

MAT 142: College Mathematics

Lecture Notes: Chapter 9 (Part 2)

9.3: Consumer Loans

Add-On Loans:

Formula for Determining the Monthly Payment of an Installment Loan:

$$\text{monthly payment} = \frac{P+I}{n}$$

Example: You have decided to purchase a new counter-length refrigerator, which has a list price of \$1200. You intend to take out an installment loan for two years at an annual interest rate of 18%. If the store is using the add-on interest method, what will be your monthly payments?

How much do you actually end up paying for the refrigerator?

What percent interest does the store actually collect?

Credit Cards – Unpaid Balance Method (uses Simple Interest):

Formula: $I=Prt$ where:

P =previous month's balance + finance charge + purchases made – returns – payments

r =annual interest rate

$t=1/12$ (payments are made each month)

Example: Assume the annual interest rate on your credit card is 12% and your unpaid balance at the beginning of last month was \$500. Since then, you purchased a BBQ for \$399 and sent in a payment of \$300.

- Using the unpaid balance method, what is your credit card bill this month?

b. What is your finance charge next month?

Example: Assume you want to pay off your credit card balance of \$5,520 by paying the minimum amount of \$80 each month. What will your balance be at the end of one month? Assume that the annual interest rate on your card is 18% and that the credit card company is using the unpaid balance method to compute your finance charges.

Credit Cards – Average Daily Balance Method:

1. Add the outstanding balance for your account for each day of the month.
2. Divide the total in step 1 by the number of days in the month to find the average daily balance.
3. To find the finance charge, use the formula $I = Prt$
P=average daily balance in step 2
r=annual interest rate
t=#of days in the month divided by 365

Example: Suppose you begin the month of September (which has 30 days) with a credit card balance of \$180. Assume that your card has an annual interest rate of 18% and that during September the following adjustments are made to your account:

- Sept 10th: A payment of \$100 credited to your account
- Sept 14th: Went out for birthday dinner and charged \$45
- Sept 25th: Fill up gas tank and charged \$55

Use the average daily balance method to compute the finance charge that will appear on your October credit card statement.

Day	Balance	Number of Days X Balance

Average Daily Balance =

Finance Charge=

9.4 Annuities (and Sinking Funds)

Annuity Example: Suppose you start depositing \$100 at the end of each month into an account paying 12% yearly interest compounded monthly. How much money will be in the account after 6 months?

End of Month	Amount after 6 months
January	
February	
March	
April	
May	
June	
Total Amount:	

Formula for Future Value for Annuities:

Sinking Fund Example: How much money would you have to deposit each month to have \$12,000 in an account that pays 6% interest compounded monthly after 8 years?

Constructing an Amortization Table:

A portion of each month's payment pays interest on your loan and the rest towards the amount you owe. These amounts change each month:

Let's go back to the original loan and complete the Amortization Table below for the first 6 payments of your car:

End of Month	Payment	Interest	Principal	Balance
0	\$238.72			\$11,500
1	\$238.72	$11500(.09)(1/12)$ =\$86.25	$238.72-86.25$ =\$152.47	$11500-152.47$ =\$11,347.53
2	\$238.72	$11347.53(.09)(1/12)$ =\$85.11	$238.72-85.11$ =\$153.61	$11347.53-153.61$ =\$11,193.92
3	\$238.72			
4	\$238.72			
5	\$238.72			
6	\$238.72			

Online Amortization Table: There are many amortization calculators available online. One site that also provides an amortization table is:

<http://www.bankrate.com/calculators/mortgages/mortgage-calculator.aspx>

Try this same problem using the calculator on the bankrate site.

