absolute comparison between the interest paid and mortgage paid is $157,500.00 − 81,549.49 = $ 75,950.51, The relative comparison is, interest paid is 52% of mortgage amount.

Suppose you paid an additional $50 towards the principal each month. How does this change the length of time needed to pay off the 30 yr loan and the total amount paid? Be specific!

The additional amount going to principal each month decreases the time needed to payoff the mortgage by 37 months. The total cost saved is $ 9779.15

Work with your information. Experiment, have fun, and learn!

Observations and Conclusions:

Use a word processor to write a one-page paper summarizing your observations about buying a house.

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"Observations About Buying a House"

Looking at the cost savings data contained in this project alone the 15 year mortgage has greater long term benefits than the 30 year mortgage. Who wouldn't prefer to pay less than $30,000.00 in interest for the 15 year loan versus over $80,000.00 interest for the 30 year mortgage? The cost savings is substantial and you are paying off the loan in half the time. On the other hand, the monthly mortgage payment for the 15 year mortgage is almost $400.00 more a month. I'm no financial expert, but I've purchased a couple of homes over the years and though the numbers look good on paper for the 15 year loan, the higher monthly payment doesn't. Other factors need to be considered when deciding to buy a home: 1) Job security? 2) Debt to Income ratio? 3) Possibilities of relocation? 4) One income or two? 5) Lifestyle? Purchasing a home is a big deal and its financial and personal ramifications are huge and far reaching. It is a decision that must be made with more than just the financial benefits of being a homeowner in mind. No one has a crystal ball that will enable them to foresee the future. That's why I have always hedged-my-bet against unforeseen catastrophe by going with a 30 year mortgage. I have been fortunate to rarely be out of work, but when I was, my monthly mortgage payment was affordable enough to still make it. Four hundred more dollars a month may not sound like a lot of money, but can help keep the utilities on and food on the table during those times when income is low or non-existent. If times are good, make an added payment toward principle to decrease your overall interest payment. With a 15 year mortgage, when times are bad, you're are contractually locked into that higher payment, and no amount of begging or pleading will reduce it. Refinancing is always an option, but if you are unemployed, no bank in their right mind will refinance your home. Life can throw you curves you can not foresee or anticipate. I have always tried to error on the side of caution to ensure I can provide for my family even in the worst of times. It's worked so far when the unexpected has occurred. A 15 year mortgage has clear and tangible cost savings associated with it, but the path life will take you on isn't so clear. I would advise anyone I know to think long and hard before jumping into a 15 year mortgage and I would strongly advise anyone with a stable income to choose home ownership over renting any day of the week. Again, the questions posed previously also apply to this scenario, but the personal and financial benefits of home ownership outweigh those renting has to offer for the majority of those considering it. I don't see why anyone would want make someone else (landlord) wealthy by paying

rent and all you have to show for it is a temporary roof over your head. Home ownership not only provides a roof over your head, but is an investment that has historically increased in value long term, and YOU OWN the roof. The tax benefits of owning a home are also an added benefit that is worth mentioning. The annual interest paid on a home mortgage is a direct deduction from your annual income that can substantially reduce your taxable income helping to reduce your state and federal tax burden.

Personally, the best options for me are:

1) 30 Year Mortgage - A 30 year mortgage is best for the reduced monthly payment but the flexibility to prepay on principle to reduce the long term cost of the loan.

2) Home Ownership - I will never go back to renting again unless age or health concerns force me to. As I get older, I may not want a single family dwelling and all of the upkeep that goes along with it. For now I prefer home ownership over renting without question.

3) The Tax Benefits of Home Ownership - The tax benefits of buying a home are secondary to me. I probably don't appreciate them as much as I should because I've never been without them. I should run an income tax scenario with and without the deduction to better appreciate the positive financial benefit it provides.

4) Risk and Return - Just like any investment, buying real estate has its risks. Historically, real estate has always been considered a stable, long-term growth investment. Yet, the recent housing market crash is a clear example of how real estate is not exempt from value loss or downturns. Though these sharp increases in home values (the bubble) appear to have been artificially imposed upon the market rather than being a function of supply and demand, real estate continues to be a stable, and profitable long term investment. I believe the returns, financial and personal, far outweigh any risks.