

Name: _____

Due date: _____

Math 11 Project: Finance

To own or not to own, that is the question.

Introduction:

In our in-class activity, we learned that compound interest over a long period of time can have a large impact on paying off a loan. Many students reach the conclusion that they do not want to own a home. But there is another side to home ownership besides the cost of the mortgage. In this project, you will compare the long-term results of purchasing a home or renting.

According to an article by Michael Bluejay in Business Week, the long term real estate appreciation rate in the U.S. is 3.4%. While appreciation rates vary from place to place, we will use 3.4% appreciation throughout this project.

Betty the Buyer vs. Randy the Renter

Betty and Randy are the same age and both went to college, graduating with bachelor's degrees and getting jobs with similar pay. The difference lies in the fact that Betty made the choice to buy a home, while Randy decided he would rent. Beginning at age 25, when Betty purchased her first home, let's compare their finances.

Betty and Randy at age 25

Betty buys a starter home for \$160,000. She makes a 10% down payment (borrowing the remaining 90%) and gets a 30-year mortgage. Her interest rate is 4.875%.

Calculate Betty's monthly house payment to the nearest dollar, showing your work. Be sure you take the down payment into account in your loan amount.

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Using an Amortization Schedule Calculator such as the one found in the link below, enter the data.

Loan Amount

Annual interest rate

Loan period in years

We will assume 12 payments per year and an artificial start date of loan like 1/1/2020.

Betty's monthly house payment: _____

Assuming she made 12 mortgage payments and including her down payment, what did Betty pay for housing this year?

Assuming Betty continues to make the payment above, how much will she pay over 5 years?

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Randy rents a house that has the same market value as Betty's. His landlord has already paid off the house and charges Randy 75% of the amount that Betty is paying each month on her mortgage. Randy must also put down a security deposit of \$1000 before moving in.

Calculate Randy's monthly rent payment to the nearest dollar: _____

Assuming Randy made 12 rent payments and including the security deposit, what did he pay for housing this year?

How much will he pay over 5 years?

How much more has Betty spent on housing during the 5 years?

Betty and Randy at age 30

Betty and Randy have both married and each have a couple of kids. They need more space!

Betty sells her house, but remember she still has that mortgage and it must be paid off. Calculate her pay off balance on the house to the nearest dollar. Show your work. Using your amortization table, observe line 60, the end of 5 years.

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Under the column Ending Balance it shows:

Betty will pay off the mortgage on her first home with the money she gets from the sale. Recall that she paid \$160,000 for it 5 years ago. Using the national average home value increase of 3.4% per year (this is an exponential growth model!), find the new value of Betty's home to the nearest dollar. Show your work.

How much money does Betty have after she sells her house and pays off the mortgage?

When Randy moves out of his rental house, the landlord keeps his security deposit (they always do...). How much money does Randy take away from this rental?

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Given Betty's earnings from the sale of the house, compare the amounts spent by she and Randy over the last 5 years by looking at the difference between their total expenditures and total gains. Be sure to include Betty's down payment and Randy's security deposit.

Moving on up!

Betty buys a larger house for \$250000. She again has a 30 year loan at 4.875% interest. The money she earned from the sale of her first home will be used as her down payment.

Calculate Betty's monthly house payment to the nearest dollar, showing your work. Be sure you take the down payment into account in your loan amount.

Now put this new loan into an Amortization Schedule and look at the Total Payment column:

Betty's monthly house payment: _____

Assuming she made 12 mortgage payments, what did Betty pay for housing this year? Do not count the down payment this time because it was the earnings from selling her old house.

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Assuming Betty lives in this house for the next 30 years and continues making the same house payment each month, what will she spend on housing over the next 30 years?

Randy rents a house that has the same market value as Betty's, and again the landlord charges Randy 75% of the amount that Betty is paying each month on her mortgage. Since this is a bigger house, Randy's security deposit is now \$2500.

Calculate Randy's monthly rent payment to the nearest dollar: _____

Assuming he made 12 rent payments and including the security deposit, what did Randy pay for housing this year?

Assuming Randy lives in this house for the next 30 years and continues making the same rent payment each month, what will he spend on housing over the next 30 years?

How much more did Betty spend over the 30 years?

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Betty spent more, but she now owns her home. Recall that she paid \$250,000 for it 30 years ago. Using the national average home value increase of 3.4% per year (this is an exponential growth model!), find the new value of Betty's home to the nearest dollar. Show your work.

The value of Randy's apartment is his landlord's asset, not Randy's! To Randy the value of his rented house is \$0.

Betty and Randy at age 60

Suppose Betty and Randy continue to live where they have been living. Betty's house is paid off. Randy's landlord decided to raise rent by 10%.

What is Randy's new rent payment?

Supposing neither of them moves and their housing costs remain the same, what will each of them pay for housing over the next 20 years between the ages of 60 and 80?

Betty:

Randy:

Name: _____

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Consider the full 50 years that have passed since Betty and Randy moved into larger homes. Who spent more on housing? Betty or Randy? Be sure to take into account the first 30 years when Betty had a mortgage as well as the 20 years after that.

Betty:

Randy:

Betty and Randy at age 80

Betty and Randy are getting old now and it's time to move into an assisted living facility.

Recall that Betty paid \$250,000 for her house 50 years ago. Using the national average home value increase of 3.4% per year, find the new value of Betty's home to the nearest dollar. Show your work.

Does it look like Betty will have financial security in her golden years?

Randy leaves his rented house to move into the assisted living facility. His landlord keeps the security deposit (they always do!). What is value of the rent house as far as Randy is concerned?

In the long term, who came out financially ahead? Betty or Randy?

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Notice that throughout the project, Betty's costs are artificially low due to not taking property taxes, mortgage insurance, and home maintenance costs into account. To balance this, the project also keeps Randy's costs artificially low with low rent costs and only one rent increase.

Finance Project Reflection

Write a paper reflecting on what you have learned from this project. You may include any thoughts on the entire learning process from the finance module, including the in-class activity, the finance homework, and especially the project. What conclusions have you drawn about the wisdom of purchasing a house? Can you make the argument that knowledge of financial formulas can help a person make life impacting decisions?

Your reflection will be word-processed and be approximately one to two pages, double spaced (350 to 450 words). Use correct grammar and spelling. Your observations will be insightful and your writing will be at an appropriate level.