

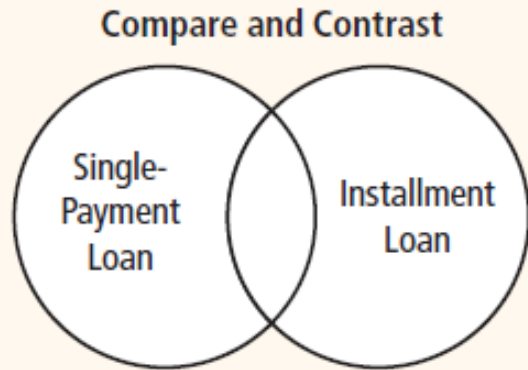
Ch 8 Loans

Main Idea

Someday you may want to borrow money for a student loan or to buy a car or purchase a home. Taking out a loan is a common way to borrow the money now and repay it later or over a period of time.

Graphic Organizer

Before you read this chapter, draw a diagram like the one below. As you read, compare and contrast the two types of loans.



Content Vocabulary

You will learn these key terms in this chapter.

- single-payment loan
- promissory note
- maturity value
- term
- ordinary interest
- exact interest
- installment loan
- down payment
- amount financed
- annual percentage rate
- repayment schedule
- final payment

Academic Vocabulary

You will see these words in your reading and on your tests.

- principal
- specify
- index
- allocate
- motive
- financed

LESSON 8.1

Single-Payment Loans

Lesson Objective

Compute the maturity value and interest rate of a single-payment loan.

Content Vocabulary

- single-payment loan
- promissory note
- maturity value
- term
- ordinary interest
- exact interest

As You Read

Summarize

What is a single-payment loan?

GET READY for the Lesson

If you had a dream for starting a business, how would you finance it?

Hailey Hannigan always dreamed of opening a ballet studio. She taught ballet at a local studio for several years in order to save money, but when the time was right, she took out a loan to open her own business.



Single-Payment Loans A **single-payment loan** is a loan that you repay with one payment after a specified period of time. A business may be short of funds and need to borrow money to meet its payroll or pay for inventory and supplies. The business owner could sign a promissory note with its financial institution. A **promissory note** is a written promise to pay a certain sum of money on a specific date in the future. The **maturity value** of the loan is the total amount you must repay. It includes both the principal and the interest owed. Remember from Chapter 5 that **principal** is the amount borrowed.

A loan's **term** is the amount of time for which the loan is granted. For example, a single-payment loan may be granted for a number of years, months, or days. When the term is a specific number of days, the lending agency may calculate interest in one of two ways:

1. **Ordinary interest** is based on a 360-day year.
2. **Exact interest** is based on a 365-day year.

The following formulas are used:

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\text{Ordinary Interest} = \text{Principal} \times \text{Rate} \times \frac{\text{Time}}{360}$$

$$\text{Exact Interest} = \text{Principal} \times \text{Rate} \times \frac{\text{Time}}{365}$$

$$\text{Maturity Value} = \text{Principal} + \text{Interest}$$

EXAMPLE 1

Anita Sloane's bank granted her a single-payment loan of \$7,200 for 91 days to pay for new merchandise for her candle shop. Determine the maturity value of the loan if the rate is (a) 6% ordinary interest or (b) 6% exact interest.

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Step 1: Find the ordinary interest owed.

$$\begin{aligned}\text{Ordinary Interest} &= \text{Principal} \times \text{Rate} \times \frac{\text{Time}}{360} \\ \$109.20 &= \$7,200.00 \times 0.06 \times \frac{91}{360}\end{aligned}$$

Step 2: Find the maturity value with ordinary interest.

$$\begin{aligned}\text{Maturity Value} &= \text{Principal} + \text{Interest} \\ \$7,309.20 &= \$7,200.00 + \$109.20\end{aligned}$$

Step 3: Find the exact interest owed.

$$\begin{aligned}\text{Principal} \times \text{Rate} \times \frac{\text{Time}}{365} \\ \$7,200.00 \times 0.06 \times \frac{91}{365} = \$107.704 = \$107.70 \text{ Exact Interest}\end{aligned}$$

Step 4: Find the maturity value with exact interest.

$$\begin{aligned}\text{Maturity Value} &= \text{Principal} + \text{Interest} \\ \$7,307.70 &= \$7,200.00 + \$107.70\end{aligned}$$

$$1 \times 0.06 \times 90 = 0.54 \times 7200 = 3888$$

EXAMPLE 2 Algebra

$$b. mv = \$4,850 + \$111.62 = \$4,961.62$$

Claudia Valdez took out a single-payment loan for \$1,500.00 at 7.8% ordinary interest to pay her federal income tax bill. If the loan's maturity value is \$1,529.25, when would Claudia have to pay back the loan if she took it out on March 1?

Step 1: Find the interest

$$\text{Maturity Value} = \text{Principal} + \text{Interest} \text{ or } \text{Interest} = \text{Maturity Value} - \text{Principal}$$

$$\text{Interest} = \$1,529.25 - \$1,500.00 = \$29.25$$

Step 2: Find the time of the loan in days, t .

$$\text{Ordinary Interest} = \text{Principal} \times \text{Rate} \times \frac{t}{360}$$

$$\$29.95 = \$1,500.00 \times 0.078 \times \frac{t}{360}$$

$$\$10,530 = \$117t$$

$$90 = t$$

Claudia would have to pay back the loan in 90 days.

Step 3: Find the due date. Use the *Elapsed Time Table* on page A10. March 1 is day $60 + 90$ days = day 150, which is May 30.

Multiply both sides by 360 →

Divide both sides by \$117 →

3. Let t = How long it would take in days

$$\$50,000 = \$548,048$$

$$\times 0.09 \times \frac{t}{365}$$

$$\$18,250,000 =$$

$$\$49,324.32t$$

$$370 = t$$

C

LESSON 8.2

Installment Loans— Amount Financed

Lesson Objective

Calculate the down payment and the amount financed on an installment loan.

Content Vocabulary

- installment loan
- down payment
- amount financed

GET READY for the Lesson

If you were interested in starting a small business, what would it be?

Kerry Holland decided to turn his experience in doing yard work for his parents into a business. His first clients were neighbors. Soon he had so much business that he had to purchase equipment and hire a friend to help him.



As You Read

Summarize
What is a down payment?

Installment Loans You could apply for an installment loan to finance the purchase of a new or used vehicle, such as a car, truck, or motorcycle. You repay an **installment loan** in equal payments over a **specified** period of time. Usually when you purchase an item with an installment loan, you must make a down payment. The **down payment** is a portion of the cash price of the item you are purchasing before financing the rest on credit. It could be a dollar amount or a percent of the cash price. The **amount financed** is the portion of the cash price that you owe after making the down payment. The formulas to calculate the amount

$$\text{Amount Financed} = \text{Cash Price} - \text{Down Payment}$$

$$\text{Down Payment} = \text{Cash Price} \times \text{Percent}$$

Amount Financed = Cash Price – Down Payment

Down Payment = Cash Price \times Percent

EXAMPLE 1

Trudy Quintero is buying gym equipment for \$1,399. She makes a \$199 down payment and finances the remainder. How much does she finance?

Find the amount financed.

Cash Price – Down Payment

$\$1,399 - \$199 = \$1,200$ amount financed

Trudy financed \$1,200.

Concept CHECK

Complete the problems by determining the amount financed. Check your answers in the back of the book.

1. Melina Vardalos purchased season concert tickets for \$1,999.99. The down payment is \$199.99. $\$1,999.99 - \$199.99 = \$1,800$
2. Bertellini Dentistry purchased new equipment for \$3,950. The down payment is \$150. $\$3,950 - \$150 = \$3,800$

Equivalents

“Twenty percent” can be written in many different ways: 20%, 0.2, $\frac{20}{100}$, $\frac{2}{10}$, $\frac{1}{5}$.

EXAMPLE 2

Roslyn Clay purchased a previously owned piano for \$1,140 using the store’s installment credit plan. She made a 20% down payment and financed the remaining amount. What amount did she finance?

Step 1: Find the 20% down payment.

$$\text{Down Payment} = \$1,140 \times 20\% = \$228$$

Roslyn made a \$228 down payment.

Step 2: Find the amount financed.

$$\text{Amount Financed} = \text{Cash Price} - \text{Down Payment}$$

$$\$912 = \$1,140 - \$228$$

She financed \$912.



1140 M+ × 20 % 228 M- RM 912

LESSON 8.3

Installment Loans—Monthly Payment & Finance Charge

Lesson Objective

Calculate the monthly payment, total amount repaid, and finance charge on an installment loan.

Content Vocabulary

- annual percentage rate (APR)

▶ GET READY for the Lesson

Why is it important to have a good credit score?

Jenny Foster is a science major in college. She knows she wants to open her own biotechnology company someday and that she may have to take out a loan, so she is working hard to make sure she has a good credit score. Jenny keeps a low balance on her credit cards and pays her student loans and credit card bills on time.



As You Read

Explain What factors affect the amount of each monthly loan payment?

Installment Loans When you obtain an installment loan, you must pay finance charges for the use of the money. You repay the loan with equal monthly payments over a specified period of time. Part of each payment pays the interest on the loan's unpaid balance. The remaining part of the payment is used to reduce the balance of the loan principal.

The amount of each monthly payment depends on the amount financed, the number of payments, and the annual percentage rate. The **annual percentage rate (APR)** is an **index** showing the cost of borrowing money on a yearly basis, expressed as a percent. You will need to refer to the *Monthly Payment on an Installment Loan of \$100* table on page A13 for a table value to calculate related amounts.

The following formulas are used:

The following formulas are used:

$$\text{Monthly Payment} = \frac{\text{Amount of Loan}}{\$100} \times \text{Monthly Payment for a \$100 Loan}$$

$$\text{Total Amount Repaid} = \text{Number of Payments} \times \text{Monthly Payment}$$

$$\text{Finance Charge} = \text{Total Amount Repaid} - \text{Amount Financed}$$

EXAMPLE 1

Blake and Jacqueline Toepfer are purchasing a \$1,399.99 side-by-side refrigerator with an installment loan that has an APR of 12%. The store financing requires a 10% down payment and 12 monthly payments. What is the finance charge?

Step 1: Find the amount financed.

$$\text{Amount Financed} = \text{Selling Price} - \text{Down Payment}$$

$$\$1,399.99 - (0.10 \times \$1,399.99)$$

$$\$1,399.99 - \$140.00 = \$1,259.99$$

Step 2: Find the monthly payment. (Refer to the *Monthly Payment on an Installment Loan of \$100* table on page A13 for a table value)

$$\frac{\text{Amount of Loan}}{\$100} \times \text{Monthly Payment for a \$100 Loan}$$

$$\frac{\$1,259.99}{\$100} \times \$8.88 = \$111.887 = \$111.89 \text{ Monthly Payment}$$

Continued on next page

Need Help? Go to...

- **Workshop 6:**
Multiplying Decimals,
p. 14
- **Workshop 5:**
Subtracting Decimals,
p. 12
- **Workshop 18:**
Reading Tables and
Charts, p. 38
- **Application C:**
Tables and Charts,
p. AP3

Step 3: Find the total amount repaid.

Total Amount Repaid = Number of Payments \times Monthly Payment

$$\$1,342.68 = 12 \times \$111.89$$

Step 4: Find the finance charge.

Finance Charge = Total Amount Repaid – Amount Financed

$$\$82.69 = \$1,342.68 - \$1,259.99$$



Complete the problem. Check your answer in the back of the book.

1. Ingrid Nilsen purchased a \$4,000 gazebo for her garden. The down payment is 20%, and the installment loan has an APR of 10% for 36 months. Find the (a) down payment, (b) amount financed, (c) monthly payment, (d) total amount repaid, and (e) finance charge.

EXAMPLE 2 Algebra

Compute the monthly payment on an installment loan using this formula:

$$\text{Monthly Payment} = \frac{pr(1.00+r)^n}{(1.00+r)^n - 1.00}$$

Where p = Principal or the amount of the loan.

r = Rate per payment (APR divided by number of payments per year)

n = Number of payments required to pay off the loan.

Solving problems with the formula requires the use of a y^x key on your calculator.

Harry Mills obtained a \$4,500 installment loan at an APR of 9%. He must repay the loan in 24 months. Find the (a) monthly payment using the formula, then (b) total amount repaid, and (c) finance charge.

Step 1: First, $r = \frac{9\%}{12} = \frac{0.09}{12} = 0.0075$ and $n = 24$

Step 2: Then, substitute into the monthly payment (mp) formula:

$$\begin{aligned} mp &= \frac{pr(1.00+r)^n}{(1.00+r)^n - 1.00} \\ &= \frac{4500(0.0075)(1.00+0.0075)^{24}}{(1+0.0075)^{24} - 1.00} \\ &= \frac{33.75(1.196413529)}{1.196413529 - 1.00} \\ &= \frac{40.37895662}{0.196413529} \end{aligned}$$

$$mp = \$205.58134 = \$205.58$$

Harry's monthly payment will be \$205.58.

[If you worked this problem using the table on p. A13, you would get a monthly payment of $(\frac{\$4,500}{\$100} \times \$4.57)$, or \$205.65. The difference is due to rounding in the table.]

Step 3: Find the total amount repaid.

$$24 \times \$205.58 = \$4,933.92$$

Step 4: Find the finance charge.

$$\$4,933.92 - \$4,500.00 = \$433.92$$



Complete the problem. Check your answer in the back of the book.

- Lisa McCorkle purchased her new \$45,000 automobile with a \$5,000 down payment and financed the rest with an installment loan for 72 months at an annual percentage rate of 6%. Find Lisa's (a) monthly payment, (b) total amount repaid, and (c) finance charge.

LESSON 8.4

Installment Loans— Monthly Payment Allocation

Lesson Objective

Calculate the payment to interest, payment to principal, and new balance.

Content Vocabulary

- repayment schedule

▶ GET READY for the Lesson

If you needed to take a loan, what factors other than loan rates would you look for?

Freddie Perez wanted to obtain a loan to pay for classes required to become an ASE certified automotive technician. State Bank and CAA Credit Union were offering the same terms for the loan. Freddie decided to take the State Bank loan because he had his checking account there and because State Bank offered online banking.



As You Read

Explain How do you allocate installment loan payments?

Allocation of Payment on Installment Loans As you learned in Lesson 8.3, an installment loan is repaid in equal monthly payments. Part of each payment is **allocated** to pay the interest on the unpaid balance of the loan, and the remaining part is used to reduce the balance. The interest is calculated each month on the unpaid balance using the simple interest formula. The amount of principal that you owe *decreases* with each monthly payment. The formulas follow:

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\text{Payment to Principal} = \text{Monthly Payment} - \text{Interest}$$

$$\text{New Principal} = \text{Previous Principal} - \text{Payment to Principal}$$

A **repayment schedule** shows the distribution of interest and principal over the life of a loan. The repayment schedule in Figure 8.1 shows the interest and principal on an \$1,800 installment loan for 6 months at 8%.

Figure 8.1

Repayment Schedule for a \$1,800 Loan at 8.0% for 6 Months				
Payment Number	Monthly Payment	Amount for Interest	Amount for Principal	Balance \$1,800.00
1	\$307.08	\$12.00	\$295.08	\$1,504.92
2	307.08	10.03	297.05	1,207.87
3	307.08	8.05	299.03	908.85
4	307.08	6.06	301.02	607.82
5	307.08	4.05	303.03	304.80
6	307.08	2.03	305.05	-0.25

Note that the last payment could be \$306.83 to zero out the loan.

EXAMPLE 1

Melinda and Xavier Garza obtained a loan for a used pickup truck. See the loan of \$1,800 at 8% for 6 months in the repayment schedule in Figure 8.1. Show the calculation for the first payment. What are the (a) interest, (b) payment to principal, and (c) new principal after they make the first payment?

Step 1: Find the interest.

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\$12 = \$1,800.00 \times 8\% \times \frac{1}{12}$$

Step 2: Find the payment to principal.

$$\text{Payment to Principal} = \text{Monthly Payment} - \text{Interest}$$

$$\$295.08 = \$307.08 - \$12.00$$

Step 3: Find the new principal.

$$\text{New Principal} = \text{Previous Principal} - \text{Payment to Principal}$$

$$\$1,504.92 = \$1,800.00 - \$295.08$$

Concept Check

Complete these problems. Check your answers in the back of the book. Regarding the loan for the Garzas from Example 1, compute the second month values for:

- The interest. $\$307.08 - \$10.03 = \$297.05$
- The payment to principal. $\$1,504.92 - \$297.05 = \$1,207.87$
- The new balance.

EXAMPLE 2

Anton Grindenko obtained a \$6,000.00 loan to update his café's kitchen equipment at 8% for 36 months. The monthly payment is \$187.80. The balance of the loan after 20 payments is \$2,849.08. What is the interest for the first payment? What is the interest for the 21st payment? Why is the interest so much different for the two payments?

Step 1: Find the interest for the first payment.

$$\text{Interest for First Payment} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\$40.00 = \$6,000.00 \times 8\% \times \frac{1}{12}$$

Anton pays \$40.00 interest in the first payment.

Step 2: Find the interest for the 21st payment.

$$\text{Interest for 21st Payment} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\$18.99 = \$2,849.08 \times 8\% \times \frac{1}{12}$$

Anton pays \$18.99 interest in the 21st payment.

The interest in the 21st payment is reduced by more than half because the principal on which the interest is calculated for the first payment is much higher than the principal on which the interest for the 21st payment is calculated.

Concept CHECK

Complete this problem. Check your answers in the back of the book.

4. You take out an \$8,000 loan on a new motorcycle at 12% for 24 months. The monthly payment is \$376.80. The balance of the loan after 15 payments is \$3,222.44. What is the interest for the (a) first payment and (b) 16th payment? a. $\$8,000 \times 12\% \times \frac{1}{12} = \80

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LESSON 8.5

Paying Off Installment Loans

Lesson Objective

Compute the final payment when paying off an installment loan.

Content Vocabulary

- final payment

▶ GET READY for the Lesson

If you want to continue your education after high school, how would you pay the related costs?

Frank Sutton decided to go to college. He completed the Free Application for Federal Student Aid (FAFSA) form and applied for scholarships. Frank also saved money from summer jobs to help pay for books.



As You Read

Identify What is included in a final loan payment?

Determining the Final Payment When you have an installment loan, you pay interest on the unpaid balance. You might have a simple interest installment loan for a car and sell the car before the end of the loan term. If so, you pay only the previous balance plus the current month's interest. This is known as the **final payment**. Note that there may be a penalty for paying off a loan early.

One **motive** to pay off a loan before the end of the term is to pay less interest. The amount of interest saved depends on the total payback minus the sum of the previous payments and the final payment. You will need to use three formulas:

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\text{Final Payment} = \text{Previous Balance} + \text{Current Month's Interest}$$

$$\text{Interest Saved} = \text{Total Payback} - (\text{Sum of Previous Payments} + \text{Final Payment})$$

- ➔ **Workshop 4:** Adding Decimals, p. 10
- ➔ **Workshop 5:** Subtracting Decimals, p. 12
- ➔ **Workshop 6:** Multiplying Decimals, p. 14
- ➔ **Workshop 14:** Finding a Percentage, p. 30

EXAMPLE 1

See Figure 8.2 for the first 3 months of the repayment schedule for Darlene and Hayden Grant's home repair loan of \$1,800 at 12% interest for 6 months. What is the final payment if they pay the loan off with the fourth payment?

Repayment Schedule for a \$1,800 Loan at 12.0% for 6 Months				
Payment Number	Monthly Payment	Amount for Interest	Amount for Principal	Balance
				\$1,800.00
1	\$310.50	\$18.00	\$292.50	1,507.50
2	310.50	15.08	295.42	1,212.08
3	310.50	12.12	298.38	913.70

Figure 8.2

Step 1: Find the previous balance.

Read the repayment schedule for the balance after the third payment. It is \$913.70.

Step 2: Find the interest for the fourth month.

Principal \times Rate \times Time

$$\$913.70 \times 12\% \times \frac{1}{12} = \$9.137 = \$9.14 \text{ Interest (fourth month)}$$

Step 3: Find the final payment.

Final Payment = Previous Balance + Current Month's Interest

$$\$922.84 = \$913.70 + \$9.14$$

Reading Math

Brackets []

When solving an equation with brackets, do the math in the brackets first.

Concept Check

Complete this problem. Check your answer in the back of the book.

- You plan to finance the purchase of a \$1,200.00 electric scooter with a 12-month loan at 12% interest with a balance of \$816.04 after the fourth payment. What is the final payment amount if you pay off the loan with the fifth payment? $i = \$816.04 \times 0.12 \times \frac{1}{12} = \$8.1604 = \$8.16$;

$$\text{Final Payment} = \$816.04 + \$8.16 = \$824.20$$

EXAMPLE 2

How much would the Grants in Example 1 save by paying off the loan early?

Find the interest saved.

$$\begin{aligned}\text{Interest Saved} &= \text{Total Payback} - (\text{Sum of Previous Payments} + \text{Final Payment}) \\ &= (6 \times \$310.50) - [(3 \times \$310.50) + \$922.84] \\ &= \$1,863.00 - [\$931.50 + \$922.84] \\ \$8.66 &= \$1,863.00 - \$1,854.34\end{aligned}$$

They saved \$8.66.

Concept Check

Complete this problem. Check your answer in the back of the book.

2. In Problem 1, you had a 12-month loan of \$1,200.00 at 12% interest to purchase an electric scooter. The balance after the fourth payment of \$106.56 is \$816.04. How much do you save by paying off the loan with the fifth payment?

$$\begin{aligned}(12 \times \$106.56) - [(4 \times \$106.56) + \$824.20] \\ \$1,278.72 - (\$426.24 + \$824.20) \\ \$1,278.72 - \$1,250.44 = \$28.28\end{aligned}$$

Determining the APR

Lesson Objective

Determine the annual percentage rate of a loan using a table and a formula.

GET READY for the Lesson

Why should you compare the cost related to different loans?

Ben Jackson would like to attend culinary school. He researches several loan options and compares the offers.



As You Read

Describe Why should you know a loan's APR?

Determining the APR You should know that a lender who gives you an installment loan must tell you the annual percentage rate (APR). If you know the number of monthly payments and the finance charge per \$100 of the amount **financed**, you can determine the loan's APR. You can use a table such as **Figure 8.3** to find the APR. With this information, you can compare the cost related to different loans.

Figure 8.3

Annual Percentage Rate for Monthly Payment Plans											
Annual Percentage Rate											
	10.00%	10.25%	10.50%	10.75%	11.00%	11.25%	11.50%	11.75%	12.00%	12.25%	12.50%
Term	Finance Charge per \$100 of Amount Financed										
6	\$ 2.94	\$ 3.01	\$ 3.08	\$ 3.16	\$ 3.23	\$ 3.31	\$ 3.38	\$ 3.45	\$ 3.53	\$ 3.60	\$ 3.68
12	5.50	5.64	5.78	5.92	6.06	6.20	6.34	6.48	6.62	6.76	6.90
18	8.10	8.31	8.52	8.73	8.93	9.14	9.35	9.56	9.77	9.98	10.19
24	10.75	11.02	11.30	11.58	11.86	12.14	12.42	12.70	12.98	13.26	13.54

Note: An expanded table can be found in the Appendix on pages A8–A9.

To use the *Annual Percentage Rate for Monthly Payment Plans* table, you need to know the finance charge per \$100 of the amount financed. You will need this formula:

$$\text{Finance Charge per } \$100 = \$100.00 \times \frac{\text{Finance Charge}}{\text{Amount Financed}}$$

- Skill 11: Dividing Decimals, p. SK12
- Skill 2: Rounding Numbers, p. SK3

EXAMPLE 1

Paul Norris obtained a \$1,500.00 installment loan to buy a racing bicycle. The finance charge is \$146.25, and he will repay the loan in 18 monthly payments. What is the APR?

Step 1: Find the finance charge per \$100.

$$\begin{aligned} \text{Finance Charge per } \$100 &= \$100.00 \times \frac{\text{Finance Charge}}{\text{Amount Financed}} \\ &= \$100.00 \times \frac{\$146.25}{\$1,500.00} \\ &= \$9.75 = \$100.00 \times 0.0975 \end{aligned}$$

For every \$100 he borrows, Paul will pay a \$9.75 finance charge.

Step 2: Find the APR. (Refer to Figure 8.3, the *Annual Percentage Rate for Monthly Payment Plans* table.)

In the row for 18 payments, find the number closest to \$9.75. It is \$9.77. Read the APR at the top of the column. **APR is 12.00%.**

Study Tip**Be Prepared**

Having all of your notes, textbooks, and study guides in front of you when you study will help you easily answer questions that arise.

Concept Check

Complete this problem by finding the (a) finance charge per \$100 and (b) APR. Check your answers in the back of the book.

1. Francesca Santorelli took a 6-month loan of \$800 to buy art supplies. The finance charge is \$24.64.

EXAMPLE 2**Algebra**

b. 10.50%

You can compute the APR on an installment loan by using this formula:

$$\text{APR} = \frac{mf(95n+9)}{(12n)(n+1)(4a+f)}$$

Where m = Number of payments per year

f = Finance charge

n = Number of scheduled payments

a = Amount financed

After he repaid his first loan, Paul Norris (Example 1) obtained another \$1,500 installment loan to buy a kayak. The finance charge is \$146.25. He agreed to repay the loan in 18 monthly payments. To the nearest hundredth of a percent, what is the annual percentage rate?

$$\begin{aligned} \text{APR} &= \frac{12 \times \$146.25[(95 \times 18) + 9]}{(12 \times 18)(18 + 1)[(4 \times \$1,500) + \$146.25]} \\ &= \frac{\$1,755(1,719)}{216(19)(\$6,146.25)} \\ &= \frac{\$3,016,845}{\$25,224,210} = 0.119601 = 11.96\% \end{aligned}$$

The APR is 11.96%.

Note that the APR in Example 1 was 12.00%. The difference is due to rounding in the table.

R**Concept Checks**

Find the APR using the formula. Check your answer in the back of the book.

- Crissy Moreau took out an installment loan to pay for her new car. She borrowed \$22,500.00 for 40 months with a \$6,743.25 finance charge. Find her APR (to the nearest hundredth of a percent).

Review and Assessment



AFTER YOU READ

Chapter SUMMARY

You may want to consider a number of factors when thinking about taking out a loan. You may want to compute the maturity value and interest rate of a single-payment loan. On installment loans, you may want to determine the amount financed and compute the monthly payment, total amount repaid, finance charge, the payment to interest, payment to principal, and the new balance. You may also want to know how to compute the final payment of an installment loan and use a table to find the annual percentage rate of a loan.



Go to
glencoe.com
to download a Vocabulary
Review for Chapter 8.

Vocabulary Check

1. On a sheet of paper, use each of these terms in a sentence.

Content Vocabulary

- single-payment loan (p. 305)
- promissory note (p. 305)
- maturity value (p. 305)
- term (p. 305)
- ordinary interest (p. 305)
- exact interest (p. 305)
- installment loan (p. 308)
- down payment (p. 308)
- amount financed (p. 308)
- annual percentage rate (p. 311)
- repayment schedule (p. 316)
- final payment (p. 319)

Academic Vocabulary

- principal (p. 305)
- specify (p. 308)
- index (p. 311)
- allocate (p. 316)
- motive (p. 319)
- financed (p. 322)

Concept Check

2. Describe a single-payment loan.
3. What two factors make up the maturity value of a single-payment loan?
4. What is an installment loan?
5. Give the formula for amount financed.
6. What is the formula for total amount repaid?
7. Summarize the information found on a repayment schedule.
8. Locate the formula for final payment.
9. List two factors you need in order to determine APR.
10. **CRITICAL THINKING** Give one motive for paying off a loan early.

Lesson-by-Lesson Review

8.1 Single-Payment Loans (pp. 305–307)

Compute the maturity value and interest rate of a single-payment loan.

Jaime Tavare's bank granted him a \$3,500 single-payment loan for 80 days at 11% ordinary interest so he could make payroll. What is the loan's maturity value?

Step 1: Find the ordinary interest.

$$\text{Ordinary Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$\$85.56 = \$3,500.00 \times 11\% \times \frac{80}{360}$$

Step 2: Find the maturity value.

$$\text{Maturity Value} = \text{Principal} + \text{Interest Owed}$$

$$\$3,585.56 = \$3,500 + \$85.56$$

Review Exercises

11. Dontice Thomas obtained a single-payment loan of \$21,400 to purchase a diamond necklace and bracelet set. She agreed to repay the loan in 120 days at an ordinary interest rate of 8.5%. What is the maturity value of her loan?
12. Jodi Pelfrey obtained a single-payment loan of \$1,600 to buy a pedigreed dog. She agrees to repay the loan in 120 days at an ordinary interest rate of 7.5%. What is the maturity value of her loan?
13. **ALGEBRA** Birgit Dohr took out an \$1,800 single-payment loan at 8.2% ordinary interest. She used it to purchase transportation, lodging, and tickets to the national figure skating championship on March 9. If the loan's maturity value was \$1,825.01, when would she have to pay it back?

Installment Loans—Amount Financed (pp. 308–310)

Calculate the down payment and amount financed on an installment loan.

Katie Burns is buying a new guitar for \$635.88. She made a 15% down payment and will finance the remainder. How much did she finance?

Step 1: Find the down payment.

$$\text{Down Payment} = \text{Cash Price} \times \text{Percent}$$

$$\$95.38 = \$635.88 \times 15\%$$

Step 2: Find the amount financed.

$$\text{Amount Financed} = \text{Cash Price} - \text{Down Payment}$$

$$\$540.50 = \$635.88 - \$95.38$$

Review Exercises

	Purpose	Cash Price	Down Payment (Cash)	Down Payment (Percent)	Down Payment (in Dollars)	Amount Financed
14.	Treadmill	\$ 789	\$300	—	a. \$ <input type="text"/>	b. \$ <input type="text"/>
15.	Symphony Season Tickets	4,500	—	25%	a. <input type="text"/>	b. <input type="text"/>

- Madelyn Cramer purchased a desk for her home office for \$587.33. Using the store's installment plan, she made a \$147.00 down payment. What amount did she finance?
- Levi Hempke wants to buy a car costing \$21,000. He will finance the purchase with an installment loan from the bank, but he would like to finance no more than \$14,280. What percent of the car's total cost should his down payment be?
- Tyler Ferguson had a pond added to his backyard. He financed its total cost of \$1,189 and made a down payment of 25%. What amount did he finance?

Calculate the (a) monthly payment, (b) total amount repaid, and (c) finance charge on an installment loan.

Kelsey Berger obtained a \$2,200 installment loan to finance her trip to a family reunion. The annual percentage rate is 10%. She must repay the loan in 24 months. What is the finance charge?

Step 1: Find the monthly payment. (Refer to the *Monthly Payment on an Installment Loan of \$100* table on page A13.)

$$\text{Monthly Payment (mp)} = \frac{\text{Amount of Loan}}{\$100} \times \text{Monthly Payment for a \$100 Loan}$$

$$\$101.42 = \frac{\$2,200.00}{\$100.00} \times \$4.61$$

Step 2: Find the total amount repaid.

$$\text{Total Amount Repaid} = \text{Number of Payments} \times \text{Monthly Payment}$$

$$\$2,434.08 = 24 \times \$101.42$$

Step 3: Find the finance charge.

$$\text{Finance Charge} = \text{Total Amount Repaid} - \text{Amount Financed}$$

$$\$234.08 = \$2,434.08 - \$2,200.00$$

Review Exercises

For these problems, refer to the *Monthly Payment on an Installment Loan of \$100* table on page A13.

19. Jesse Procter obtained an installment loan of \$3,500 to have some storm-damaged trees in his yard removed. The APR is 12%, and the loan is to be repaid in 30 months. What is the finance charge?
20. Etienne and Corinne Bertrand purchased a new living room set at Allied Furniture Store for \$2,896.00. They agreed to make a 20% down payment and to finance the remainder for 12 monthly payments. The APR is 8%. What is the finance charge?
21. Laura and Dwayne Knight purchased a new riding lawn mower for \$7,500. They agreed to make a 25% down payment and to finance the remainder with 12 monthly payments. The APR is 9%. What is the finance charge?
22. Henrietta Burke obtained a \$3,200 installment loan for a marble floor in her foyer. The annual percentage rate is 9%. She must repay the loan in 24 months. Find the (a) monthly payment using the formula, (b) total amount repaid, and (c) finance charge.

Compute the final payment when paying off an installment loan.

You have a 6-month loan of \$1,000.00 at 10% with a balance of \$338.89 after the fourth payment. What is the final payment if you pay off the loan with the fifth payment?

Step 1: Find the previous balance.

$$= \$338.89$$

Step 2: Find the interest for the fifth month.

$$\begin{aligned} \text{Fifth Month Interest} &= \text{Principal} \times \text{Rate} \times \text{Time} \\ \$2.82 &= \$338.89 \times 10\% \times \frac{1}{12} \end{aligned}$$

Interest for the fifth monthly payment is \$2.82.

Step 3: Find the final payment.

$$\begin{aligned} \text{Final Payment} &= \text{Previous Balance} + \text{Current Month's Interest} \\ \$341.71 &= \$338.89 + \$2.82 \end{aligned}$$

Your final payment is \$341.71.

Review Exercises

	Purpose	Interest Rate	Previous Balance	Interest	Final Payment
31.	Camper	10%	\$3,600.00	a. \$	b.
32.	Water Scooter	8	2,400.00	a.	b.
33.	ATV	12	4,860.80	a.	b.
34.	Pontoon Boat	6	2,984.50	a.	b.
35.	Billiard Table	12	1,824.25	a.	b.
36.	Air Conditioner	10	1,200.00	a.	b.
37.	Television	8	1,499.00	a.	b.
38.	Camcorder	6	1,050.00	a.	b.

39. John Marks has a loan at 10% interest for \$33,825 for 96 months. The monthly payment is \$512.90. The balance after payment number 70 is \$12,397.86. What is the final payment if the loan is paid off with payment number 71?
40. In problem 35, how much would John save by paying off the loan with payment number 71?
41. Nancy Parker has a \$12,000 simple-interest installment loan at 12% for 36 months. The monthly payment is \$398.52. The balance after the sixth payment is \$10,286.53. (a) What is the final payment if the loan is paid off with the seventh payment? (b) How much will Nancy save by paying off the loan with payment number seven?

Determine the annual percentage rate of a loan using a table and a formula.

Uma Hartmann obtained a \$900.00 installment loan to pay for brochures to advertise her new business. The finance charge is \$13.14, and she must repay the loan in 6 months. What is the annual percentage rate?

Step 1: Find the finance charge per \$100.

$$\begin{aligned} \text{Finance Charge per } \$100 &= \$100 \times \frac{\text{Finance Charge}}{\text{Amount Financed}} \\ &= \$100 \times \frac{\$13.14}{\$900} \\ \mathbf{\$1.46} &= \$100 \times 0.0146 \end{aligned}$$

The finance charge per \$100 is \$1.46.

Step 2: Find the APR. (Refer to the *Annual Percentage Rate for Monthly Payment Plans* table on pages A8–A9.)

In the row for 6 payments, find the number closest to \$1.46. It is \$1.46. Read the APR at the top of the column. **The APR is 5.00%.**

Review Exercises

For Problems 42–45, refer to the *Annual Percentage Rate for Monthly Payment Plans* table on pages A8–A9.

	Purpose	Finance Charge	Amount Financed	Finance Charge per \$100	Number of Payments	Annual Percentage Rate
42.	Storage Cabinets	\$ 45.20	\$2,000	a.	6	b.
43.	Security Files	84.24	3,600	a.	12	b.
44.	Oak Conference Table	160.00	2,500	a.	18	b.
45.	Intercom System	81.00	4,500	a.	18	b.

46. **ALGEBRA** Liam Elliott obtained a \$1,700 installment loan to pay for an invisible fence for his dog. The finance charge is \$154.25. He agreed to repay the loan in 18 monthly payments. Use the APR formula to determine the annual percentage rate. Round the answer to the nearest hundredth of a percent.
47. **ALGEBRA** Tynetta Mafundo obtained an installment loan of \$3,600.00 to buy a sculpture from the local art gallery. The finance charge is \$126.18. She agreed to repay the loan in 18 monthly payments. Use the APR formula to determine the annual percentage rate. Round the answer to the nearest hundredth of a percent.
48. Tom North obtained a \$12,000 installment loan to purchase a used truck. The loan was for 36 months at 12% with a monthly payment of \$398.52. Find the APR.