Betty the Buyer vs. Randy the Renter
To own or not to own, that is the question.

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%.

1. Calculate Betty's monthly house payment, <u>showing your work</u>. Be sure you take the down payment into account in your loan amount.

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

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

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.

4. What will be Randy's monthly rent payment?

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

6. How much will he pay over 5 years?

7. 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 plans to sell her house, but remember she still has that mortgage and it must be paid off. To figure out how much the payoff is consider the loan from the banks point of view. They could have invested the principal and earned interest on it. So after 5 years with interested compounded monthly the bank would have earned:

$$A = P_0 \left(1 + \frac{r}{k}\right)^{Nk}$$

And Betty has been making monthly payments for 5 years so she has paid

$$P_N = \frac{d\left(\left(1 + \frac{r}{k}\right)^{Nk} - 1\right)}{\left(\frac{r}{k}\right)}$$

So her unpaid balance would be the difference of these two values:

$$\text{unpaid balance} = P_0 \left(1 + \frac{r}{k}\right)^{Nk} - \frac{d\left(\left(1 + \frac{r}{k}\right)^{Nk} - 1\right)}{\left(\frac{r}{k}\right)}$$

8. What is Betty's unpaid balance?

9. 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!), what is the new value of Betty's home? Show your work.

10. 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? None!

11. 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.

   Betty: gains – expenditures =

   Randy: gains – expenditures =

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.

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

13. 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.

14. 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?

15. 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. What will be Randy's monthly rent payment?

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

17. 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?

18. How much more did Betty spend over the 30 years?

19. 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. 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?

20. 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:

21. 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.

22. 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. Show your work.

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

23. 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 rented house as far as Randy is concerned?

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

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.

Reflection

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?