# *PEAK FINANCIAL ACTIVITY 4a:*
# *Discover Interest Basics* *(see answers on the last page)*

**"Interest" is the fee you pay a lender for loaning you money. Interest is calculated as a percentage of what you borrow. Each payment you make includes some interest and some principal (the amount of the original loan).**

**There are different kinds of interest lenders offer. Understanding the differences can save you money.**

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## Simple Interest

Go Find It → ***In the Online Course,*** you'll find links to a calculator to compute interest.

Simple interest is the best kind of interest for a depreciating asset (the value of the asset declines over time). Your monthly payments are more equally distributed between the interest and the principle reduction.

Using the online **Interest Calculator** and determine the payment for a car loan using simple interest. Use a $20,000 loan amount, a 6.9 percent interest rate, and a 48 month term.

**1.) What is the monthly payment for this loan? _____**

**2.) What is the total interest for all 48 payments? _____**

The term **amortization** refers to the full schedule of payments you make over the life of a loan. Amortizing lets you see how much of each payment goes toward interest and how much goes toward the principal (the original amount borrowed).

Using the online calculator, find the option "Would you like to print an amortization schedule?" and set it to YES. Click Compute again. Look at the amortization schedule provided for this example.

**3.) How much is applied toward principal in the first month? _____**

**4.) How much is applied toward interest in the first month? _____**

## Amortization and How It Works

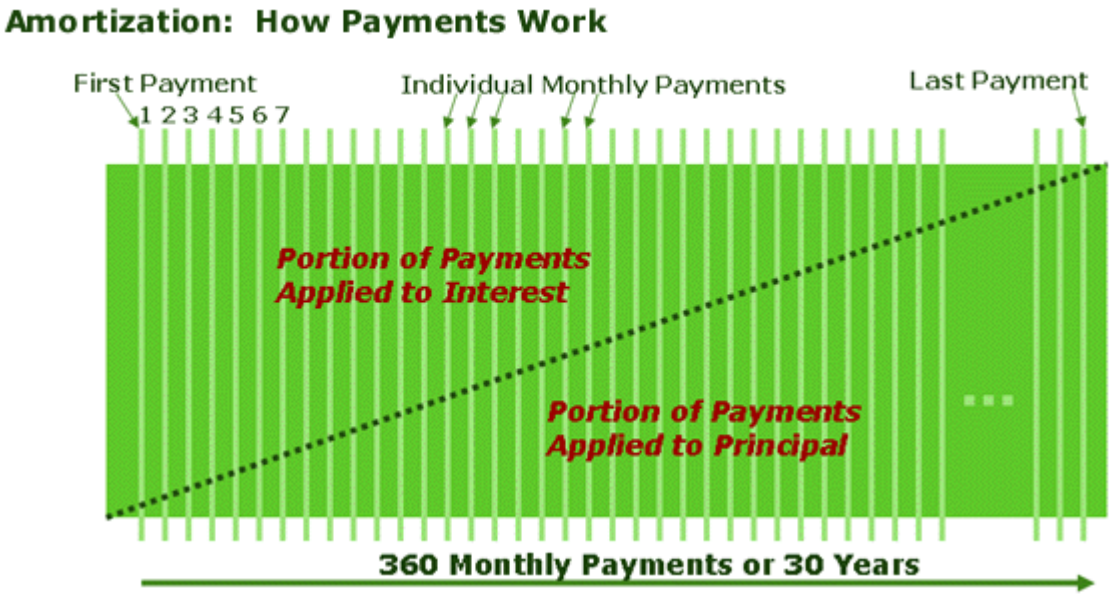
Below is a picture of amortization. This is how the interest and principle is structured in a typical mortgage. It's done this way so that average people can afford to buy homes.

Below the dotted line is the portion of your payment that's applied to the principle of your loan. As you can see, it starts out small but grows over time.

Above the dotted line the portion applied to interest. It starts out large but grows smaller each month.

An Amortization Schedule (see the large table of numbers below) prints out the numeric value of each slice of each monthly payment, showing interest and principle.

On fixed rate mortgages, the total monthly payment remains the same each month. As the interest shrinks, more of your monthly mortgage payment is shifted to pay down principle.



## Sample amortization table comparing a Simple Interest loan and a Rules of 78 loan

(each row shows one monthly payment)

| | | SIMPLE INTEREST EXAMPLE | | | | RULES OF 78 EXAMPLE | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Event** | **Date** | **Payment** | **Interest** | **Principal** | **Balance** | **Payment** | **Interest** | **Principle** | **Balance** |
| Loan | 07-15-2005 | | | | | 20,000.00 | | | |
| 1 | 08-15-2005 | 478.00 | 115.00 | 363.00 | 19,637.00 | 478 | $452.88 | $25.12 | $19,974.88 |
| 2 | 09-15-2005 | 478.00 | 112.91 | 365.09 | 19,271.91 | 478 | $415.14 | $62.86 | $19,912.02 |
| 3 | 10-15-2005 | 478.00 | 110.81 | 367.19 | 18,904.72 | 478 | $377.40 | $100.60 | $19,811.42 |
| 4 | 11-15-2005 | 478.00 | 108.70 | 369.30 | 18,535.42 | 478 | $339.66 | $138.34 | $19,673.08 |
| 5 | 12-15-2005 | 478.00 | 106.58 | 371.42 | 18,164.00 | 478 | $301.92 | $176.08 | $19,497.00 |
| **2005 Total** | | **2,390** | **554** | **1,836.00** | | **$2,390** | **$1,887** | **$503** | |
| 6 | 01-15-2006 | 478.00 | 104.44 | 373.56 | 17,790.44 | 478 | $264.18 | $213.82 | $19,283.18 |
| 7 | 02-15-2006 | 478.00 | 102.30 | 375.70 | 17,414.74 | 478 | $226.44 | $251.56 | $19,031.62 |
| 8 | 03-15-2006 | 478.00 | 100.13 | 377.87 | 17,036.87 | 478 | $188.70 | $289.30 | $18,742.32 |
| 9 | 04-15-2006 | 478.00 | 97.96 | 380.04 | 16,656.83 | 478 | $150.96 | $327.04 | $18,415.28 |
| 10 | 05-15-2006 | 478.00 | 95.78 | 382.22 | 16,274.61 | 478 | $113.22 | $364.78 | $18,050.50 |
| 11 | 06-15-2006 | 478.00 | 93.58 | 384.42 | 15,890.19 | 478 | $ 75.48 | $402.52 | $17,647.98 |
| 12 | 07-15-2006 | 478.00 | 91.37 | 386.63 | 15,503.56 | 478 | $ 37.74 | $440.26 | $17,207.72 |
| 13 | 08-15-2006 | 478.00 | 89.15 | 388.85 | 15,114.71 | 478 | $0 | $478.00 | $16,729.72 |
| 14 | 09-15-2006 | 478.00 | 86.91 | 391.09 | 14,723.62 | 478 | $0 | $478.00 | $16,251.72 |
| 15 | 10-15-2006 | 478.00 | 84.66 | 393.34 | 14,330.28 | 478 | $0 | $478.00 | $15,773.72 |
| 16 | 11-15-2006 | 478.00 | 82.40 | 395.60 | 13,934.68 | 478 | $0 | $478.00 | $15,295.72 |
| 17 | 12-15-2006 | 478.00 | 80.12 | 397.88 | 13,536.80 | 478 | $0 | $478.00 | $14,817.72 |
| **2006 Total** | | **5,736** | **1,108.80** | **4,627.20** | | **$5,736** | **$1,056.72** | **$4,679.28** | |
| 18 | 01-15-2007 | 478.00 | 77.84 | 400.16 | 13,136.64 | 478 | $0 | $478.00 | $14,339.72 |
| 19 | 02-15-2007 | 478.00 | 75.54 | 402.46 | 12,734.18 | 478 | $0 | $478.00 | $13,861.72 |
| 20 | 03-15-2007 | 478.00 | 73.22 | 404.78 | 12,329.40 | 478 | $0 | $478.00 | $13,383.72 |
| 21 | 04-15-2007 | 478.00 | 70.89 | 407.11 | 11,922.29 | 478 | $0 | $478.00 | $12,905.72 |
| 22 | 05-15-2007 | 478.00 | 68.55 | 409.45 | 11,512.84 | 478 | $0 | $478.00 | $12,427.72 |
| 23 | 06-15-2007 | 478.00 | 66.20 | 411.80 | 11,101.04 | 478 | $0 | $478.00 | $11,949.72 |
| 24 | 07-15-2007 | 478.00 | 63.83 | 414.17 | 10,686.87 | 478 | $0 | $478.00 | $11,471.72 |
| 25 | 08-15-2007 | 478.00 | 61.45 | 416.55 | 10,270.32 | 478 | $0 | $478.00 | $10,993.72 |
| 26 | 09-15-2007 | 478.00 | 59.05 | 418.95 | 9,851.37 | 478 | $0 | $478.00 | $10,515.72 |
| 27 | 10-15-2007 | 478.00 | 56.65 | 421.35 | 9,430.02 | 478 | $0 | $478.00 | $10,037.72 |
| 28 | 11-15-2007 | 478.00 | 54.22 | 423.78 | 9,006.24 | 478 | $0 | $478.00 | $ 9,559.72 |
| 29 | 12-15-2007 | 478.00 | 51.79 | 426.21 | 8,580.03 | 478 | $0 | $478.00 | $ 9,081.72 |
| **2007 Total** | | **$5,736** | **779.23** | **4,956.77** | | **$5,736** | | **$5,736** | |
| 30 | 01-15-2008 | 478.00 | 49.34 | 428.66 | 8,151.37 | 478 | $0 | $478.00 | $ 8,603.72 |
| 31 | 02-15-2008 | 478.00 | 46.87 | 431.13 | 7,720.24 | 478 | $0 | $478.00 | $ 8,125.72 |
| 32 | 03-15-2008 | 478.00 | 44.39 | 433.61 | 7,286.63 | 478 | $0 | $478.00 | $ 7,647.72 |
| 33 | 04-15-2008 | 478.00 | 41.90 | 436.10 | 6,850.53 | 478 | $0 | $478.00 | $ 7,169.72 |
| 34 | 05-15-2008 | 478.00 | 39.39 | 438.61 | 6,411.92 | 478 | $0 | $478.00 | $ 6,691.72 |
| 35 | 06-15-2008 | 478.00 | 36.87 | 441.13 | 5,970.79 | 478 | $0 | $478.00 | $ 6,213.72 |
| 36 | 07-15-2008 | 478.00 | 34.33 | 443.67 | 5,527.12 | 478 | $0 | $478.00 | $ 5,735.72 |
| 37 | 08-15-2008 | 478.00 | 31.78 | 446.22 | 5,080.90 | 478 | $0 | $478.00 | $ 5,257.72 |
| 38 | 09-15-2008 | 478.00 | 29.22 | 448.78 | 4,632.12 | 478 | $0 | $478.00 | $ 4,779.72 |
| 39 | 10-15-2008 | 478.00 | 26.63 | 451.37 | 4,180.75 | 478 | $0 | $478.00 | $ 4,301.72 |
| 40 | 11-15-2008 | 478.00 | 24.04 | 453.96 | 3,726.79 | 478 | $0 | $478.00 | $ 3,823.72 |
| 41 | 12-15-2008 | 478.00 | 21.43 | 456.57 | 3,270.22 | 478 | $0 | $478.00 | $ 3,345.72 |
| **2008 Total** | | **$5,736** | **426.19** | **5,309.81** | | **$5,736** | | **$5,736** | |
| 42 | 01-15-2009 | 478.00 | 18.80 | 459.20 | 2,811.02 | 478 | $0 | $478.00 | $ 2,867.72 |
| 43 | 02-15-2009 | 478.00 | 16.16 | 461.84 | 2,349.18 | 478 | $0 | $478.00 | $ 2,389.72 |
| 44 | 03-15-2009 | 478.00 | 13.51 | 464.49 | 1,884.69 | 478 | $0 | $478.00 | $ 1,911.72 |
| 45 | 04-15-2009 | 478.00 | 10.84 | 467.16 | 1,417.53 | 478 | $0 | $478.00 | $ 1,433.72 |
| 46 | 05-15-2009 | 478.00 | 8.15 | 469.85 | 947.68 | 478 | $0 | $478.00 | $ 955.72 |
| 47 | 06-15-2009 | 478.00 | 5.45 | 472.55 | 475.13 | 478 | $0 | $478.00 | $ 477.72 |
| 48 | 07-15-2009 | 477.86 | 2.73 | 475.13 | | 477.72 | $0 | $477.72 | $ |
| **2009 Total** | | **3,345.86** | **75.64** | **3,270.22** | | **$3,345.72** | | **$3,345.72** | |
| **Grand Total** | | **$22,943.86** | **2,943.86** | **20,000.00** | | **$22,943.86** | **2,943.86** | **$20,000.00** | |

## The Rules of 78

**Front loaded interest** is often offered on automobile loans. Front loaded means most of your initial payments go toward interest and not principal. Front loaded interest is also referred to as the **Rules of 78**. When considering a car loan with front loaded interest, beware! This is the **worst** kind of interest to have on an asset that **depreciates**, or loses its value over time.

The rules of 78 gets it name because your total interest costs for the loan are divided into "78 parts". Those 78 parts are then paid during the **first 12 months of the loan** according the following equation: 12+11+10+9+8+7+6+5+4+3+2+1 = 78

- The first month, you pay 12 of the 78 parts of the interest
- The second month, you pay 11 of the 78 parts
- The third month, you pay 10 of the 78 parts
- ...and so on until the twelfth payment of 1 part interest.

To demonstrate, use the same loan scenario for simple interest above: the monthly payment is $478.00 for a $20,000 car loan, at 6.9% interest, for 4 years. To compare this to a loan that uses the rules of 78, you have to know the total interest from a simple interest loan. In this example, the total interest is $2,943.86.

Here's what happens with the rules of 78: Divide the total interest, $2,943.86 by 78 parts, which equals $37.74

Take a look at the amortization table above. The left side of the table shows a $20,000 automobile loan as a simple interest loan, and the right side shows the same loan as a Rules of 78 loan. Take a close look at the 7th payment in the table (each row shows one monthly payment). The balance of the simple interest loan, after the 7th payment as been made, is $17,414.74. Notice the balance of the Rules of 78 loan after the 7th payment has been made: $19,031.62.

After the 7th payment has been made, assume you had to sell this car and you got $17,800 for it. If you had a simple interest loan, you would owe less than the sales price. You would keep $385.26. In the Rules of 78 example, if you sold the vehicle for $17,800 after the 7th payment had been made you would **still owe $1231.62** on the loan. **The difference to you is a whopping $1704.16.**

Over that first year the value of the new car depreciates. This is how many people find themselves **upside down** in their car - which means they owe more on the loan than the car is worth. Why? Because with a rules of 78 loan, the car is depreciating while they're paying mostly interest. They then take the car back to the dealer and give it up as a voluntary repossession. The dealer sells the vehicle for book value but then hits the owner with a **deficiency judgment**, which is what happens when the car is worth less than what's owed on the car loan.

***When considering a new car loan, ask for a simple interest loan.***

## How Extra Payments Work

Go Find It → ***In the Online Course,*** you'll find links to an amortization calculator.

Click the **Amortization** button for these next questions. Assume a mortgage with a $160,000 balance, for 30 years, at 7 percent interest. Assume the first payment was due on August 1, 2005

**5.) What is the mortgage payment? _____**

**6.) If you make regular payments with nothing extra, when is this loan paid in full?**

**_____**

**7.) If you made an extra $25.00 payment each month, when is this loan paid in full?**

**_____**

**8.) If you applied a $500 tax refund to your mortgage, when is this loan be paid in full?**

**_____**

**Look at the "Amortization: How Payments Work" diagram above.**

- The numbers in the upper left represent the monthly payments 1 through 7
- The total fixed monthly payment is $1,000
- The first seven interest payments are: $999,$998,$997,$996,$995,$994,$993...
- The first seven principle payments are: $1,$2,$3,$4,$5,$6,$7...
- The first interest payment plus the first principle payment is $1,000
- The second interest payment plus the second principle payment is $1,000
- ...and etc.

Every one of the individual payments always equals the same number. What changes is the proportion of interest and principle **within the total**.

So what would happen if you sent your mortgage company a check for $1,002 for the first mortgage payment in this example? The lender would apply the first month's interest for $999, the first month's principle for $1, and the second month's principle for $2. The second month's interest **disappears** from the schedule. You're next payment will actually be the 3rd payment in the schedule: $997 interest and $3 principle.

And what if you sent in a check for $1004? You'll skip $996 in interest for the 4th scheduled payment. Your next payment will be for the 6th payment on your schedule. This example reduced a 360 month mortgage to 358 months and saved $1,994 in interest over the life of the loan.

*Remember: You are obligated in a mortgage to make at least one full payment within every 30-day period, due on or before the first. Just because you make additional payments to the principle does not mean you get to wait until the schedule "catches" up, or wait 30 days. Lenders rely upon regular income from mortgages. Paying additional principle is a way for you to manage an asset more to your advantage*

**It is best to make additional principle reduction early in the loan process. Looking at the amortization diagram above, can you guess why?**

**The diagram shows that as the loan gets older, the interest payments get smaller and the *remaining* principle reduces. Why might lenders desire amortization as a financing tool?**

## ANSWERS to questions (DON'T PEEK!)

**1.)** $478
**2.)** $2943.86
**3.)** $363
**4.)** $115
**5.)** $1064.48
**6.)** October 2035
**7.)** August 2033
**8.)** July 2035