

## 11.4 Installment Buying

Mathematical Concepts

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There are two types of installment loans:

- ▶ fixed payment
- ▶ open-end

*Advantage:* buyer has use of an article while paying for it.

*Disadvantages:*

- ▶ one may buy more on the installment plan than they can afford.
- ▶ the interest the borrower pays for the loan

The *annual percentage rate (APR)* is the true rate of interest charged for the loan.

The total *finance charge* is the total amount of money the borrower must pay for borrowing the money.

The *total installment price* is the sum of all the monthly payments and the down payment, if any.

A *fixed installment loan* is one on which you pay a fixed amount of money for a set number of payments.

Examples of items purchased

- ▶ college tuition loans
- ▶ cars, boats, appliances and furniture loans

a) From the table finance

Charge per \$100 for 24 months  
at 7% is \$7.45

Hundreds of dollars financed  
is  $\frac{\$1500}{100} = 15$

1. Window blinds Total finance charge

$$\begin{aligned} &= \$7.45 \times 15 \\ &= \boxed{\$111.75} \end{aligned}$$

Kristin Aiken wishes to purchase new window blinds for her house at a cost of \$1500. The home improvement store has an advertised finance option of no down payment and 7% APR for 24 months.

- Determine the finance charge.
- Determine Kristin's monthly payment.

$$\begin{aligned} \text{Total installment price} \\ &= \$1500 + \$111.75 \\ &= \$1611.75 \end{aligned}$$

$$\begin{aligned} \text{Monthly Payment} \\ &= \frac{\$1611.75}{24} \end{aligned}$$

$$\approx \boxed{\$67.16}$$

$$\begin{aligned}
 \text{a) Total installment price} & \\
 &= \$5000 + (60 \times \$410.33) \\
 &= \$29,619.80
 \end{aligned}$$

$$\begin{aligned}
 \text{Finance charge} & \\
 &= \$29,619.80 - \$25,000 \\
 &= \boxed{\$4619.80}
 \end{aligned}$$

2. Determining the APR =

Jan Ford is purchasing a new boat for \$25,000, including taxes. Jan decides to make a \$5,000 down payment and finance the balance, \$20,000, through her bank. The loan officer informs her that her monthly payment will be \$410.33 for 60 months.

- Determine the finance charge.
- Determine the APR.

$$\begin{aligned}
 \text{b) Finance charge per } \$100 & \\
 \text{of amount financed} & \\
 \frac{4619.80}{20,000} \times 100 &\approx \$23.10
 \end{aligned}$$

From the table  
 60 payments, \$23.10 charge per \$100  
 $\boxed{\text{APR} = 8.5\%}$

$$\begin{aligned}
 & \text{Finance charge} \\
 & = (237 \times 48) - 9800 \\
 & = 11,376 - 9800 \\
 & = \$1576
 \end{aligned}$$

### 3. Financing a Restored Car

Tino Garcia borrowed \$9800 to purchase a classic 1966 Ford Mustang. He does not recall the APR of the loan but remembers that there are 48 payments of \$237. If he did not make a down payment on the car, determine the APR.

Finance charge per \$100 financed

$$\frac{1576}{9800} \times 100 \approx \$16.08$$

From Tables

48 payments, \$16.08 per \$100

APR  $\approx$  7.5%

An *open-end installment loan* is a loan on which you can make variable payments each month.

Example: Credit card loans

- ▶ For *purchases*, there is no finance or interest charge if there is no previous balance due and you pay the entire new balance by the payment due date.
- ▶ The *grace period* is the period between when a purchase is made and when the credit card company begins charging interest.
- ▶ If you use a credit card to borrow money (*cash advance*), there is no grace period and a finance charge is applied from the date you borrowed the money until the date you repay the money.



a) No new interest due  
 minimum monthly payment is  
 1.5% of outstanding principal  
 $0.015 \times \$1500 = \$22.50$

About \$23

## 5. Calculating Minimum Monthly Payments

Mary Beth Orrange's credit card company determines her minimum monthly payment by adding any new interest owed to 1.5% of the outstanding principal. The credit card company charges an interest rate of 0.04792% per day. For Mother's Day, May 17, Mary Beth used her credit card to purchase a \$1500 plasma television set for her mother. She made no other purchases in May.

- Assuming Mary Beth owed no interest, determine Mary Beth's minimum payment due on June 1, her billing date.
- On June 1, instead of making the minimum payment, Mary Beth makes a payment of \$200. Assuming there are no additional charges or cash advances, determine Mary Beth's payment due on July 1.

$$\begin{aligned} \text{b) } I &= prt & P &= 1500 - 200 \\ & & &= 1300 \\ & & &= 1300 \times 0.00004792 \times 30 \\ & & &\approx \$18.69 \end{aligned}$$

$$\begin{aligned} 1.5\% : 0.015 \times \$1300 &= \$19.50 \\ \text{payment} &= \$18.69 + \$19.50 \\ &= \$38.19 \end{aligned}$$

≈ \$39

a) Finance Charges is based on the \$275 balance due Nov 5

$$i = prt$$
$$= \$275 \times 0.013 \times 1$$
$$\approx \boxed{\$3.58}$$

## 6. Finance Charges Using the Unpaid Balance Method

In October, Ed Laughbaum charged all the supplies for his Halloween party to his Visa card. On November 5, the billing date, Ed had a balance due of \$275. From November 5 through December 4, he did some shopping and charged items totaling \$320, and he also made a payment of \$145.

- Determine the finance charge due on December 5, Ed's next billing date, using the unpaid balance method. Assume that the interest rate charged is 1.3% per month.
- Determine the new account balance on December 5.

$$\begin{aligned} \text{balance due} &= (\text{Costs of new} \\ &\text{purchases}) + (\text{interest}) + \\ &(\text{balance due Nov 5}) - \\ &(\text{payments made}) \\ &= \$275 + \$320 + \$3.58 - \$145 \\ &= \boxed{\$453.58} \end{aligned}$$

$$\text{Amount} = (\text{Original principal}) + (\text{accrued interest})$$

### 8. Using a Credit Card for a Cash Advance

To obtain money to buy a stereo system, Bobby Bueker obtained a cash advance of \$1500 from his credit card. He borrowed the money on July 10 and repaid it on July 31. If Bobby is charged an interest rate of 0.05477% per day, how much did Bobby pay the credit card company on July 31?

$$\begin{aligned} i &= prt \\ &= \$1500 \times 0.0005477 \times 21 \\ &= \$17.25 \\ \text{Amount} &= \$1500 + \$17.25 \\ &= \boxed{\$1517.25} \end{aligned}$$

