

## Lesson 4: Mortgage Spreadsheets

In the previous lesson, we took a look at how to find the monthly payment, the interest, the principal, the unpaid balance, and the owner's equity in a mortgage. At this time we will produce a spreadsheet to do the same.

What would you ideally want to work toward when dealing with a mortgage? Think about which options cost less and help toward owning your home the fastest. (Circle your answer for each.)

Length of Mortgage	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance	Owner's Equity
Long or Short	Large or Small	High or Low	High or Low	Increase or Decrease	Increase or Decrease

### *Mortgage Spreadsheet Example 1:*

Casey and Evelyn bought a house from Mr. Jones for \$65,000.

They had a down payment of \$15,000 and had to borrow the rest from the bank at an interest rate of 5.25%.

The mortgage is taken over 25 years.

The first mortgage payment was dated March 10.

Prepare a spreadsheet to find the payment, interest, principal, unpaid balance, and owner's equity for the first three months.

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	$(Payment - Interest)$	$(Previous Balance - Principal)$	$(Previous Balance + Principal)$
<u>1</u>						
<u>2</u>						

## Filling in the Mortgage Spreadsheet

In this case, first we need to determine the amount of the mortgage.

Since,

$$\text{Mortgage} + \text{Down Payment} = \text{Purchase Price}$$

We can calculate the mortgage value as,

$$\$65,000 - \$15,000 = \$50,000 \text{ mortgage amount}$$

Next, we can begin to fill in the Mortgage Spreadsheet.

<p><b>Step 1: Determine Monthly Mortgage Payment using the amortization chart.</b></p>	<p>Hint: See Lesson 3 Trend: This number will stay constant.</p> <p>Monthly Mortgage Payment = table value <math>\times</math> mortgage + 1000 = <math>(\\$5.94 \times \\$50\,000) + \\$1000</math></p>
<p><b>Step 2: Determine the Interest Portion using <math>I = Prt</math>, where P is the previous Unpaid Balance and t is <math>\frac{1}{12}</math> (you can divide by 12).</b></p>	<p>Trend: This should decrease slowly.</p> <p>Interest = (interest rate <math>\times</math> previous Unpaid Balance) <math>\div</math> 12 = <math>(0.0525 \times \text{previous Unpaid Balance}) \div 12</math></p>
<p><b>Step 3: Determine the Principal Portion by finding the difference between the Mortgage Payment and the Interest Portion</b></p>	<p>Trend: This should increase slowly.</p> <p>Principal = payment - interest</p>
<p><b>Step 4: Determine the Unpaid Balance by subtracting the Principal Portion.</b></p>	<p>Trend: The starting amount is the mortgage and this should decrease slowly.</p> <p>Unpaid Balance = previous unpaid balance - principal</p>
<p><b>Step 5: Determine the Owner's Equity by adding the Principal Portion.</b></p>	<p>Trend: The starting amount is the down payment and this should increase slowly.</p> <p>Owner's Equity = previous owner's equity + principal</p>

Down Payment: \$15 000  
 Mortgage: \$50 000  
 Mortgage Interest Rate: 4.75%  
 Amortization Period: 25 years

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

**Remember:**

$\text{First Month Interest} = \text{Previous Unpaid Balance} \times \text{Rate as a decimal} \div 12$
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Amortization Period of Mortgage Loan When Paid Monthly (Blended payment of principal and interest per \$1000 of loan)					
Interest Rate	5 years	10 years	15 years	20 years	25 years
4.00%	\$18.40	\$10.11	\$7.38	\$6.04	\$5.26
4.25%	18.51	10.23	7.50	6.17	5.40
4.50%	18.62	10.34	7.63	6.30	5.53
4.75%	18.74	10.46	7.75	6.44	5.67
5.00%	18.85	10.58	7.88	6.57	5.82
5.25%	18.96	10.70	8.01	6.71	5.96
5.50%	19.07	10.82	8.14	6.84	6.10

**Practice Question 1:**

Molly Diaz purchases a home for \$90 000. She makes a down payment of \$20 000 and takes out a fixed-rate mortgage at 5.25% for the balance of the purchase price. The mortgage is to be amortized over 10 years.

- a) Determine Molly's monthly mortgage payments (amortization table).
  
  
  
  
  
  
  
  
  
  
- b) How much interest does she pay during the first month ( $I = Prt$ )?
  
  
  
  
  
  
  
  
  
  
- c) How much of the principal does she pay during the first month?
  
  
  
  
  
  
  
  
  
  
- d) How much equity will she have after the first month?
  
  
  
  
  
  
  
  
  
  
- e) Calculate the amount of interest she pays during the entire 10-year amortization period.

- f) Suppose Molly chooses to amortize over 25 years at 5.25%. Determine her monthly payments.

**How did increasing the length of the amortization affect her monthly mortgage payments?**

- g) How much interest would she pay over the entire 25 year period?

**How did increasing the length of the amortization affect her overall interest paid?**

- h) Suppose she is able to negotiate the interest rate down to 4.25%. How much will her monthly payment be?

**How did decreasing the interest rate affect her monthly mortgage payment (compared to part f)?**

- i) How much interest would she pay over the entire 25 year period?

**How did decreasing the interest rate affect her overall interest paid (compared to part f)?**

**Practice Question 2**

Mary and Bob just bought a house for \$115 000. They had a down payment of \$25000 and had to borrow the rest from the bank at an interest rate of 7% amortized over 20 years. Their first payment will be on March 1. Fill in the missing information and the chart below.

**Selling Price:** \_\_\_\_\_ **Down Payment:** \_\_\_\_\_

**Principal:** \_\_\_\_\_ **Interest Rate:** \_\_\_\_\_

**Amortization Period:** \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	$(Payment - Interest)$	$(Previous Balance - Principal)$	$(Previous Balance + Principal)$
<u>1</u>						
<u>2</u>						
<u>3</u>						
<u>4</u>						

# Assignment 4

The following problems may be done using the Mortgage Payment Charts:

1. Alvin bought a house for \$85,000. He paid \$20,000 down and borrowed the rest from the bank at a rate of 7.25% for 15 years. Prepare a schedule of mortgage payments for a period of 3 payments. The first mortgage payment was due July 1. Prepare a spreadsheet to find the payment, interest, principal, unpaid balance, and owner's equity.

## Mortgage Payments Chart

Selling Price: \_\_\_\_\_ Down Payment: \_\_\_\_\_

Mortgage Principal: \_\_\_\_\_ Interest Rate: \_\_\_\_\_

Amortization Period: \_\_\_\_\_ Monthly Payment: \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

2. A house was purchased for \$210,000. The buyer made a down payment of \$27,500 with the balance of the purchase price to be mortgaged over 20 years. The interest rate is 4.75%.

a) Prepare a schedule of mortgage payments for three months.

**Mortgage Payments Chart**

**Selling Price:** \_\_\_\_\_ **Down Payment:** \_\_\_\_\_

**Mortgage Principal:** \_\_\_\_\_ **Interest Rate:** \_\_\_\_\_

**Amortization Period:** \_\_\_\_\_ **Monthly Payment:** \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

b) Recalculate the 3 months in (a), (b), and (c) with a 25-year mortgage.

c) Recalculate the 3 months in (a), (b), and (c) with a 15-year mortgage.

d) Recalculate the 3 months in (a), (b), and (c) using a 20 year amortization period and a rate of 4.00% for 3 months.

e) Recalculate the 3 months in (a), (b), and (c) using a 20 year amortization period and a rate of 5.25% for 3 months.



**Mortgage Payments Chart**

b) Recalculate the 3 months with a 25-year mortgage.

**Selling Price:** \_\_\_\_\_ **Down Payment:** \_\_\_\_\_

**Mortgage Principal:** \_\_\_\_\_ **Interest Rate:** \_\_\_\_\_

**Amortization Period:** \_\_\_\_\_ **Monthly Payment:** \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

**Mortgage Payments Chart**

c) Recalculate the 3 months with a 15-year mortgage.

**Selling Price:** \_\_\_\_\_ **Down Payment:** \_\_\_\_\_

**Mortgage Principal:** \_\_\_\_\_ **Interest Rate:** \_\_\_\_\_

**Amortization Period:** \_\_\_\_\_ **Monthly Payment:** \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

**Mortgage Payments Chart**

d) Recalculate the 3 months using a 20 year amortization period and a rate of 4.00%.

Selling Price: \_\_\_\_\_ Down Payment: \_\_\_\_\_

Mortgage Principal: \_\_\_\_\_ Interest Rate: \_\_\_\_\_

Amortization Period: \_\_\_\_\_ Monthly Payment: \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

**Mortgage Payments Chart**

e) Recalculate the 3 months using a 20 year amortization period and a rate of 5.25%.

Selling Price: \_\_\_\_\_ Down Payment: \_\_\_\_\_

Mortgage Principal: \_\_\_\_\_ Interest Rate: \_\_\_\_\_

Amortization Period: \_\_\_\_\_ Monthly Payment: \_\_\_\_\_

Payment #	Due Date	Monthly Mortgage Payment	Interest Portion (month)	Principal Portion (month)	Unpaid Balance (Selling-Down Payment)	Owner's Equity (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
<u>3</u>						

**Mortgage Payments Chart**

**Selling Price:** \_\_\_\_\_ **Down Payment:** \_\_\_\_\_

**Mortgage Principal:** \_\_\_\_\_ **Interest Rate:** \_\_\_\_\_

**Amortization Period:** \_\_\_\_\_ **Monthly Payment:** \_\_\_\_\_

<b>Payment #</b>	<b>Due Date</b>	<b>Monthly Mortgage Payment</b>	<b>Interest Portion (month)</b>	<b>Principal Portion (month)</b>	<b>Unpaid Balance</b> (Selling-Down Payment)	<b>Owner's Equity</b> (Down Payment)
		Amortization Table	$(Rate \times Balance \div 12)$	(Payment-Interest)	(Previous Balance-Principal)	(Previous Balance+Principal)
<u>1</u>						
<u>2</u>						
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