

**Activity Title:** Retirement and Mortgages

**Unit:** Managing Money

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**Description and Purpose:**

The objectives of this lab are to develop skills in calculating mathematics of investment. Students will learn how to plan for future retirement income. Students will demonstrate knowledge of the mortgage process and how to calculate mortgages use in practical daily life. They will engage complex and realistic applications involving mathematics of finance. Students will also learn about the culture and financial rules governing property purchase and ownership in Belize.

**Time Needed:**

The lab requires two hours of class time including the concept building lessons on retirement investment and mortgages. It will require additional lab time outside the classroom for more research.

**Materials For Activity:**

- Retirement and Mortgages lab sheets
- Retirement and Mortgages Calculation in Excel spreadsheet
- TI Graphing Calculator
- Online Mortgages/Retirement Calculator links
- Internet Access

**Procedure:**

This lab will be completed after the investment and mortgage classroom lectures and discussions. Students are working in groups of 3 with the guidance of the instructor. They will use either TI graphing calculator finance apps or excel spreadsheets in calculating mortgages and investment values. Students will need internet access to open links to the different apps and websites related to this lab. However, the group can continue to research outside the classroom as part of their homework.

**Assessment:**

Part	Recommended Points
I: Retirement Income	15 points
II: Mortgage: How much you can afford	10 points
III: Cultural Acclimation: Learning About Belize	15 points
IV: Mortgage: Buying a house	60 points
<b>Total Score</b>	<b>100 points</b>

**Resources:**

- Crauder, B., Evans, B., Johnson, J., & Noell, A. (2015). Quantitative Literacy (2<sup>nd</sup> Ed.) New York, NY.
- Gaze, E. (2014). Thinking Quantitatively: Communicating with Numbers (1<sup>st</sup> Ed.)
- Rachowiecki, R., & Beech, C. (2004). *Peru* (5th ed.). Oakland, CA: Lonely Planet.
- <http://www.globalpropertyguide.com/Caribbean/Belize>
- <http://www.belizepropertycenter.com>
- <http://www.belizepropertycenter.com/search3.php>
- <http://www.arebb.com/belize-real-estate>

## **MAT 143 Lab: Managing Money – Retirement and Mortgages**

**INSTRUCTIONS:** Answer each of the following questions in this Word document. Correct responses must include units such as \$ signs. Answer in complete sentences. Your file name should have the format “YourNameMortgageLab.doc.”

### **Part I: Retirement Income – Perpetuity**

In this lab, you will set-up a savings for your retirement plan (nest egg) after working. You will live on this money when you stop earning a paycheck. Retiring with enough money to live on comfortably is within all our reaches. It's very important to start saving for retirement from the day we begin to work. Just sit back and let the power of compounding take over.

**Perpetuity:** If a retirement fund is set up as perpetuity, one withdraws each month only the interest accrued over that month; the principal remains the same. For example, suppose you have accumulated \$500,000 in an account with a monthly interest rate of 0.5%. Each month, you can withdraw  $\$500,000 \times 0.005 = \$2,500$  in interest, and the nest egg will always remain at \$500,000. That is, the \$500,000 perpetuity has a monthly yield of \$2500. In general, the monthly yield for a perpetuity is given by the formula

**Monthly perpetuity yield = Nest egg  $\times$  Monthly interest rate.**

**Investment:** You began saving for retirement at age 25 by contributing \$550 per month at an APR of 6% compounded monthly. You plan to retire at the age 65 and live on your retirement nest egg.

1. How much money is in your account on retirement at age 65?
2. What is the total amount of your deposits over 40 years?
3. Compare that amount of money in your account to the total deposits made over the time period. Explain your observation.
4. After working for 40 years, you decide to retire. Suppose you set up your account as a perpetuity on retirement paying an APR of 6% compounded monthly. If the value of your nest egg (that is, the present value) is the amount found in question #1, what will be your monthly income?

**Monthly perpetuity yield = Nest egg  $\times$  Monthly interest rate**

### **Part II: Mortgages – How much can you afford?**

5. Lending agencies usually require that no more than 28% of the borrower's monthly income be spent on housing. Given the monthly income from question 4, the amount that could be spent on housing would be \$\_\_\_\_\_.
6. The amount we spend on housing consists of our monthly mortgage payment plus property taxes and property insurance. Assume that property taxes plus insurance equals \$250 per month.
  - (a) What percentage of our monthly income is \$250?
  - (b) Determine the monthly mortgage payment we can afford after paying the property tax and home insurance.

7. If you can afford to pay the monthly payment from the above calculation, how much can you borrow? Assume that the term is 20 years and the interest rate is 6.25%.

### Part III: Cultural Acclimation – Learning About Belize

In this lab, you plan to buy your 2<sup>nd</sup> home, a retirement house, in Belize district, Belize. You will describe/explore the property market of Belize and research the process of buying a house in that country. However, before buying a home, you should get to know Belize a little better.

8. Go to the websites listed below and read about the history and culture of Belize. Then, answer the following questions.

- <http://caribya.com/belize/culture/>
- <http://belizeculture.com/>

(a) Where is Belize located?

(b) What language is spoken in Belize? If there is more than one language, which is the primary language spoken?

(c) What is the weather like in Belize?

(d) What are the major ethnic groups in Belize? Write a short description of each one.

(e) What currency is used in Belize? What is the exchange rate between Belizean money and American dollars? (Exchange rates can be found at <http://www.xe.com/>.)

9. Go to the following website regarding property investment in Belize and read what the article has to say:

<http://www.belizepropertycenter.com/top-10-reasons-to-invest.html#r1>

Give a descriptive reason why you wish to retire in Belize, assuming that it's your own desire or decision to retire there. *Explain vividly.*

### Part IV: Mortgages – Buying a vacation home in Belize

When buying property, you should outline your budget for purchasing your retirement/vacation home, including insurance, legal costs, notary fees and translation fees in addition to the price. Meet with a local lawyer/broker in Belize before you put in a bid on any property. Ask him or her to brief you on the home-buying process of that country. Have your lawyer validate the title and other legal permissions associated with the house. Request an independent translation of all documents that you must sign, even if you speak the language.

10. Read this link: <http://www.globalpropertyguide.com/Caribbean/Belize/Buying-Guide>, then describe and discuss the basic requirements of buying your retirement home in Belize.

11. Using the Internet, find a realty company's website for the district you want to live in Belize and search for a home in the price range from question #7 on Part II of this lab. Copy and paste the picture of a home from the site

that you would consider buying that is within that price range. *The house price should be converted to U.S dollars from Belize dollars. Include both prices in your answer.*

Suggested links: <http://www.alphaomegabelizealestate.com/featured-searches/single-family/3-pg/> ;  
<http://www.belizepropertycenter.com/search3.php>

*Paste your picture in this space. Below, list the house price in Belizean dollars; then show the conversion to American dollars.*

12. If you invested \$300 now at 6.5% interest compounded monthly, how much money do you have available for a down payment 5 years later?

13. After your broker agent or lawyer guides you the process of buying your retirement home,

a) How much is the transaction cost paid by the buyer?

<http://www.globalpropertyguide.com/Caribbean/Belize/Buying-Guide>

b) Calculate the down payment/deposit to be paid during the transaction period as your earnest money.

<http://www.belizepropertycenter.com/buyers-costs-in-buying-property-in-belize.html>

c) Find the **total** cost of the down payment and the transaction costs.

d) How much will you be financing?

14. Assume that your broker agents introduce/assess you to a local bank of Belize. The bank offers you their lowest interest rate at 9.25% APR, either a **10-year fixed interest rate** or **20-year fixed interest rate**.

a) If you want a 10-year, fixed-rate mortgage loan, find the monthly mortgage payment.

Mortgage Calculator in Belize: <http://www.alphaomegabelizealestate.com/buyers/mortgagecalc.aspx> ;

<http://www.belizepropertycenter.com/mortgage-calculator-2.html>

b) Determine the total amount to be paid over the full term of the loan.

c) How much **interest** that will be paid on the loan over the 10 years.

15. Suppose you want a 20-year instead of 10-year fixed-rate mortgage loan, and the same fixed annual interest rate of 9.25%,

a) Determine your monthly mortgage payment.

b) Calculate the **total** of the payments over the life of the loan?

c) Find the amount of **interest** that will be paid on the mortgage loan over the 20 years.

d) How much less is the amount of interest paid over the life of the 10-year loan than over the life of a 20-year loan?

16. Of the **first month's mortgage payment on the 20-year loan**,

- a) How much goes towards the **interest** and how much is applied to the **principal**?
- b) Calculate the **new balance** on the 20-year loan after the first mortgage payment.
- c) How much of the second payment goes towards interest and how much goes toward reducing the principal?
- d) Use an Excel table to create an amortization table for the first five months of your mortgage. Go to the tab labeled Insert → Table → Excel Spreadsheet.

17. After making payments for 11 years of the **20-year loan**, you must sell the house and move back to the United States due to a medical reason. What is the **payoff** amount for the mortgage?

18. Homeowners must pay the annual **property taxes** and **property insurance**. In your 1<sup>st</sup> year in Belize,

- a) How much are you going to pay for the monthly property tax? *Assume that it is based on the present mortgage value.* <http://www.globalpropertyguide.com/Caribbean/Belize/Taxes-and-Costs>
- b) How much is the monthly property insurance? <http://www.arebb.com/belize-real-estate>
- c) What will be the prospective homeowner's **total monthly costs** for the mortgage, property tax, and property insurance bills?

18. Based in your monthly income and your mortgage, do you still have enough money to address your daily costs of living? Why or why not? Explain your response.