

Owning a home is a keystone of wealth . . . both financial affluence and emotional security.

Suze Orman, Author, TV Personality, and Personal Finance Expert

Purchase a Home

8-4

Key Terms

- recurring costs
- non-recurring costs
- closing
- closing costs
- earnest money deposit
- attorney fee
- origination fee
- title
- title search
- points
- origination points
- discount points
- prepaid interest
- arrears
- transfer tax
- amortization table
- initial rate
- adjustment period
- hybrid ARM

Objectives

- Estimate closing costs.
- Create an amortization table for a fixed rate mortgage.
- Create an amortization table for a fixed rate mortgage with extra payments.
- Investigate the amortization table for an adjustable rate mortgage.

WHAT WILL THE AMERICAN DREAM COST YOU?

Once you have your mortgage approval, you are a big step closer to home ownership. Below are a few questions that you must investigate thoroughly before buying a home

- What is the cost of the home?
- Will you need to make a down payment?
- Where is the home located?
- How many rooms does the home have?
- What is the size of the property you will own?
- What condition is the house and property in?
- What type of heating/cooling system does the house have?
- What is the approximate cost of running the house (electricity, gas, water, and so on)?

One of the biggest concerns for a prospective homeowner is the costs in both the immediate and the distant future. These costs are in two categories: recurring costs and non-recurring costs. **Recurring costs** are costs that occur on a regular basis. Some examples of recurring costs are mortgage payments, insurance payments, and property taxes.

Non-recurring costs are one-time costs. Moving costs and many of the costs at the closing are non-recurring. The **closing** is a meeting attended by the buyer, seller, their attorneys, and a representative of the lending institution. The official sale takes place at this meeting. The buyer is responsible for paying **closing costs**. Although they can differ from state to state, some of the most common non-recurring closing costs are listed and explained on the next page.

EXAMINE THE QUESTION

The American dream is usually thought of as home ownership. Attaining that dream is often very costly. This lesson walks students through some of the costs incurred in purchasing a home.

CLASS DISCUSSION

Before addressing the opening questions in the text, ask students to come up with some questions of their own that they believe need to be answered before buying a home.

Ask students to identify some recurring and non-recurring costs that they are responsible for now.

Why is it important for a prospective buyer to have a title search?

Ask students for other financial responsibilities that are paid in arrears (for example, credit card balances).



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- **Earnest Money Deposit** The earnest money, or good-faith deposit, is the money paid to the seller by an interested buyer to show that the buyer is serious about buying the house.
- **Attorney Fees** These are fees paid to the attorney in return for representation at the closing.
- **Origination Fee** This fee is money paid to the lending institution for the paperwork involved in the loan application process.
- **Title** The title is the legal claim of property ownership. It is common practice that before property can change hands, a **title search** is conducted. A title search is a procedure used to make sure that the seller does actually hold title to the property being sold.
- **Points** Points are extra fees charged by the lending institution for the use of their money. Each point is equivalent to 1% of the loan amount. There are two types of points. **Origination points** are similar to origination fees. They are collected from the buyer as a means of paying for the loan application process. **Discount points** are points that reduce the interest rate of the loan. They generally lower the interest rate about 0.25% on a fixed rate mortgage and 0.375% on an adjustable rate mortgage. These percentages vary depending upon the lending institution.
- **Prepaid Interest** Mortgage interest is not paid like rent. Rent is paid ahead of the time you live in the home. Mortgage interest is paid in **arrears**. Interest starts accruing (building) at the beginning of each month and continues throughout the month. When you make your mortgage payment, you are paying the interest that has built up on money borrowed during the month that just passed. Prepaid interest at the closing is the amount of mortgage interest due to cover the time from the closing date to when the first mortgage payment is due. For example, if you close on the 10th day of a 30-day month, you will need to prepay 20 days of interest at the closing.
- **Transfer Tax** This is a fee that is charged for the transfer of title from the seller to the buyer.

Skills and Strategies

Here you will learn about the financial aspects of the closing and the years that follow the purchase of a home.

EXAMPLE 1

Leah and Josh are buying a \$600,000 home. They have been approved for a 7.25% APR mortgage. They made a 15% down payment and will be closing on September 6th. How much should they expect to pay in prepaid interest at the closing?

SOLUTION First determine the amount that Josh and Leah borrowed. Since they made a 15% down payment, multiply \$600,000 by 0.15. Then subtract the down payment from the original amount.

$$\text{Down payment} \quad 600,000 \times 0.15 = 90,000$$

$$\text{Loan amount} \quad 600,000 - 90,000 = 510,000$$

You can also calculate the loan amount by recognizing that 15% of the purchase price was the down payment. Therefore, subtract 15% from 100% to find the percent of the purchase price that is the loan amount.

$$100\% - 15\% = 85\%$$

Then multiply the purchase price by the percent that remains to be financed by the mortgage to find the loan amount.

$$600,000 \times 0.85 = 510,000$$

Josh and Leah's first mortgage payment will be due on October 1. At that time they will prepay interest from September 7 to September 30 for a total of 24 days. The amount of prepaid interest is calculated as follows.

Determine the annual interest by multiplying the APR times the amount borrowed.

$$510,000 \times 0.0725 = 36,975$$

There is \$36,975 in annual interest for this loan.

Determine the daily amount of interest due by dividing the annual interest by 365 calendar days.

$$36,975 \div 365 \approx \$101.30$$

It will cost \$101.30 in interest per day.

Multiply the daily interest rate by the number of days to be paid in arrears.

$$101.30 \times 24 = 2,431.20$$

Leah and Josh will owe \$2,431.20 in prepaid interest for the remainder of September.

TEACH

Purchasing a home is a financial, emotional, and time-consuming endeavor. Students need to understand the complexity of the process. There are many online sites that offer advice about home purchases. Encourage students to do some research. You might also want to ask a local realtor to make a presentation in your class about the steps involved in purchasing a home.

EXAMPLE 1

The steps involved in determining the prepaid interest at the closing need to be thoroughly developed and explained to the students. Because the closing is on September 6th, interest is due from September 7th to the end of that month for a total of 24 days. The daily interest owed on the loan is computed by finding the annual interest on the \$510,000 borrowed and dividing that amount by 365. The buyers will have to pay 24 times that amount since there are 24 days remaining until September 30th.

CHECK YOUR UNDERSTANDING

Answer \$920.50

This amount is computed as follows:

$$\left(\frac{400,000 \times 0.06}{365} \right) \times 14$$

■ CHECK YOUR UNDERSTANDING

How much will be charged in prepaid interest on a \$400,000 loan with an APR of 6% that was closed on December 17?

EXAMPLE 2

There is no fixed amount that lending institutions charge at closing. These amounts vary depending upon location and the financial circumstances surrounding the sale. The usual expectation for closing fees is somewhere between 2–7% of the purchase price. Lending institutions will send the purchaser an accounting of the exact fees that will be incurred so there are no surprises.

CHECK YOUR UNDERSTANDING

Answer \$8,000–\$28,000

Since the mortgage is \$340,000, Shannon has already made a 15% down payment. Calculate the purchase price by dividing the mortgage amount by 0.85. Then apply the percentage interval to that amount.

EXAMPLE 3

Make sure that you thoroughly review the change in the loan formula. The new monthly payment formula is adjusted so that the rate is entered as a percent rather than as an equivalent decimal.

EXAMPLE 2

Leah and Josh know that they will have to bring their checkbook to the closing. What might they expect to pay in total at the closing?

SOLUTION Although there are no guarantees about what they will pay, the rule of thumb is that they can expect the closing costs to run from 2% to 7% of the purchase price. These numbers vary depending upon the location of the house and on any special circumstances.

$$600,000 \times 0.02 = 12,000$$

$$600,000 \times 0.07 = 42,000$$

Leah and Josh should be prepared to write checks that will total from \$12,000 to \$42,000 at the closing.

■ CHECK YOUR UNDERSTANDING

Shannon had to make a down payment of 15% of the selling price of her house. She was approved for a \$340,000 mortgage. What range of costs might she expect to pay at the closing?

EXAMPLE 3

Trudy and Tom have been approved for a \$300,000, 15-year mortgage with an APR of 5.75%. How much of their first monthly payment will go to interest and principal?

SOLUTION The amount allocated to principal and interest changes from month to month. At the beginning of the loan, the interest payment is high and the principal payment is lower. Towards the end of the loan the amount the principal payment becomes larger than the interest payment. To calculate each amount, you need to determine the monthly payment. You will use a slightly altered loan formula that allows you to enter the rate as a percent rather than as an equivalent decimal. Since the decimal is needed in the calculation, the monthly rate of $\frac{r}{12}$ is divided by 100.

$$\frac{r}{12} \div 100 = \frac{r}{12} \times \frac{1}{100} = \frac{r}{1,200}$$

The new monthly payment formula is

$$M = \frac{p \left(\frac{r}{1,200} \right) \left(1 + \frac{r}{1,200} \right)^{12t}}{\left(1 + \frac{r}{1,200} \right)^{12t} - 1} \quad \text{where } \begin{array}{l} M = \text{monthly payment} \\ p = \text{principal} \\ r = \text{interest rate expressed} \\ \text{as a percent} \\ t = \text{length of loan in years} \end{array}$$

Substitute and simplify.

$$M = \frac{300,000 \left(\frac{5.75}{1,200} \right) \left(1 + \frac{5.75}{1,200} \right)^{12(15)}}{\left(1 + \frac{5.75}{1,200} \right)^{12(15)} - 1} = 2491.23$$

The monthly payment on this loan is \$2,491.23.

The monthly interest can be determined using the monthly interest formula.

$$I = p \times \frac{r}{1,200} \quad \text{where } \begin{array}{l} I = \text{interest} \\ p = \text{principal} \\ r = \text{interest rate expressed as a percent} \end{array}$$

Substitute. $I = 300,000 \times \frac{5.75}{1,200} = 1,437.50$

The first monthly interest amount is \$1,437.50.

Subtract that amount from the monthly payment to get the amount paid towards the principal.

$$2,491.23 - 1,437.50 = 1,053.73$$

The amount paid towards the principal is \$1,053.73.

CHECK YOUR UNDERSTANDING

Answer approximately 58% to interest and 42% to principal

EXAMPLE 4

This example mimics the mathematics that is used in online mortgage calculators. Students learn how to use the mortgage formula in a spreadsheet so that the monthly interest and principal can be calculated and displayed.

■ CHECK YOUR UNDERSTANDING

What percent of the monthly payment went to principal and what percent went to interest?

EXAMPLE 4

How can Trudy and Tom get an accounting of where their monthly payments will go for the first year of their mortgage?

SOLUTION In Example 3, you calculated the principal and interest for a single month. Here, Trudy and Tom need data over the course of 12 months. To determine the principal and interest amounts for an extended period of time, they should review an amortization table for their loan. An **amortization table** is a listing of the unpaid principal, the monthly payment, the amount allocated to paying down the principal, and the amount allocated to interest. There are many websites that offer mortgage amortization calculators. Some of them generate the amortization table.

Trudy and Tom can set up their own spreadsheet to generate the amortization table. They first set up rows 1–4 of the spreadsheet where the user will input the necessary data. Here the information is entered into the cells in column B in rows 1–4.

	A	B	C	D	E	F
1	Principal	300,000				
2	Interest rate as a percent	5.75				
3	Length of loan	15				
4	Number of yearly payments	12				
5	Payment Number	Beginning Balance	Monthly Payment	Towards Interest	Towards Principal	Ending Balance

Next, determine the information that they will need in the amortization table. It should contain the payment number, the beginning balance, the monthly payment, the amounts allocated towards principal and interest, and the ending balance as shown in row 5.

CHECK YOUR UNDERSTANDING

Answer \$9,811.37 in interest and 10 monthly payments were saved.

■ CHECK YOUR UNDERSTANDING

Examine the loan summaries below for each of the two situations outlined above. How much interest and loan time was saved by making the extra \$100 in payments toward principal each month?

	Without Extra Payment	With Extra Payment
Monthly Payment	2,491.23	2,491.23
Scheduled Payments	180	180
Actual Payments	180	170
Total Extra Payments	0	16,900.00
Total Interest	148,421.45	138,610.08

Adjustable Rate Mortgages (ARMs)

In the previous examples, each of the homebuyers had a fixed rate mortgage. In a fixed rate mortgage, the interest rate remains the same throughout the term of the loan. In an *adjustable rate mortgage* or ARM, the interest rate can change periodically. Therefore, the monthly payments change as well, based upon those rates.

Here is how an adjustable mortgage works. Lenders quote you an **initial rate** that stays in effect for an agreed upon period of time. This can be as short as 1 month to several years. The monthly payment is based upon that initial rate. Often, the initial interest rate quoted is tied into a customer's credit worthiness. In an ARM, the interest rate and monthly payment will change periodically. The period between rate changes is known as the **adjustment period**. A loan with a 1-year adjustment period is known as a 1-year ARM. Here, the interest rate and the monthly payment may change at the end of one year's adjustment period.



Some ARMS, known as **hybrid ARMs**, are a combination of a fixed rate period of time with an adjustable rate period of time. A 3/1 hybrid ARM indicates that the initial interest rate is fixed for the first 3 years and then there is an adjustment period every year thereafter for the life of the loan. There are many types of adjustable mortgages and many different rules and regulations attached to those mortgages. This is just another example of "Buyer Beware!" You must always be sure to read the fine print.

EXAMPLE 6

Chris and Gene have a 6-month adjustable 15-year mortgage. They borrowed \$300,000 and were quoted an initial rate of 5%. After 6 months, their rate increased by 1%. Examine the following spreadsheet for the first year of payments. How were the amounts for payment 7 calculated?

	A	B	C	D	E	F	G
1	Principal	300,000					
2	Interest rate as a percent	5	6				
3	Length of loan	15	14.5				
4	Number of yearly payments	12					
5	Payment Number	Beginning Balance	Monthly Payment	Towards Interest	Towards Principal	Ending Balance	Interest Rate
6	1	300,000.00	2,372.38	1,250.00	1,122.38	298,877.62	5%
7	2	298,877.62	2,372.38	1,245.32	1,127.06	297,750.56	5%
8	3	297,750.56	2,372.38	1,240.63	1,131.75	296,618.81	5%
9	4	296,618.81	2,372.38	1,235.91	1,136.47	295,482.34	5%
10	5	295,482.34	2,372.38	1,231.18	1,141.20	294,341.13	5%
11	6	294,341.13	2,372.38	1,226.42	1,145.96	293,195.17	5%
12	7	293,195.17	2,526.94	1,465.98	1,060.96	292,134.21	6%
13	8	292,134.21	2,526.94	1,460.67	1,066.27	291,067.94	6%
14	9	291,067.94	2,526.94	1,455.34	1,071.60	289,996.34	6%
15	10	289,996.35	2,526.94	1,449.98	1,076.96	288,919.39	6%
16	11	288,919.39	2,526.94	1,444.60	1,082.34	287,837.05	6%
17	12	287,837.05	2,526.94	1,439.19	1,087.75	286,749.30	6%

SOLUTION In the spreadsheet you need to adjust the formulas for payments 7–12. Enter an interest rate of 6% in cell C2 and a length of loan of 14.5 years in cell C3. Adjust the formulas in row 12 so they use the adjusted interest rate and length of loan. Then copy those formulas into rows 13 to 17.

The new ending balance is \$286,749.30.

■ CHECK YOUR UNDERSTANDING

How much of a difference did the 1% adjustment in interest rate make in the monthly payment and the amounts towards interest and principal?

EXAMPLE 6

This example begins similar to Example 4. The interest rates and lengths of the loans differ. Students can build formulas for row 6 by referencing to Example 4. The formulas are:

$$C6 = (B1 * (B2/1200) * (1 + B2/1200)^{(B4 * B3)}) / ((1 + B2/1200)^{(B4 * B3)} - 1)$$

$$D6 = B6 * B2 / 1200$$

$$E6 = C6 - D6$$

$$F6 = B6 - E6$$

The formulas change for row 7. The adjusted formulas are:

$$C12 = (B1 * (C2/1200) * (1 + C2/1200)^{(B4 * C3)}) / ((1 + C2/1200)^{(B4 * C3)} - 1)$$

$$D12 = B12 * B2 / 1200$$

$$E12 = C12 - D12$$

$$F12 = B12 - E12$$

CHECK YOUR UNDERSTANDING

Answer The monthly payment increased by \$154.56. The amount toward interest increased by \$239.56. The amount toward principal decreased by \$85.