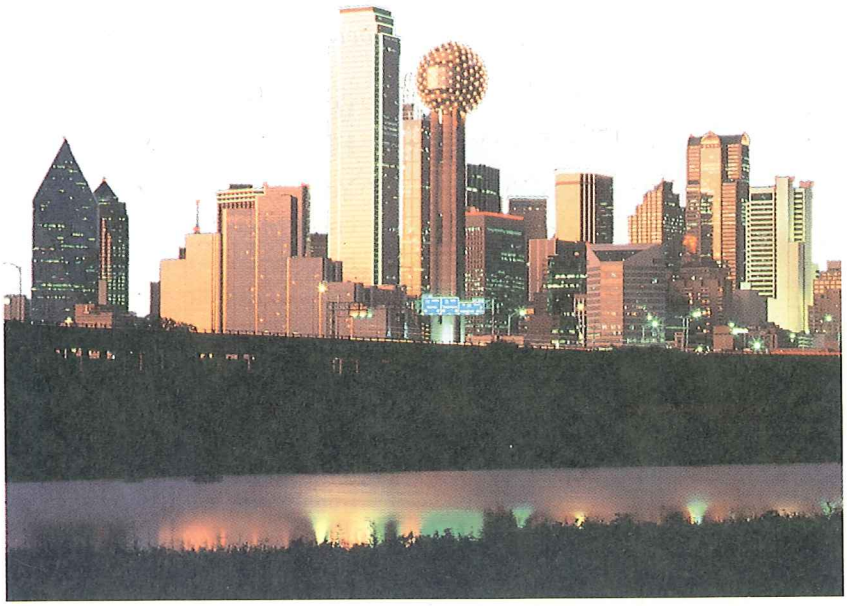
6-3 INTEREST CHARGES: THE CHARGES FOR CHARGING



Vernon lives in a suburban area near Dallas. His parents are both college graduates with well-paying jobs. Vernon has played football for his high school team for 3 years. He can run the 100-meter dash in close to 10 seconds. Because of his speed, he usually plays a running back position. He caught two touchdown passes and one 43-yard pass last year in the regional championship game.

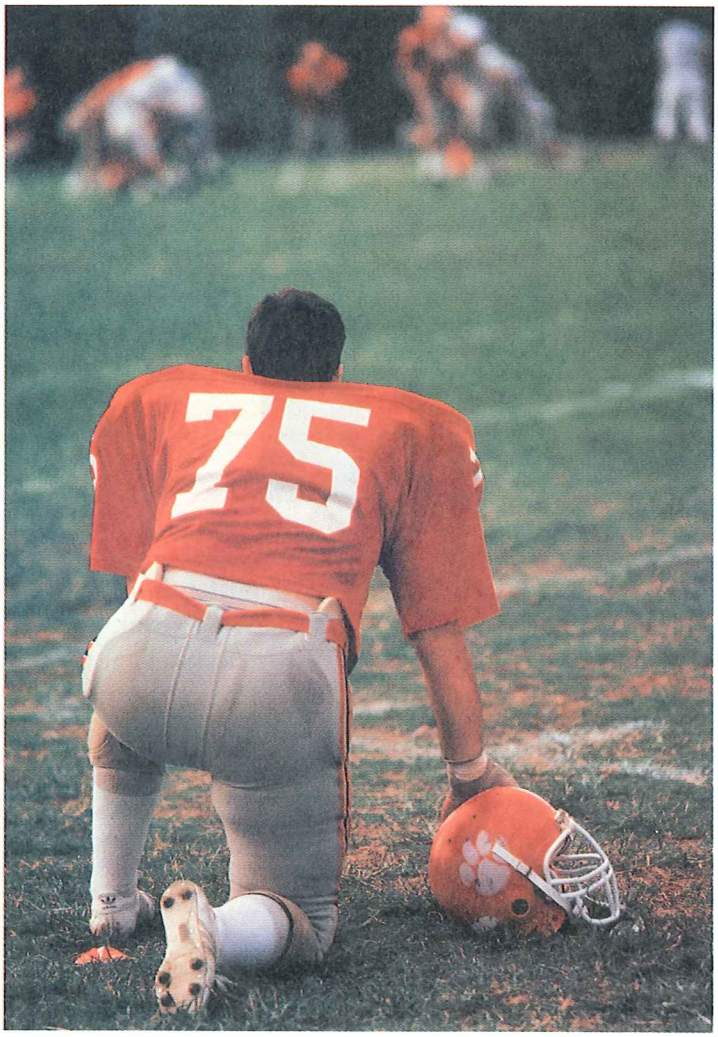
When Vernon and his girlfriend Veronica go out to dinner, he often picks up the tab for several other friends who happen to stop by their table to talk football. Vernon carries his father's American Express card for such expenditures.

Vernon has stopped asking his mother to select his clothes for him because she does not always understand the importance of maintaining his image. She has, however, allowed Vernon to use her VISA card to buy his clothes, provided that he does not charge too much in any one month. Last month, after he purchased new snakeskin boots with silver trim, his mother insisted that he not use the card until she had paid down the balance.

Vernon wondered why his parents set limits on their credit card spending. They explained that if he charges more than they can afford to pay when they receive the statement each month, interest payments on his purchases will be added and displayed on the following statement. Vernon wonders about interest charges and whether there are ways to reduce the amount of interest charges.

OBJECTIVES: *In this lesson, we will help Vernon to:*

- *Recognize the many ways of using credit cards.*
- *Observe which people are likely to use credit each way.*
- *Determine whether and in what ways a consumer should use credit.*
- *Explore the relationship between the size of the monthly payment and the interest charges.*
- *Understand the relationship between APR and interest charges.*



WHO GETS CREDIT AND HOW DO THEY USE IT?

Your level of income determines how much credit you can get. Vernon's family—with its high income—has been offered quite a lot of credit. People with a higher-than-average education are more likely to be offered credit cards than are those with less education. Young families with children are more likely to use cards but are also more likely to incur debt with their cards. Likewise, those who live in the suburbs tend to use their credit cards more than families living in central cities or rural areas.

Some families fall into the category of people who use their cards as a convenience, instead of carrying large amounts of cash or writing many checks. They pay their credit card charges promptly, within the 20- to 25-day grace period, and pay little or no interest.

The other group of card users takes advantage of the revolving installment loan features of their credit cards, almost never completely paying off their debts, making the minimum required payments, and paying interest to the bank with every payment.

Should you use a credit card? According to the experts, the answer to this question is *no* if *any* of the following are true:

- You use the card as an excuse to overspend.
- You frequently buy things impulsively that you do not need.
- You are often late making scheduled payments.
- You have no steady income.

The answer is *yes* if *all* of the following are true:

- You have handled credit responsibly in the past.
- You use the card as a budgeting convenience.
- You recognize the dangers as well as the attraction of using credit cards.

To use credit cards to your best advantage, adhere to the following rules:

1. Keep only the cards that you will use fairly often. For most people in the middle-income bracket, a couple of oil company cards for gasoline and one bank card are enough. The businessperson may wish to use a travel and entertainment card also.
2. Consider every charged purchase as though you were paying cash. Ask yourself: Can I repay the charge promptly and easily?
3. Do not spend more than 20% of your take-home pay on credit payments. As described in earlier chapters, if a family uses more than this amount on credit payments (not including the mortgage payment), it may suffer from credit overload.
4. At the beginning of each month, set a limit on the total amount of charges you will be able to repay easily. Stay within that limit and repay the charges promptly to avoid additional interest charges.
5. Keep your receipts until you receive your statement to verify your spending with the statement.

ASK YOURSELF

1. What are two ways in which consumers use credit cards?
2. Why is it a good idea to charge only what you can pay for each month?
3. What are three reasons not to use a credit card?

ALGEBRA *REVIEW*

Express each percent as a decimal.

1. 13.9%
2. 1.85%
3. 245%
4. 111.1%

Express each decimal as a percent.

5. 456
6. 233.4
7. 0.09
8. 9.876

Find.

9. What is 1.6% of $1600?
10. What is 0.85% of $2100?
11. What is 18% of $4433.22?
12. $1500 is what percent of $7500?
13. $12,750 is what percent of $85,000?
14. $41.25 is what percent of $750?
15. 25 is 100% of what number?
16. $13.75 is 20% of what number?
17. $7800 is 15% of what number?

SHARPEN YOUR SKILLS

SKILL 1

Banks and other lending institutions set forth a **minimum monthly payment** that must be made by their credit card holders. However, you can set your own monthly payment as long as it is above the required amount. The amount of your payment affects the length of time it will take you to pay off your balance. It also affects the amount of interest that you will pay.

EXAMPLE 1 The current balance on Vernon's mother's VISA card is \$785.00, and her monthly finance charge is 1.5% of the amount owed. Her bank requires a minimum monthly payment of 10% of her unpaid balance rounded to the nearest dollar or \$20, whichever is larger. If the amount she owes drops below \$20, then she must make a payment equal to the total amount owed.

QUESTION How much interest will she pay in the next year, assuming that she makes a payment of 10% of the amount owed on the last day of the month?

SOLUTION

In the first month she has a balance of \$785.00.

$$\begin{aligned}\text{Interest charge} &= \text{balance} \cdot 0.015 \\ &= 785.00 \cdot 0.015 \\ &= 11.78 \qquad \text{To the nearest cent}\end{aligned}$$

$$\begin{aligned}\text{Amount owed} &= \text{balance} + \text{interest} \\ &= 785.00 + 11.78 \\ &= 796.78\end{aligned}$$

$$\begin{aligned}\text{Payment} &= 10\% \text{ of amount owed} \\ &= 0.10 \cdot 796.78 \\ &= 80 \qquad \text{To the nearest dollar}\end{aligned}$$

In the second month she has a balance of $796.78 - 80 = \$716.78$.

Use a spreadsheet program to work through the first 12 payments, and then total the interest column. To total the interest column use a sum function, such as @SUM(C2..C13) which adds the numbers in cells C2 through C13. In the columns for interest and 10% payment, you will need to use a rounding function. However, the interest is rounded to the nearest cent but the payment is rounded to the nearest dollar. Therefore the formulas are

For cell C2: @ROUND(0.1*D2,0)

For cell E2: @ROUND (0.015*B2,2)

	A	B	C	D	E
1	Month	Balance	Interest	Amount Owed	10% Payment
2	1	785.00	11.78	796.78	80.00
3	2	716.78	10.75	727.53	73.00
4	3	654.53	9.82	664.35	66.00
5	4	598.35	8.98	607.33	61.00
6	5	546.33	8.19	554.52	55.00
7	6	499.52	7.49	507.01	51.00
8	7	456.01	6.84	462.85	46.00
9	8	416.85	6.25	423.10	42.00
10	9	381.10	5.72	386.82	39.00
11	10	347.82	5.22	353.04	35.00
12	11	318.04	4.77	322.81	32.00
13	12	290.81	4.36	295.17	30.00
14		Total interest	90.17		

@ROUND(0.1*D2,0)

@ROUND(0.015*B2,2)

@SUM(C2..C13)

She pays $90.17 in interest during the first year.

EXAMPLE 2 Vernon wonders whether his mother's interest payments for the first year would increase if her bank allowed her to make smaller monthly payments.

QUESTION How much interest would she pay in the first year if her bank required only that she make a minimum monthly payment of 5% of her unpaid balance (rounded to the nearest dollar) or $20, whichever is larger? How much more interest would she pay in this case?

SOLUTION

In the first month her balance, interest, and amount owed would be the same as in Example 1. However, her payment would be $0.05 \cdot 796.78 = \$40$, rounded to the nearest dollar.

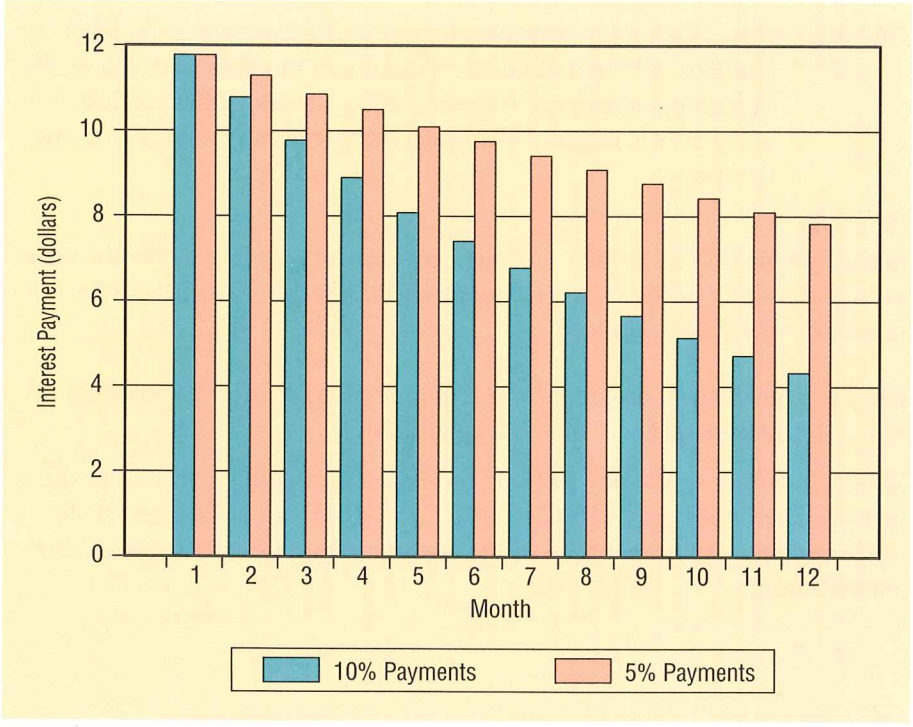
Copy the spreadsheet program from Example 1 and change the payment to 5% of the amount owed as shown on page 264.

Vernon's mother would pay $116.62 in interest during the first year. In the first year, she would pay $116.62 - 90.17 = \$26.45$ more in interest if she made monthly payments of 5% of the amount owed rather than 10% of the amount owed.

@ROUND(0.05*D19,0)

	A	B	C	D	E
18	Month	Balance	Interest	Amount Owed	5% Payment
19	1	785.00	11.78	796.78	40.00
20	2	756.78	11.35	768.13	38.00
21	3	730.13	10.95	741.08	37.00
22	4	704.08	10.56	714.64	36.00
23	5	678.64	10.18	688.82	34.00
24	6	654.82	9.82	664.64	33.00
25	7	631.64	9.47	641.11	32.00
26	8	609.11	9.14	618.25	31.00
27	9	587.25	8.81	596.06	30.00
28	10	566.06	8.49	574.55	29.00
29	11	545.55	8.18	553.73	28.00
30	12	525.73	7.89	533.62	27.00
31		Total interest	116.62		

To compare the interest paid for monthly payments of 5% and 10%, Vernon created a bar graph as shown. He used the months for x values, the interest for 10% payments as the first data range, and the interest for 5% payments as the second data range.



SKILL 2

Since Christmas and Hanukkah shopping entices many consumers to buy more than they do at other times of the year, many banks open new MasterCard and VISA accounts for potential shoppers in preparation for the holiday season. The APRs that are offered vary from bank to bank.

EXAMPLE 3 Karl's and Aubrey's parents have two MasterCard accounts. They currently have balances of $450.00 on each account. One account has an APR of 21%, and the other has an APR of 14%.

QUESTION They make monthly payments of 10% of the amount owed (rounded to the nearest dollar) or $20, whichever is larger, on the last day of each month on both accounts. How much will they pay in interest charges during the next year on the account with an APR of 21%? On the account with an APR of 14%? How much will be saved at the lower interest rate?

SOLUTION

Use a computer spreadsheet program to determine the total interest paid on each account during the next year. Remember the monthly interest is the APR divided by 12.

When 10% of the amount owed is less than $20, the payment is $20. Notice that in cell E16 this happens:

$0.10(188.94) = 19$ To the nearest dollar

Therefore in cell E16 and also in cell E17 you must enter 20. The spreadsheet automatically recalculates the remaining cells when you do this.

In working an exercise you may get a negative number in your spreadsheet. This may be because the amount owed is less than $20. Remember that if the amount owed is less than $20, you will only pay the amount owed so you will need to adjust your spreadsheet.

	A	B	C	D	E
1	MASTERCARD ACOUNT WITH 21% APR				
2	21% APR = 0.0175 per month				
3	Month	Balance	Interest	Amount Owed	Payment
4	1	450.00	7.88	457.88	46.00
5	2	411.88	7.21	419.09	42.00
6	3	377.09	6.60	383.69	38.00
7	4	345.69	6.05	351.74	35.00
8	5	316.74	5.54	322.28	32.00
9	6	290.28	5.08	295.36	30.00
10	7	265.36	4.64	270.00	27.00
11	8	243.00	4.25	247.25	25.00
12	9	222.25	3.89	226.14	23.00
13	10	203.14	3.55	206.69	21.00
14	11	185.69	3.25	188.94	20.00
15	12	168.94	2.96	171.90	20.00
16		Total interest	60.90		
17					
18					
19	MASTERCARD ACOUNT WITH 14% APR				
20	14% APR = 0.0116666 per month				
21	Month	Balance	Interest	Amount Owed	Payment
22	1	450.00	5.25	455.25	46.00
23	2	409.25	4.77	414.02	41.00
24	3	373.02	4.35	377.37	38.00
25	4	339.37	3.96	343.33	34.00
26	5	309.33	3.61	312.94	31.00
27	6	281.94	3.29	285.23	29.00
28	7	256.23	2.99	259.22	26.00
29	8	233.22	2.72	235.94	24.00
30	9	211.94	2.47	214.41	21.00
31	10	193.41	2.26	195.67	20.00
32	11	175.67	2.05	177.72	20.00
33	12	157.72	1.84	159.56	20.00
34		Total interest	39.56		

@ROUND(0.1*D2,0)

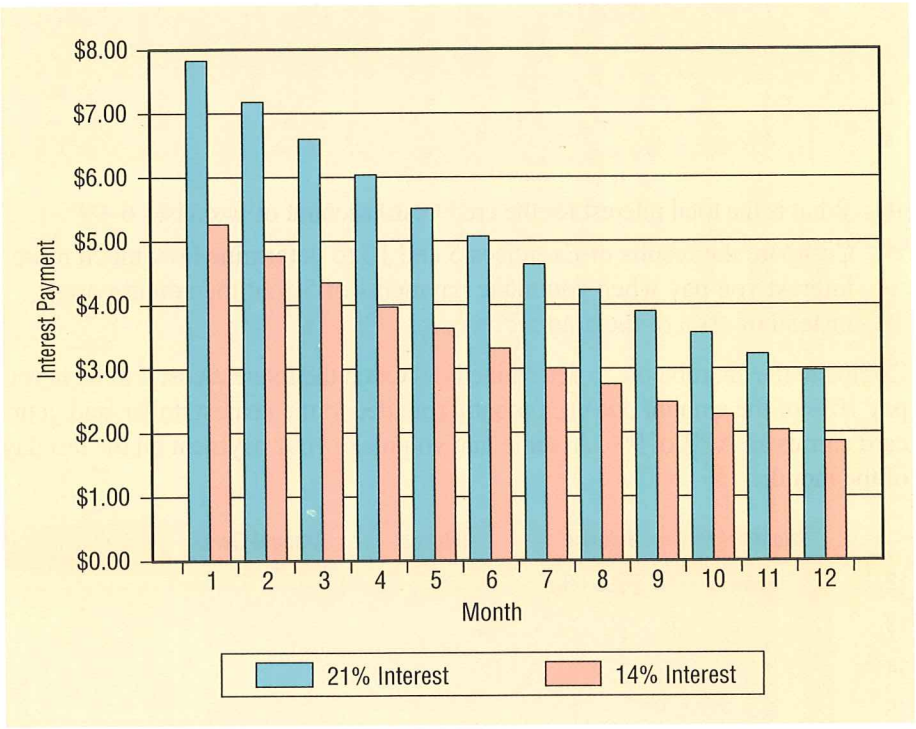
change 19.00 to 20.00

change 18.00 to 20.00

Karl's and Aubrey's parents pay $60.90 in interest during the year with an APR of 21%. They pay $39.56 in interest during the year with an APR of

14%. This represents a savings of $60.90 - 39.56 = \$21.34$ over the interest charges on the card with an APR of 21%.

To compare the interest payments, create a bar graph as shown.



The interest charge is greater when the APR is larger if all other variables are the same.

TRY YOUR SKILLS

Complete the following chart to determine the interest charges over the next four months on a balance of $995.00. Assume that your card has an APR of 15% and you make monthly payments of 5% of the amount due, rounded to the nearest dollar. Assume that you make your payment on the last day of the month.

	Month	Balance	Interest	Amount Owed	Payment
1.	1	$995.00			
2.	2				
3.	3				
4.	4				

5. What is the total interest for the credit card account of Exercises 1–4?

For the credit card account of Exercises 1–5, find the interest cost for the next 4 months if you pay 10% of the amount due instead of 5% of the amount due.

	Month	Balance	Interest	Amount Owed	Payment
6.	1	$995.00			
7.	2				
8.	3				
9.	4				

10. What is the total interest for the credit card account of Exercises 6–9?
11. Compare the results of Exercises 5 and 10 to determine how much more interest you pay when you make payments of 5% of the amount owed instead of 10% of the amount owed.

Complete the chart below to determine how much the interest cost will be if you pay 10% of the amount due each month, rounded to the nearest dollar, and your card carries an APR of 9%. Assume that you make your payment on the last day of the month.

	Month	Balance	Interest	Amount Owed	Payment
12.	1	$995.00			
13.	2				
14.	3				
15.	4				

16. What is the total interest for the credit card account of Exercises 12–14?
17. Compare the results of Exercises 10 and 16 to determine how much more interest you pay if the APR on your card is 15% instead of 9%.

EXERCISE YOUR SKILLS

1. How can you use credit cards to your best advantage?
2. Why is it easier to overspend when you use a credit card?
3. Why do the interest payments decrease when you make larger monthly payments?

KEY TERM

minimum monthly payment

The current balance on Pedro's VISA card is $400.00, and his card carries a monthly finance charge of 1.75% of the amount owed. His bank requires a minimum monthly payment of 10% of his unpaid balance rounded to the nearest dollar or $20, whichever is larger. If the amount he owes drops below $20, then he must make a payment equal to the total amount owed. Use a spreadsheet program to determine how much interest he will pay in the next year, assuming that he makes his payment on the last day of the month.

	Month	Balance	Interest	Amount Owed	Payment
4.	1	$400.00			
5.	2				
6.	3				
7.	4				
8.	5				
9.	6				
10.	7				
11.	8				
12.	9				
13.	10				
14.	11				
15.	12				

16. What is the total interest that Pedro must pay?

Complete the chart below to determine his interest cost for the year if Pedro pays 5% of the amount due instead of 10% of the amount due.

	Month	Balance	Interest	Amount Owed	Payment
17.	1	$400.00	$7.00		
18.	2	387.00	6.77		
19.	3				
20.	4				
21.	5				
22.	6				
23.	7				
24.	8				
25.	9				
26.	10				
27.	11				
28.	12				

29. What is the total interest that Pedro must pay?
30. Compare the results of Exercises 16 and 29 to determine how much more interest he pays if he makes payments of 5% of the amount owed instead of 10% of the amount owed.
31. Use the graph function of your computer spreadsheet program to graph Pedro's monthly payments at 10% and 5% of the amount owed.

Complete the chart below to determine how much Pedro's interest cost will be if he pays 10% of the amount due each month and his card carries a monthly finance charge of 1% of the amount owed.

	Month	Balance	Interest	Amount Owed	Payment
32.	1	$400.00	$4.00		
33.	2	364.00	3.64		
34.	3				
35.	4				
36.	5				
37.	6				
38.	7				
39.	8				
40.	9				
41.	10				
42.	11				
43.	12				

44. What is Pedro's total interest?

45. Compare the results of Exercises 16 and 44 to determine how much more interest Pedro pays if the monthly finance charge is 1.75% instead of 1%.

46. Use the graph function of your computer spreadsheet program to graph Pedro's monthly payments with a monthly finance charge of 1.75% and 1%.

MIXED REVIEW

1. Determine which of the following loans has a greater total cost.
   a. $12,000 at 14% for 5 years b. $15,000 at 11% for 4 years
2. During the first week of September, Samantha worked $37\frac{1}{2}$ hours and received $75.75 in tips. If her hourly rate of pay is $6.95, how much did she earn that week?
3. Determine the monthly payment that must be made to reduce a $3333.33 MasterCard balance to zero in 28 months if the card carries an APR of 17.5%
4. Zachary receives a commission of 5.5% on sales up to $12,000 and 7.5% on all sales over $12,000. How much has he earned in commission if his sales are $19,950?
5. How long will it take to pay off a credit card balance of $1800.75 with monthly payments of $200 if the APR is 11%? Express your answer as a whole number of months.
6. Suppose that your family's take-home pay is $4,300 per month. How much can you afford to spend for credit-card payments each month?