

Math 1030 Project 1

(Work in groups of two to four.)

Buying a House

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Select a house from a real estate booklet, newspaper, or website. Find something reasonable – between \$180,000 and \$2,500,000. Cut out the picture and/or description of your chosen house and attach it to this project. Assume that you will pay the asking price for your house.

The listed selling price is \$339,000.00.

Assume that you will make a down payment of 20%.

The down payment is \$67,800.00. The amount of the mortgage is \$271,200.00.

Ask at least two lending institutions for the interest rate for both a 15-year and a 30-year fixed rate mortgage with no “points” or other variations on the interest rate for the loan.

Name of first lending institution: America First Credit Union.

Rate for 15-year mortgage: 3.375%. Rate for 30-year mortgage 3.75%.

Name of second lending institution: Cyprus Credit Union.

Rate for 15-year mortgage: 2.75%. Rate for 30-year mortgage 3.375%.

Assuming that the rates are the only difference between the different lending institutions, find the monthly payment at the better interest rate for each type of mortgage.

15-year monthly payment: \$1840.42. 30-year monthly payment \$1198.96.

These payments cover only the interest and the principal on the loan. They do not cover the insurance or taxes.

To organize the information for the amortization of the loan, construct a schedule that keeps track of: (1) the payment number and/or (2) the month and year (3) the amount of the payment, (4) the amount of interest paid, (5) the amount of principal paid, and (6) the remaining balance. There are many programs online available for this. A Microsoft Excel worksheet that does this available online at <http://office.microsoft.com/en-us/templates/loan-amortization-schedule-TC001019777.aspx?CategoryID=CT062100751033>. It's not necessary to show all of the payments. Fill in the sample of payments in the following schedules, and answer the questions after each table.

15-year mortgage

Payment Number	Payment Date	Payment Amount (\$)	Interest Paid (\$)	Principal Paid (\$)	Remaining Balance (\$)
1.	11/1/12	\$1840.42	\$621.50	\$1218.92	\$269,981.08
2.	12/1/12	\$1840.42	\$618.71	\$1221.72	\$268,759.36
50.	12/1/16	\$1840.42	\$476.82	\$1363.60	\$206,703.12
90.	4/1/20	\$1840.42	\$346.07	\$1494.35	\$149,518.56
120.	10/1/22	\$1840.42	\$239.85	\$1600.58	\$103,059.77
150.	4/1/25	\$1840.42	\$126.07	\$1714.35	\$53,298.50
180.	10/1/27	\$1840.42	\$4.21	\$1832.01	\$0.00.
total	-----				-----

Use the proper word or phrase to fill in the blanks.

The total principal paid is the same as the The original loan amount (\$271,200.00)

The total amount paid is the number of payments times Principal + Interest.

The total interest paid is the total amount paid minus The Principal.

Use the proper number to fill in the blanks and cross out the improper word in the parenthesis.

Payment number 1 is the first one in which the principal paid is greater than the interest paid.

The total amount of interest is \$ 211,124.06 ^{LESS} (more or less) than the mortgage.

The total amount of interest is 77.85 % ^{LESS} (more or less) than the mortgage.

The total amount of interest is 22.15 % of the mortgage.

30-year mortgage

Payment Number	Payment Date	Payment Amount (\$)	Interest Paid (\$)	Principal Paid (\$)	Remaining Balance (\$)
1.	11/1/12	\$1198.96	\$762.75	\$436.21	\$270,763.79
2.	12/1/12	\$1198.96	\$761.52	\$437.44	\$270,362.34
60.	10/1/17	\$1198.96	\$684.13	\$514.83	\$242,732.61
120.	10/1/22	\$1198.96	\$589.64	\$609.33	\$209,040.21
240.	10/1/32	\$1198.96	\$345.44	\$853.53	\$121,968.27
300.	10/1/37	\$1198.96	\$188.78	\$1010.19	\$66,110.32
360.	10/1/42	\$1198.96	\$3.36	\$1192.24	\$0.00.
total	-----				-----

Payment number 115 is the first one in which the principal paid is greater than the interest paid.

The total amount of interest is \$ 110,772.63 ^{LESS} (more or less) than the mortgage.

The total amount of interest is 40.85 % ^{LESS} (more or less) than the mortgage.

The total amount of interest is 59.15 % of the mortgage.

Suppose you paid an additional \$100 a month towards the principal:

The total amount of interest paid with the \$100 monthly extra payment would be \$ 138,017.47.

The total amount of interest paid with the \$100 monthly extra payment would be \$ 22,409.90
(more or less) than the interest paid for the scheduled payments only.
LESS

The total amount of interest paid with the \$100 monthly extra payment would be 14 %
(more or less) than the interest paid for the scheduled payments only.
LESS

The \$100 monthly extra payment would pay off the mortgage in 26 years and 4 months;
that's 44 months sooner than paying only the scheduled payments.

Observations and Reflections:

Summarize what you have done and learned on this project. Because this is a math project, it's good to compare both absolute and relative values that haven't been compared above. It's especially good to compare: (1) the 15-year mortgage to the 30-year mortgage, (2) the 15-year mortgage to the 30-year mortgage with an extra payment, and (3) the 15-year mortgage to the 30-year mortgage with a large enough extra payments to save 15 years and have the loan paid off in 15 years. Also, you know that the numbers don't explain everything. Comment on other factors that must be considered, either by them selves or with the numbers, when making a mortgage.

The first thing we noticed is a 15 year loan would yield a higher percentage of the monthly payment towards the principal rather than interest. The total amount paid for the 30 year mortgage is \$100,351.43 more than the 15 year one. The relative difference is 30.29% more. Therefore, if it's possible to do a 15 year mortgage, that is the better option financially. If the larger monthly payments are not manageable within the household budget, paying even \$100 extra a month greatly reduces the amount of interest paid over the lifetime of the loan.

The 30 year mortgage racks up well over \$100,000 more in interest that the 15 year mortgage does; that's 267% more that you will give over to the bank. Even with the extra payment of \$100 a month, you still pay almost \$78,000 more with a 30 year mortgage, which is still 130% more a 15 year mortgage.

In conclusion, the 15 year has a substantial lower relative value then the 30 year. Not only because of the higher interest rate but because of the longer time period. Even with the extra payment the relative values are extremely higher than the 15 year loan; this would be the best possible scenario if you want to take the pressure off of the higher payment but still pay the least amount of interest. The biggest thing we learned from this project is that research is your best friend when it comes to choosing a mortgage. At this point in time, every bank posts their APRs for the day, as well as offer payment calculators which you can use to figure out what your monthly payment will be. If you are willing to the put in the time to do research, it can be the difference of thousands of dollars paid to the bank. One group member is currently looking to buy a house and remarked "although my budget is quite a bit lower than our model, it was helpful to see the different scenarios. I will aim for the 15 year mark to pay less over the long term."