Objectives

1. Determine the amount financed, the installment price, and the finance charge for a fixed loan.
2. Determine the APR.
3. Find the interest, the balance due, and the minimum monthly payment for credit card loans.
4. Calculate interest on credit cards using three methods.

■ Fixed Installment Loans

- The *amount financed* is what the consumer _borrows_ :

  > Amount financed = cash price – down payment.

- The *total installment price* is the _sum_ of all monthly payments plus the down payment:

  > Total Installment Price = Total of all monthly payments + down payment.

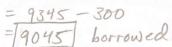- The _finance charge_ is the interest on the installment loan:

  > Finance charge = Total installment price - Cash price.

  Find interest:
  SUBTRACT

cash price

Example 1: The cost of a used pick-up truck is $9345. We can finance the truck by paying $300 down and $194.38 per month for 60 months.

a. Determine the amount financed. = cash price − down payment

$$= 9345 - 300$$
$$= \boxed{9045} \text{ borrowed}$$

b. Determine the total installment price. =

monthly payments + down payment
$$(\$194.38)(60) + \$300$$
$$\$11,662.80 + \$300 = \boxed{\$11,962.80} \text{ Total}$$

c. Determine the finance charge.

↓

Interest

How much extra did you pay?

SUBTRACT!

$$11,962.80 \quad \text{Total}$$
$$- 9,345.00 \quad \text{cash price}$$
$$\boxed{\$2617.80} \quad \text{FINANCE CHARGE}$$

■Annual Percentage Rate (APR)

Steps in using the APR table below:

$$\text{Finance charge per \$100 financed} = \frac{\text{Finance charge}}{\text{Amount financed}} \times \$100.$$

1. Compute the finance charge per $100 financed:
2. Look in the row (in table below) corresponding to the number of payments to be made and find the entry closest to the value in step 1.
3. Find the APR at the top of the column in which the entry from step 2 is found. This is the APR rounded to the nearest ½%.

Annual Percentage Rate APR Table

TABLE 8.3 ANNUAL PERCENTAGE RATE (APR) FOR MONTHLY PAYMENT LOANS

Number of Monthly Payments	Annual Percentage Rate (APR)												
	10.0%	10.5%	11.0%	11.5%	12.0%	12.5%	13.0%	13.5%	14.0%	14.5%	15.0%	15.5%	16.0%
	(Finance charge per $100 of amount financed)												
6	$2.94	$3.08	$3.23	$3.38	$3.53	$3.68	$3.83	$3.97	$4.12	$4.27	$4.42	$4.57	$4.72
12	5.50	5.78	6.06	6.34	6.62	6.90	7.18	7.46	7.74	8.03	8.31	8.59	8.88
18	8.10	8.52	8.93	9.35	9.77	10.19	10.61	11.03	11.45	11.87	12.29	12.72	13.14
24	10.75	11.30	11.86	12.42	12.98	13.54	14.10	14.66	15.23	15.80	16.37	16.94	17.51
30	13.43	14.13	14.83	15.54	16.24	16.95	17.66	18.38	19.10	19.81	20.54	21.26	21.99
36	16.16	17.01	17.86	18.71	19.57	20.43	21.30	22.17	23.04	23.92	24.80	25.68	26.57
48	21.74	22.90	24.06	25.23	26.40	27.58	28.77	29.97	31.17	32.37	33.59	34.81	36.03
60	27.48	(28.96)	30.45	31.96	33.47	34.99	36.52	38.06	39.61	41.17	42.74	44.32	45.91

Example 2: In the previous example, we found that the amount financed for the truck was $9045 and the finance charge was $2617.80. The borrower financed the truck with 60 monthly payments. Use the table to determine the APR.

Solution: Step 1. Find the finance charge per $100 of the amount financed.

$$\text{Finance charge per \$100 financed} = \frac{\text{Finance charge}}{\text{Amount financed}} \times \$100 \qquad \frac{2617.80}{9045} \times 100$$

$$= 28.94$$

This means that the borrower pays $ _28.94_ interest for each $100 being financed.

Step 2. We look for 60 in the left column since we make 60 monthly payments. Move to the right until you find the amount closest to the finance

charge of $ _28.96_ .

Step 3. **Find the APR.** Look at the corresponding APR for $28.96 at the top of the column.

Thus, the APR for the fixed installment truck loan is approximately _10.5_ %.

■ Open-end Installment Loans

- Using a credit card is an example of an open-end installment loan, commonly called __revolving__ __credit__.
- Customers receive a statement, called an __itemized__ __billing__.

■ Methods for Calculating Interest on Credit Cards:

Use $I = Prt$, where r is the monthly rate and t is one month.

$$\text{monthly rate} = \frac{\text{annual rate}}{12}$$

Unpaid balance method: The principal, P, is the balance on the first day of the billing period less payments and credits.

Previous balance method: The principal, P, is the unpaid balance on the first day of the billing period.

Average daily balance method (this is the most __common__ method used by credit cards): The principal, P, is the *average daily balance*. This is determined by adding the unpaid balances for each day in the billing period and dividing by the number of days in the billing period.

$$\text{Average Daily Balance} = \frac{(balance)(\# \ of \ days) + (balance)(\# \ of \ days) + \ ...}{\# \ of \ days \ in \ that \ month}$$

Example 1: Christian's credit card company starts each billing period on the first day of each month, and it uses the <u>unpaid balance method</u>. His starting balance in January was $300.00. Christian made the following purchases and payments in January:

a) What is Christian's unpaid balance for <u>January</u>?

Date	Description	Amount
January 6th	College Textbooks	$450
January 11th	Car Insurance Payment	$154
January 15th	Payment Received	$35
January 20th	Dinner and a movie	$79

$$\begin{array}{r} 300 \\ -35 \\ \hline 265 \end{array} \text{ unpaid balance}$$

b) Christian's credit card has an <u>annual interest rate</u> of 18%. What is the monthly interest rate? How much interest will he pay in January? (Hint: divide the annual interest rate by ___12___ and then use the simple interest formula.)

$$\frac{18\%}{12} = 1.5\% = .015$$

$$\begin{aligned} I &= Prt \\ &= 265(.015)(1) \\ &= 3.98 \end{aligned}$$

c) What is Christian's balance on the credit card by the end of the January billing period?

$$\underbrace{265}_{\substack{\text{unpaid}\\\text{balance}}} + \underbrace{3.98}_{\text{interest}} + \underbrace{450 + 154 + 79}_{\text{new charges}} = 951.98$$

d) This credit card requires a $10 minimum monthly payment if the total balance owed on the last day of the billing period is less than $360. Otherwise, the minimum monthly payment is 1/36 of the balance owed on the last day of the billing period, rounded to the nearest whole dollar. What is the minimum monthly payment due by February 15?

$$\frac{951.98}{36} = 26.44$$

e) Christian will make the minimum payment in February, and decides not to make any other purchases. His payment is received on <u>February 15th</u>. How much interest will Christian pay in February? What is his balance at the end of February?

$$\begin{array}{r} 951.98 \\ -26.44 \\ \hline 925.54 \end{array}$$

$$\begin{aligned} I &= Prt \\ &= (925.54)(.015)(1) \\ &= 13.88 \end{aligned}$$

$$\begin{array}{r} 925.54 \\ +13.88 \\ \hline 939.42 \end{array}$$

f) In March, Christian makes no purchases and pays the minimum monthly payment on <u>March 15th</u>. What is his balance by the end of March? (Be certain to find the interest paid and include this in his balance.)

$$\frac{939.42}{36} = 26.10 \quad \text{Min. payment}$$

$$\begin{array}{r} 939.42 \\ -26.10 \\ \hline 913.32 \end{array} \text{ unpaid balance}$$

$$\begin{aligned} I &= Prt \\ &= (913.32)(.015)(1) \\ &= 13.70 \end{aligned} \quad \text{Interest}$$

$$\begin{array}{r} 913.32 \\ +13.70 \\ \hline 927.02 \end{array} \text{ new balance}$$