Name: Date:

In this activity, you will need a TI-83/84 calculator and a real estate listing. Please show all algebra and arithmetic on separate paper.

You will learn about financing a home with the help of your TI calculator and the ordinary annuity formula:

$$S + P\left(1 + \frac{r}{m}\right)^{mt} + R\left[\frac{\left(1 + \frac{r}{m}\right)^{mt} - 1}{\frac{r}{m}}\right] = 0$$

Symbol	Usual Meaning	Mortgage Specific Meaning
S	Future Value	\$0
Р	Present Value or Principal	Amount (usually positive) you borrow
R	Periodic Payment	Amount (usually negative) you pay ea. month
r	Interest Rate	APR or annual percentage rate (in decimal)
t	Time	Number of years of the mortgage
m	Compounding Rate	How often interest is computed (usually monthly)

## PART ONE: THE BASICS

- 1. Select a home from a real estate listing and attach the listing to this report.
- 2. Determine the amount needed for a mortgage (usually, the selling price less 20%). This 20% amount is the **down payment** made when the home is purchased.<sup>\*</sup>
- 3. Select two fixed rate mortgages one for 15 years and one for 30 years. Select mortgages that require points or fees to be paid.
- 4. Include the arithmetic for computing the monthly payment by hand for both mortgage options, that is, show the work you would do *without* using the TVM (Time Value Money) features of your calculator.
- 5. Include the arithmetic you do to compute **Total Amount Paid**. This amount is the sum of all monthly payments plus points and fees.
- 6. Include the arithmetic you do to compute Effective Interest Rate. Divide the total amount paid by the number of payments to get the effective monthly payment. Use this effective monthly payment to solve for the effective interest rate. (Hint: You may now use the **TVM\_Solver** on your TI calculator).

7. Use the information you gathered above to complete Table-1 below for the 15-year and 30-year mortgages.

	15-Year Mortgage	<b>30-Year Mortgage</b>
Bank's Name		
Selling Price		
Down Payment		
Present Value		
Interest Rate (APR)		
Monthly Payment		
Number of Payments		
Points Paid (if any)		
Fees (if any)		
Total Amount Paid		
Effective Interest Rate		

## Table-1: Basic Mortgage Comparison

## PART TWO: AMORTIZATION

8. Complete the partial amortization table below:

Table-2: Partial Amortization Table for 15-Year Mortga
--

	Principal Remaining	Interest Paid
Payment #1		
Payment #2		
Payment #50		
Payment #100		
Payment #150		

- 9. Show the arithmetic you do to compute by hand the information for payments 1 and 2.
- 10. Show how you used technology (e.g., a TI calculator or spreadsheet) to compute the information for payments 50, 100, and 150.

## PART THREE: CONCLUDING REMARKS

- 11. What are the advantages and disadvantages of a 15-year mortgage?
- 12. What are the advantages and disadvantages of a 30-year mortgage?
- 13. Describe how the principal owed changes over time. Is the increase linear, exponential, or quadratic? Why?
- 14. Describe how the interest paid with each payment changes over time. Is the decrease in interest linear, exponential, or quadratic? Why?

Congratulations: when you finish, you will be a real pro at home financing!

<sup>&</sup>lt;sup>\*</sup> If you do not make a minimum down payment such as 20%, many lenders require you to pay PMI (Private Mortgage Insurance).