NAME: _____ CLASS PERIOD: _____

Everything You Wanted to Know About Figuring Interest

Credit isn't free. The price of credit is called the interest rate, and total interest paid is known as the finance charge. The finance charge is usually stated in dollars, but sometimes it is stated as a percentage of the loan. When stated as a percentage of the loan, it is another way to refer to the interest rate.

The Truth in Lending Law makes comparing credit costs fairly simple. This federal law requires that all lenders state their finance charges and interest rates in the same way. This rate is called the annual percentage rate, or APR. An APR is the rate you pay in a single year on the money you borrow.

Every loan must also state the finance charge. When stated in dollars, the finance charge is the total dollar amount of interest and other fees you must pay on the loan. The amount you borrow is called the principal of the loan. You pay back the principal plus the finance charge. The finance charge depends on the interest rate, the principal, the loan fees, and the length of the loan. The higher the APR and the longer the period of the loan, the higher the finance charge. By using your math skills, you can save big bucks on a loan. Let's find out how.

Part 1: Figuring Simple Interest

First, let's figure some finance charges. Here is the basic formula for figuring out interest:

> **FC = PRT**
>
> **FC: Finance charge or total interest**
> **P: Principal**
> **R: Interest Rate (an add-on rate, expressed in decimal form)**
> **T: Time (in years)**

In this formula, the rate is an add-on rate with one payment of principal. An add-on rate is a simplified way to compute total interest on a loan. It is calculated by simply determining the total interest that is payable on the full principal. This amount is then added to the amount of the principal to determine the total amount owed. Note that this is different from calculating payments according to APR procedures.

This formula assumes that the principal (amount of loan) and the interest are paid in one lump sum at the maturity date (end of loan period). For example, if you borrowed $2,000 at a 12 percent add-on rate for two years, the interest would be $480 ($480 = $2,000 x .12 x 2). The amount of $2,480 (interest and principal) would be repaid at the end of two years.

Questions:

a. Gabrielle Daily borrows $1,000 at a 6 percent add-on rate for one year. What is the finance charge?

b. Jesse Candelaria borrows $2,000 at a 10 percent add-on rate for three years. What is the finance charge?

c. Jessica Tate borrows $2,000 at a 10 percent add-on rate for two years. What is the finance charge?

d. Travis Whitaker borrows $2,000 at an 8 percent add-on rate for two years. What is the finance charge?

e. If you want to reduce the finance charge, should you shop for a higher or lower interest rate? Why?

f. If you want to reduce the finance charge, should you pay back the loan more quickly or less quickly? Why?

Part 2: Figuring Monthly Payments

Most loans are paid back on a monthly basis. Very few are paid back all at once at the maturity value of the loan. The monthly payment is the amount the borrower must pay the lender each month to pay back the loan. The monthly payment covers both principal and an interest finance charge. When using add-on interest, the formula for figuring the monthly payment is:

$$MP = \frac{(P + FC)}{N}$$

MP: Monthly payment

P: Principal of the loan

FC: Finance charge or total interest
(Calculated in the same way as in part 1 above)

N: Number of months the loan is for

For example, you borrow $10,000 at an 8 percent add-on rate for four years.

P = $10,000

FC = ($10,000 x .08 x 4) = $3,200

MP = $\frac{(\$10,000 + \$3,200)}{48}$ = $275

Questions:

a. David Kim borrows $8,000 at an 8 percent add-on rate for two years.
   -What is the finance charge?

   -What is the monthly payment?

b. Marcia Torres borrows $8,000 at an 8 percent add-on rate for four years.
   -What is the finance charge?

   -What is the monthly payment?

c. If a borrower takes longer to pay back a loan, what happens to the monthly payment?

d. If a borrower takes longer to pay back a loan, what happens to the finance charge?

e. What are the costs and benefits of taking longer to pay off a loan?

Part 3: Determining the APR

In the past, lenders advertised interest rates in various ways. In some instances, people were paying higher rates than they thought they would pay because lenders were figuring the rates differently. Consumers had difficulty shopping for credit because of these variations in figuring rates.

Let's look at a couple of examples to illustrate what was being done. Suppose George secures a $1,200 loan at 10 percent add-on interest for one year—a loan that he would pay off (interest and principal) at the end of the year. At the end of the year, he would pay $1,320 to the lender ($1,200 principal plus $120 finance charge). The interest rate advertised for this loan was 10 percent.

Now suppose that Sheila secured a $1,200 loan at 10 percent add-on interest, paying $110 a month. She would be paying a total of $1,320 as well. Before the Truth in Lending Law, the lender probably would have advertised this loan as a 10 percent interest loan, just like the lender for George's loan. In reality, are both of them paying the same interest rate?

They are certainly paying the same amount of interest, but they are not paying the same rate of interest. Why? In the first situation, the person receiving the loan has the full $1,200 for the entire year. In the second situation, part of the $110 a month is going toward the repayment of the loan. Sheila has less of the loan each month because of her monthly payments.

The Truth in Lending Law was established so that individuals shopping for credit could have a common basis for comparing loans. According to this law, the interest rate must be stated as an Annual Percentage Rate (APR), based on the declining balance of the loan. The Truth in Lending Law also requires that the full amount of finance charges (interest plus other charges) must be indicated to the consumer.

There can be variations on the formula for determining the effective APR for a loan. One method using simple interest computations is:

$$APR = \frac{2 \times M \times FC}{P \times (N + 1)}$$

M: **Number of payments per year**
        (For monthly payments this is always 12)

FC: **Finance charge or total interest**

P: **Principal**

N: **Total number of payments**

Let's figure out the APR for Sheila's loan by first looking at the finance charge that she pays.

$120 = $1,200 (principal) X .10 (interest rate) X 1 (number of years)

Now let's figure the annual percentage rate using the APR formula.

$$\text{APR} = \frac{2 \times 12 \times \$120}{\$1200 \times 13} = \frac{\$2880}{\$15,600} = 0.1846 = 18.46\%$$

Notice that the APR for Sheila is much higher than the 10 percent that was probably quoted to her by the lender. If you use the formula for George's loan, you will see that it will come out to 10 percent APR since there was no declining balance on the loan. He always had $1,200 available on the loan.

Questions:

Now let's figure some APRs. All these loans are paid back on a monthly basis.

a. Lisa Rosas borrows $5,000 at a 5 percent add-on rate for one year.
   -What is the finance charge?

   -What is the APR?

b. Brett Olson borrows $6,000 for three years at a 7 percent add-on rate.
   -What is the finance charge?

   -What is the APR?

c. What is the relationship between an APR for an add-on rate for a one-payment loan compared to an APR for an add-on rate on a monthly installment loan?