

# 4.1 Promissory Notes

## GOALS

- Calculate interest on interest-bearing promissory notes
- Calculate interest using the exact interest method
- Calculate interest using the ordinary interest method
- Calculate the rate of interest

## Start Up

Jamal wants to borrow money for a vacation and also to buy a new car. He thinks that since the vacation loan is for less money than the car loan, he will get a better interest rate on that loan. Do you think he is correct?



## Math Skill Builder

Review these math skills and solve the exercises that follow.

- 1 Write percents as decimals.

Write 67% as a **decimal**.  $67\% = 0.67$

1a. 45%

1b. 150%

1c. 0.5%

1d. 1.89%

- 2 Multiply money amount by percents.

Find 4% of \$3,500.  $4\% = 0.04$ ;  $0.04 \times \$3,500 = \$140$

2a. 3% of \$2,580

2b. 6.5% of \$6,340

2c. 5.07% of \$855

- 3 Multiply money amounts by whole numbers and fractions.

Find the product:  $\$3,000 \times 2\% \times \frac{1}{2}$ ;  $0.02 \times \$3,000 = \$60$ ;  $\$60 \times \frac{1}{2} = \$30$

3a.  $\$5,000 \times 4\% \times \frac{1}{4}$

3b.  $\$7,520 \times 6.2\% \times 1\frac{1}{2}$

3c.  $\$8,356 \times 4.25\% \times 3$

3d.  $\$2,698 \times 1.42\% \times 3\frac{1}{3}$

- 4 Calculate a percent.

What percent of \$350 is \$14?  $\$14 \div \$350 = 0.04$ , or 4%

4a. \$15 is what percent of \$750?

4b. \$25 is what percent of \$860?

4c. \$1,170 is what percent of \$4,500?

- 5 Simplify fractions.

Simplify  $\frac{24}{48} \cdot \frac{24 \div 24}{48 \div 24} = \frac{1}{2}$

5a.  $\frac{180}{360}$

5b.  $\frac{260}{360}$

5c.  $\frac{126}{360}$

5d.  $\frac{240}{365}$

5e.  $\frac{165}{365}$

5f.  $\frac{170}{365}$

## Interest-Bearing Promissory Notes

When you borrow money, you usually sign a promissory note. A **promissory note** is your written promise, or IOU, that you will repay the money to the lender on a certain date. Usually you also have to pay for using the lender's money. That cost is called **interest**. A note that requires you to pay interest is called an *interest-bearing note*.

Lenders may require a borrower to deposit or pledge property as security for a loan. This property is called *collateral*. Types of collateral that are often used to secure loans are cars, stocks, bonds, and life insurance.

Many lenders offer *home equity loans* to home owners. *Home equity* is the difference between what the home could be sold for and what is owed on it. To get a home equity loan, the borrower pledges the equity in the home as collateral for the loan.

If the loan is not repaid, the lender can seize the collateral and sell it to recover the borrowed money.

### BUSINESS TIP

Interest is like paying rent to use someone else's money.

Principal	Time	Lender	Date of note
\$ 6,500.00	Peoria, IL		May 8 20 02
Two years AFTER DATE I PROMISE TO PAY TO			
THE ORDER OF <u>Prairie Bank</u>			
<u>Six thousand, five hundred and <sup>no</sup> / 100</u> DOLLARS			
PAYABLE AT <u>Prairie Bank</u>			
VALUE RECEIVED WITH INTEREST AT <u>10</u> %			
NO. <u>4089</u>	DUE <u>May 8</u>	20 <u>04</u>	<u>Jawad Sharon</u>
Due date		Rate of Interest	

The amount borrowed on a promissory note is the *face*, or **principal**. The date the note was signed is called the *date of the note*. The time for which the money is borrowed is called the **time**. The date on which the money must be repaid is the *due date*, or *maturity date*. The rate of interest to be paid is the **rate of interest**. The money that must be paid on the due date is the *maturity value* or the amount due.

To calculate interest on a note, you use the same formula as you used to calculate simple interest paid on savings.

Interest rates are stated as rates *per year*. The interest you pay on a loan is proportional to the time for which you borrow the money. For a loan of three months, or  $\frac{1}{4}$  of a year, the interest is one year's interest multiplied by  $\frac{1}{4}$ . For a loan of 2 years, the interest is one year's interest multiplied by 2.

To find the amount due on the due date, you add the interest to the principal.

### MATH TIP

Interest formula:

$$PRT = I$$

$P = \text{principal}$

$R = \text{rate}$

$T = \text{time}$

$I = \text{interest}$

## EXAMPLE 1

On May 8, 2002, Jawad Sharon borrowed \$6,500 from his bank to buy a boat, which he used as collateral for the loan. Jawad signed a 2-year promissory note at a 10% interest rate. Find the amount of interest Jawad must pay. Then find the total amount he must repay when the note is due.

### SOLUTION

Rewrite the interest rate as a decimal:  $10\% = 0.10$

Substitute known values in the formula.

$$\$6,500 \times 0.10 \times 2 = \$1,300 \quad \text{Use } PRT = I.$$

Add to find the amount due at end of 2 years.

$$\$6,500 + \$1,300 = \$7,800$$

### ■ CHECK YOUR UNDERSTANDING

- A. On May 8, 2002, Leslie Regis borrowed \$2,500 from her bank to pay for a cruise. Leslie signed a 6-month promissory note at 18% interest. Find the amount of interest Leslie must pay. Then find the total amount she must repay to her bank when the note is due.
- B. Raanan Beilin borrowed \$3,500 for 18 months from his bank to have his house repainted. Raanan signed a promissory note that carried 12% interest. Find the amount of interest Raanan must pay. Then find the total amount he must repay to his bank on the due date.



### ■ Exact Interest Method

When the time of a note is shown in days, interest may be calculated by the **exact interest method**. Exact interest uses a 365-day year. The exact interest method is used by the United States government and by many banks and other businesses.

To find exact interest, you show the time as a fraction with 365 as the denominator. For example, you would show 83 days as  $\frac{83}{365}$ .

### EXAMPLE 2

Rosa Chavez borrows \$1,000 at 6% exact interest for 85 days

### SOLUTION

Rewrite the interest rate as a decimal:  $6\% = 0.06$

Write and simplify the time fraction:  $\frac{85}{365} = \frac{17}{73}$

$$\$1,000 \times 0.06 \times \frac{17}{73} = I \quad \text{Use } PRT = I.$$

$$\$1,000 \times \frac{6}{100} \times \frac{17}{73} = \frac{1020}{73} = \$13.97$$

**CALCULATOR TIP**

To use a calculator:

Enter	1000
Press	$\times$
Enter	.06
Press	$=$
Press	$\times$
Enter	85
Press	$=$
Press	$\div$
Enter	365
Press	$=$

## ■ CHECK YOUR UNDERSTANDING

- C. Ana Lopez borrows \$5,000 for 75 days at 8% exact interest. Find how much interest she must pay on the loan and how much will be due at maturity.
- D. Albert O'Malley signs a promissory note for \$3,500 for 150 days at 9% exact interest. Find the interest he must pay and the total amount due on the due date.

## ■ Ordinary Interest Method

The **ordinary interest method**, or *banker's interest method* is used in place of the exact interest method by some businesses. With this method of finding interest, a year has only 360 days. The 360-day year has 12 months of 30 days each and is known as the *banker's year*. Of course, there really is no such year. It is used because it is easier to calculate with than a 365-day year.

### EXAMPLE 3

Rosa Chavez borrows \$1,000 at 6% ordinary interest for 85 days

#### SOLUTION

$$\$1,000 \times 0.06 \times \frac{85}{360} = I \quad \text{Use } PRT = I.$$

$$\begin{array}{r} 1 \\ \cancel{10} \\ \$1,000 \end{array} \times \frac{\cancel{6}}{100} \times \frac{85}{\cancel{360}} = \frac{85}{6} = \$14.17$$

## ■ CHECK YOUR UNDERSTANDING

- E. Ikuko Kimura signed a promissory note for \$5,900 at 12% ordinary interest for 180 days. Find the interest and amount due she will pay when the note is due.
- F. On May 6, Solomon Kaufman borrowed \$4,000 signing a promissory note at his bank. The note carries 9% ordinary interest and is due in 4 months. Find the interest and amount due that Solomon must pay at maturity.

## ■ Rate of Interest

If you know the principal and the amount of interest for one year, you can find the rate of interest by dividing the interest by the principal.

$$\text{Rate of Interest} = \text{Interest for One Year} \div \text{Principal}$$

If the interest given in the problem is not for a year, you must first find how much the interest would be for one year.

### EXAMPLE 4

Ella Stein paid \$30 interest on a loan of \$1,000 for 3 months. Find the rate of interest she paid.

### SOLUTION

Find the amount of interest for one year by finding the number of 3-month periods in one year.

$$12 \text{ months} \div 3 \text{ months} = 4 \text{ number of 3-month periods in one year}$$

$$\$30 \times 4 = \$120 \text{ interest for one year}$$

$$\$120 \div \$1,000 = 0.12, \text{ or } 12\% \text{ rate of interest}$$

### ■ CHECK YOUR UNDERSTANDING

G. Trish Newcomb must pay \$320 in interest on a promissory note for \$8,000 due 4 months from the date of the note. Find the rate of interest she will pay.

H. Susilo Wahyudi paid \$450 in interest on a 3-month note for \$12,000. Find the rate of interest he paid.



### Wrap Up

To answer the questions posed in the start up, you needed to know about collateral and different types of loans. If Jamal gets a car loan and a personal loan, the car loan will have the lower interest rate because collateral is used for that loan. If Jamal uses a home equity loan to get money for his vacation, the interest may be as good or better than the car loan. In the case of the home equity loan, his home becomes the collateral for the vacation loan.

## TEAM MEETING

Lenders usually charge higher interest rates on loans that have no collateral than on loans that are secured with collateral. The interest rate on an auto loan or a home equity loan is usually less than a personal loan for a vacation. Organize a team of 2-3 members and identify reasons that could be used to convince a bank to lower the rate of interest on a personal loan. To gather ideas for reasons, call or visit one or more neighborhood banks. You might also search the Web for reasons. These keywords might help get you started: credit risk, cosigning notes, credit rating.

Prepare a list of the reasons you found to convince a bank to lower the interest rate on a personal loan. As a follow up, someone from your team may want to question bank personnel to determine if your list is accurate and complete.

### EXERCISES

**Find the product.**

1. 2% of \$4,689

2. 150% of \$84

3.  $\$2,200 \times 6\% \times 5$

**Find the percent.**

4. 75 as a percent of 3,000

5. \$150 as a percent of \$1,200

6. Write these as a decimal: 2.3%, 230%, 23%

**Find the interest to be paid for each promissory note.**

Principal	Rate	Time in Years
7. \$2,500	0.15	2
8. \$12,500	0.12	$3\frac{1}{2}$
9. \$500	0.08	$\frac{1}{2}$

**Find the interest and the amount due at maturity for each note.**

Face of Note	Time	Rate	Interest	Amount Due at Maturity
10. \$500	3 yr	12%		
11. \$150	3 mo	18%		
12. \$920	$2\frac{1}{4}$ yr	$5\frac{1}{2}\%$		

13. To finance the remodeling of her kitchen, Rosa borrowed \$26,400 on an 18-month home equity loan. She signed a promissory note bearing interest at  $12\frac{1}{2}\%$ . What total amount did Rosa pay on the due date?

14. Rondel Wilson borrowed \$2,000 for a vacation trip to Mexico. The promissory note he signed was for 3 months at  $15\frac{1}{4}\%$  interest. How much did Rondel have to pay when the note came due?

**Find the exact interest to the nearest cent. Then find the ordinary interest to the nearest cent.**

15. \$360 @ 19% for 210 days

16. \$1,500 @ 15% for 36 days

17. \$1,200 @ 6% for 240 days

18. \$2,400 @ 9% for 60 days

19. \$450 @ 12% for 146 days

20. \$1,450 @ 7% for 100 days

**Tara Long borrowed \$10,000 for 180 days. She paid exact interest at an annual rate of 12%.**

21. Estimate the interest Tara owed.

22. What is the exact amount of interest she had to pay?

23. What total amount did she have to repay?

**Bill Rich signed a 180-day note for \$1,250. He repaid the loan when due with interest at an annual rate of 12% using a banker's year.**

24. How much interest did Bill pay?

25. What total amount did he pay?

26. Kelly Bullock borrowed \$4,800 for 6 months and paid \$264 interest. What rate of interest did she pay?

27. Tony Colito paid \$19.50 in interest on a loan of \$2,600 for 1 month. What rate of interest did he pay?

28. Khalil Hamid Ali borrowed \$12,000 and paid \$1,890 in exact interest when the loan came due  $1\frac{1}{2}$  years later. What rate of interest did Khalil pay?
29. Lynn Wessel borrowed \$2,500 for 18 months. The total interest she paid was \$315. What rate of interest did Lynn pay?
30. **CRITICAL THINKING** Look at your answers to Check Your Understanding problems B, E, and Exercises 11, 21, and 24. What relationship do you see between the amount of interest and time?

**DECISION MAKING** You can borrow \$5,600 at 12% interest for 90 days from a lender that uses the exact interest method. You can borrow \$5,600 at 12% for 90 days from a lender that uses the ordinary interest method.

31. Which lender offers the loan with the lowest interest?
32. How much less interest will you pay?
33. **STRETCHING YOUR SKILLS** A family sells their home for \$150,000 through a real estate agent who deducts \$9,000 commission. Other costs they were charged to complete the sale totaled \$1,875. What percent of the sale price did the family receive, to the nearest whole percent?



## MIXED REVIEW

34.  $632.7 + 25.23 + 0.17$
35.  $4.15 \times 0.822$
36. Write  $5\frac{7}{8}\%$  as a decimal.
37. \$80 is  $6\frac{1}{2}\%$  of what amount?
38. \$5.32 is 5% less than what amount?
39. Julio Navarro began the day with \$65. During the day he received \$25 for mowing a lawn and spent \$19.75 for gas, \$6 for a movie, \$25 for some CDs, and \$6.75 for lunch. How much money did Julio have at the end of the day?
40. Ellen Carson's sales for 5 months were \$26,908, \$28,386, \$28,730, \$27,290, and \$29,009. What must be her sales next month if she wants her monthly sales average to be \$28,000 for the 6 months?
41. Klaus Reinhardt, a secretary, is paid a yearly salary of \$24,960. This is equal to how much a week?
42. On April 31, Steve Daley's balances were checkbook, \$339.11, and bank statement, \$394.62. A service charge of \$1.74 had not been deducted in the checkbook. Checks outstanding were 134, \$41.32; 135, \$3.18; 137, \$12.75. Prepare a reconciliation statement for Steve.



# 4.2

# Discounted Promissory Notes

## GOALS

- Calculate the interest and proceeds for discounted promissory notes
- Calculate the true rate of interest on a discounted promissory note

## Start Up

Fernando Morrero is planning a vacation to Europe next year. He estimates that the vacation will cost him about \$3,000. His bank offers to lend him the money if he signs a 6-month, \$3,000, discounted promissory note with a rate of 15%. Will this note provide him with enough money for his trip?

## Math Skill Builder

Review these math skills and solve the exercises that follow.

- 1 Write percents as decimals.  
Write 39% as a **decimal**.  $39\% = 0.39$ 
  - 1a. 45%
  - 1b. 150%
  - 1c. 0.5%
  - 1d. 1.89%
- 2 Multiply money amount by percents.  
Find the product. 15% of \$8,500.  $0.15 \times \$8,500 = \$1,275$ 
  - 2a. 13% of \$4,800
  - 2b. 18.07% of \$950
- 3 Multiply money amounts by whole numbers and fractions.  
 $\$8,500 \times 5\% \times \frac{1}{2}$ .  $0.05 \times \$8,500 = \$425$ ;  $\$425 \times \frac{1}{2} = \$212.50$ 
  - 3a.  $\$15,000 \times 14\% \times 4$
  - 3b.  $\$1,720 \times 9.2\% \times 1\frac{1}{2}$
  - 3c.  $\$9,686 \times 13.25\% \times \frac{1}{4}$
- 4 Calculate a percent.  
What percent of \$800 is \$56?  $\$56 \div \$800 = 0.07$ , or 7%
  - 4a. \$35 is what percent of \$1,250?
  - 4b. \$627 is what percent of \$1,650?
  - 4c. \$29,700 is what percent of \$44,000?
- 5 Simplify fractions.  
Simplify  $\frac{124}{648} \cdot \frac{124 \div 4}{648 \div 4} = \frac{31}{162}$ 
  - 5a.  $\frac{120}{560}$
  - 5b.  $\frac{380}{1,260}$
  - 5c.  $\frac{56}{860}$



## SPREADSHEET TIP

To enter and display fractions and mixed numbers in an Excel cell, enter the whole number first, then a space, then the fraction.

To enter  $14\frac{1}{4}$ , enter 14, space, 1, slash, 4.

To enter  $\frac{1}{4}$  only, enter 0 (as the whole number), space, 1, slash 4.

If you simply enter 1/4, your entry will be read as a date: January 4.



## ■ Discounted Promissory Notes

Banks and other lenders may lend money to businesses and people for short periods of time, such as 30, 60, or 90 days. These loans are called short-term loans.

When a bank makes a short-term loan, it may require the borrower to sign a note and pay the interest when the loan is made. When interest is collected in advance this way, it is known as a **bank discount**. Because the interest is paid in advance, the note itself does not show any interest rate, and it is called a *noninterest-bearing note*.

The bank collects the bank discount by deducting it from the principal, or face of note. The amount the borrower gets is the principal of the note less the discount. When the loan is due, only the principal of the note is paid. Obtaining a loan in this way is known as *discounting a note*.

The percent of discount charged by the bank is the *rate of discount*. The amount of money that the borrower gets is the *proceeds*.

$$\text{Principal} \times \text{Rate of Discount} = \text{Bank Discount}$$

$$\text{Principal} - \text{Bank Discount} = \text{Proceeds}$$

### SPREADSHEET TIP

Excel spreadsheets can add, subtract, multiply and divide fractions. For example, to multiply  $\frac{1}{2}$  by  $\frac{3}{4}$ , enter 0, space, 1, slash, 2 in cell B1. In cell B2, enter =, B1, \*, 3, slash, 4. The cell B2 will display  $\frac{3}{8}$ .

### EXAMPLE 1

A lender discounted a \$3,500 note for Risa DeWitt at 15% interest for 3 months. Find the proceeds of the note that Risa receives.

#### SOLUTION

Rewrite the rate of bank discount as a decimal:  $15\% = 0.15$

$3 \text{ months} \div 12 \text{ months} = \frac{1}{4}$  time of note as fraction of a year

Multiply the principal by the rate of bank discount and time of note.

$$\$3,500 \times 0.15 \times \frac{1}{4} = \$131.25 \text{ bank discount (interest)}$$

Subtract the bank discount from the principal.

$$\$3,500 - \$131.25 = \$3,368.75 \text{ Risa received as proceeds}$$

Note that three months later, Risa would repay the lender \$3,500.

### ■ CHECK YOUR UNDERSTANDING

- A bank discounted a \$9,600 noninterest-bearing note for Jason Williams at 10% interest for 9 months. Find the proceeds of the note that Jason receives.
- Yang Sun discounted her \$12,800, 3-month, noninterest-bearing note at 15% at her bank. Find the proceeds of the note.

## ■ True Rate of Interest

When you discount your own noninterest-bearing note, you pay a rate of interest based on the principal. However, you do not get the full principal because interest is deducted in advance. To find the true rate of interest you paid, you must divide the interest paid (bank discount) by the amount you actually received (proceeds).

$$\text{True Rate of Interest} = \text{Interest} \left( \frac{\text{Bank Discount}}{\text{Actual Amount Borrowed (Proceeds)}} \right)$$

If the interest paid is for less than one year, you must first find the interest for one year. For example, if the interest paid is for 6 months, multiply that interest by 2 to find the interest for one year ( $12 \div 6 = 2$ ).

## EXAMPLE 2

Find the true rate of interest, rounded the nearest tenth of a percent, on Risa DeWitt's note in Example 1.

### SOLUTION

$12 \text{ months} \div 3 \text{ months} = 4$  periods of 3-months in the year

Multiply the interest for 3 months by 4 to find the interest for one year.

$\$131.25 \times 4 = \$525$  interest (bank discount) for 1 year

Subtract the interest (bank discount) from the principal of the note.

$\$3,500 - \$131.25 = \$3,368.75$  amount actually borrowed (proceeds of note)

$\frac{\$525}{\$3,368.75} = 0.1558$ , or 15.6% true interest rate Risa paid

## ■ CHECK YOUR UNDERSTANDING

- C. Julius Amani signed a \$25,000 noninterest-bearing note on March 22. He discounted the note at 14% and paid the principal back 6 months later. He received \$23,250 as proceeds. What true rate of interest, to the nearest tenth percent, did Julius pay on the note?
- D. Your bank discounted your 4-month, \$2,600, noninterest-bearing note. The discount rate was 12%. You received \$2,496 as proceeds. What true rate of interest, to the nearest tenth percent, did you pay on the note?

## Wrap Up

Look back at the Start Up question at the beginning of this lesson. If Fernando took the bank's offer, he would only receive \$2,775 in proceeds. The bank would deduct the interest in advance. This would leave him \$225 short for his vacation.

## COMMUNICATION

Call or visit at least 3 banks in your area. Gather from them the interest rates they charge for unsecured promissory notes, unsecured noninterest-bearing notes that are discounted, car loans, and home equity loans. Prepare a chart containing the names of the banks, the types of loans, and the interest rates for each type of loan.

Prepare a short presentation for your chart. Explain to the class what information you gathered from banks and how you displayed that information on your chart.

## EXERCISES

Write as a decimal.

1. 2.3%

2. 250%

3. 0.75%

Find the product.

4. 4.2% of \$4,689

5. 150% of \$84

6.  $\$2,200 \times 6\% \times 5$

7.  $\$3,800 \times 8.5\% \times 1\frac{1}{2}$

Find the percent.

8. 75 as a percent of 3,000?

9. \$150 as a percent of \$1,200

Find the proceeds of each noninterest-bearing note. Each note was discounted on the same day as the date of the note.

Date of Note	Face	Time	Discount Rate	Proceeds
10. Mar. 1	\$3,000	3 months	19%	
11. Oct. 5	\$8,400	2 months	15%	
12. Jan. 12	\$5,700	4 months	17%	
13. May 15	\$15,000	6 months	12%	
14. Nov. 25	\$900	1 month	10%	

### MATH TIP

Don't forget to subtract the amount of discount from the principal or face of the note.

On June 12, the bank discounted Ehud Ben-Ami's 12%, 3-month noninterest-bearing \$995 note.

15. Estimate the bank discount. Estimates may vary.

16. What was the actual bank discount?

17. What were the actual proceeds of the note?

18. Julie Frey signed a \$5,400 noninterest-bearing note. She discounted the note at 12% and paid the principal back 3 months later. She received \$5,238 as proceeds. What true rate of interest, to the nearest tenth percent, did Julie pay on the note?

19. Farouk Alwash received \$8,099 in proceeds from an \$8,900 noninterest-bearing note that he discounted at his bank. The bank discount rate was 18%. He repaid the principal 6 months later. Find his true rate of interest, to the nearest tenth percent.

**INTEGRATING YOUR KNOWLEDGE** On February 24, Lake County Bank discounted Elmore Corporation's note for \$20,000. The note was dated October 21, due in 3 months, and it carried no interest. The rate of discount was 15%.

20. What was the amount of the bank discount?

21. What proceeds did Elmore receive?

22. What true rate of interest, to the nearest tenth of a percent, did Elmore pay?

**INTEGRATING YOUR KNOWLEDGE** The bank discounted Fusako Komuro's 6-month noninterest-bearing note for \$8,400. The rate of discount was 18%.

23. What was the amount of the bank discount?
24. What proceeds did Fusako receive?
25. How much did Fusako pay her bank on the maturity date?
26. What true rate of interest, to the nearest tenth of a percent, did Fusako pay?

**DECISION MAKING** You need to borrow \$2,000 for a vacation trip. You can borrow the money from one lender who will ask you to sign a 6-month promissory note for \$2,000 at 18% interest. A second lender asks you to sign a noninterest-bearing, 6-month note for \$2,000. The second lender will discount the note at 17%.

27. Which bank offers the lowest true interest rate?
28. Which bank's offer will you take and why?

## MIXED REVIEW

29. \$25,498.12 - \$19,008.08
30. What is 139 divided by 27, rounded to the nearest hundredth?
31.  $\frac{3}{4} \div \frac{7}{8}$
32.  $1\frac{1}{2} + 3\frac{1}{4} + 5\frac{5}{6}$
33. Write 0.005 as a fraction in simplest form.
34. Jaron received \$11,088 in proceeds from a \$12,600 noninterest-bearing note that he discounted at his bank. The bank discount rate was 16%. He repaid the principal 9 months later. Find his true rate of interest, to the nearest tenth percent.
35. Amelia signed a promissory note for \$15,800 at 12% interest for 3 months. Find the interest and amount she will pay when the note falls due.
36. Doug Palen started the day with a bank balance of \$389.34. He used an ATM to deposit a check for \$150 and his debit card to make these purchases: \$45.09, \$12.88, \$81.06, and \$23.91. What is his bank balance after these transactions are processed by the bank?

**The Belino family had a total income last year of \$89,500. They spent \$1,790 on entertainment and \$18,795 on housing.**

37. What percent of their total income was spent on entertainment?
38. What percent of their total income was spent on housing?

