

GUIDELINES FOR USING CREDIT WISELY

Credit can be an important tool in money management if it is used wisely. By doing some research, Raul has discovered the following suggestions on the proper use of credit made by financial advisers and credit counselors.

1. *Limit installment debt to 15–20% of take-home pay.* Monthly installment payments, excluding a home mortgage, are likely to be manageable if they are limited to 15–20% of take-home pay. Any amount over 20% may reduce an individual's or family's ability to pay for food, shelter, transportation, clothing, and other essentials. An authority on money matters has recommended that you not owe more than one-third of your discretionary income for the year. **Discretionary income** is the income you have left after paying for basic needs such as food, clothing, and shelter.
2. *Purchase durable products that will outlast the payment period.* If you are going to use credit for items that do not appreciate (increase in value), use it only on the purchase of durable products such as household appliances or cars. Be careful to choose products carefully. For instance, you do not want to make payments on a used car for 3 years if it only lasts for 15 months.

If you are thinking of borrowing money or opening a charge account, determine the cost, and then decide whether you can afford it. Then shop around for the best credit terms.

WAYS TO REDUCE THE COST OF INSTALLMENT LOANS

Raul has also discovered the following ways to minimize credit costs:

1. *Select a short payment period.* As you discovered in Lesson 5–2, the cost of financing an item is greater with a longer payment period and smaller payments.
2. *Compare interest rates.* The interest rate on a loan can vary dramatically from lender to lender, so it is wise to shop for interest rates just as you would shop for the product itself.
3. *Make a large down payment.* The larger your down payment, the less you will have to borrow.

You can save money in interest charges by paying for a larger portion and financing a smaller portion.

Ask Yourself

1. What are two guidelines for using credit wisely?
2. What should you consider first if you are thinking about borrowing money?
3. What are three ways to reduce the cost of installment loans?

ALGEBRA REVIEW

Determine each of the following.

1. 20% of \$5500
2. 10% of \$7500
3. 30% of \$4300

Evaluate. Give the results to the nearest hundredth.

4. $y = 5750 - (0.2)(5750)$
5. $z = 3600 - (0.4)(3600)$
6. Express y as the product of two numbers by factoring Exercise 4.
7. Express z as the product of two numbers by factoring Exercise 5.

SHARPEN YOUR SKILLS

SKILL 1

EXAMPLE 1 Raul is thinking about buying a portable keyboard. He has compared prices and financing costs at various stores. He can purchase it at one store for \$650 at an interest rate of 12% and at another store for \$650 at an interest rate of 9%. Both loans must be repaid over a period of 2 years.

QUESTION How much money will he save if he purchases the keyboard at the store that offers 9% interest?

SOLUTION

Use the monthly payment formula and your calculator to determine the monthly and total payments at each rate of interest.

$$M = \frac{Pr(1+r)^n}{(1+r)^n - 1} \quad P = 650; n = 2 \cdot 12 = 24$$

Monthly Payment at 12%	Total Payment at 12%	Monthly Payment at 9%	Total Payment at 9%	Total Savings
\$30.60	\$734.35	\$29.70	\$712.68	\$21.67

Remember to use the answer key to find the total payments. However, to find the total savings, use the exact amounts. Why?

EXAMPLE 2 In Example 3 of Lesson 5-1, Maria considered loans of \$4200, \$5500, \$6325, \$8275, and \$9750 at 8% over periods of 3 years, 4 years, and 5 years. The car dealership is offering 5% financing for one day only.

QUESTION How much can she save on each loan if she finances at a rate of 5% instead of 8%?

SOLUTION

Use a spreadsheet program to find the total payments on each loan at 8% and 5%, and then find the difference (savings). To subtract the exact amount of the total payments, use the function of your spreadsheet that formats a column in exact amounts, such as @round. Remember when you use a display function that a computer or calculator still uses the unrounded amounts in calculations unless you use special formatting functions.

For 5 years at 8%:

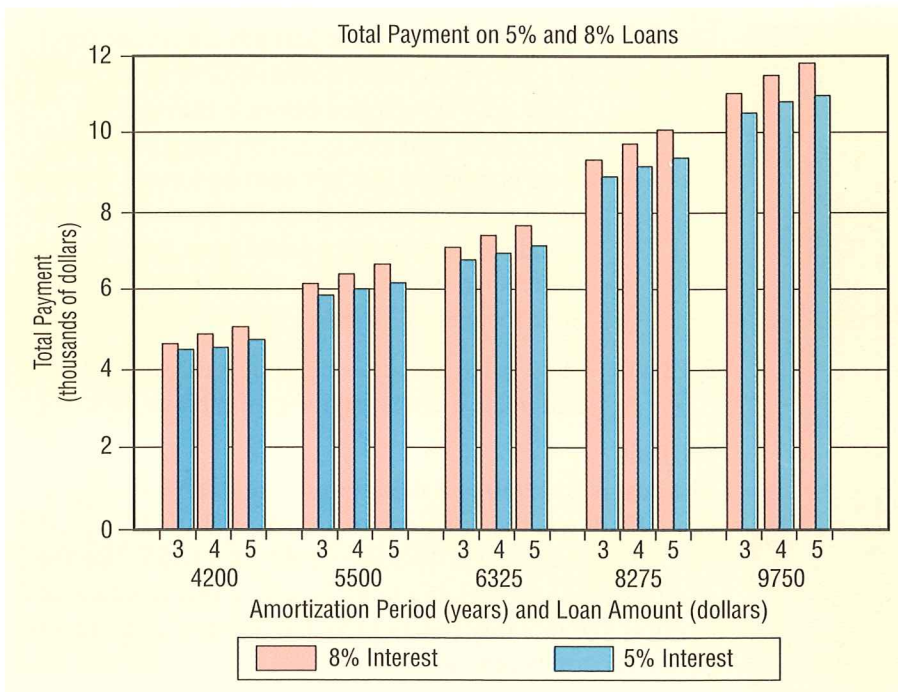
$$\text{@ROUND}(+60 * A5 * (0.08/12) * (1 + (0.08/12))^60 / ((1 + (0.08/12))^60 - 1), 2)$$

For 5 years at 5%:

$$\text{@ROUND}(+60 * A5 * (0.05/12) * (1 + (0.05/12))^60 / ((1 + (0.05/12))^60 - 1), 2)$$

	A	B	C	D	E
1	Loan	Number	Total	Total	Total
2	Amount	of Years	Payment at 8%	Payment at 5%	Savings
3	4200	3	4,738.06	4,531.60	206.46
4	4200	4	4,921.65	4,642.71	278.94
5	4200	5	5,109.65	4,755.55	354.10
6	5500	3	6,204.60	5,934.24	270.36
7	5500	4	6,445.01	6,079.73	365.28
8	5500	5	6,691.21	6,227.51	463.70
9	6325	3	7,135.29	6,824.37	310.92
10	6325	4	7,411.76	6,991.69	420.07
11	6325	5	7,694.89	7,161.63	533.26
12	8275	3	9,335.10	8,928.33	406.77
13	8275	4	9,696.81	9,147.24	549.57
14	8275	5	10,067.23	9,369.57	697.66
15	9750	3	10,999.06	10,519.78	479.28
16	9750	4	11,425.25	10,777.71	647.54
17	9750	5	11,861.69	11,039.67	822.02

Use the graph function of your computer spreadsheet program to graph the relationship between amortization periods of 3 years, 4 years, and 5 years and total payments for each amount at 8% and 5%.



The total payments, and therefore the total cost, on a loan for a given amount of money over a specified amortization period are always lower when the interest rate is lower.

SKILL 2

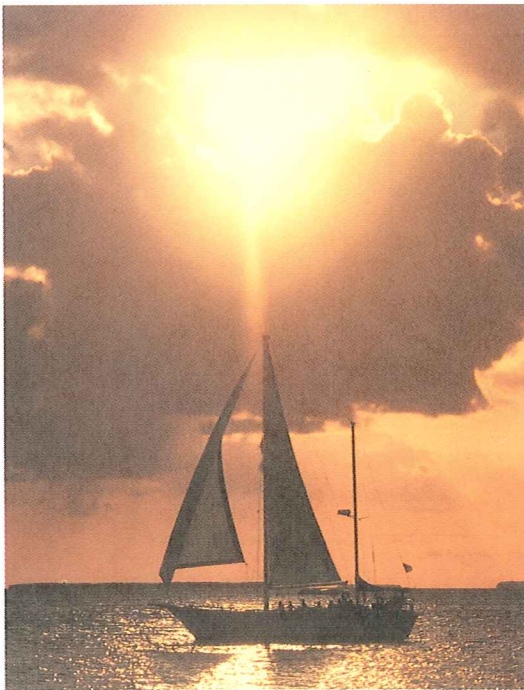
Many loans require that you make a *down payment*, which is a percentage of the cost or price. To find the down payment D multiply the cost C by the percent for the down payment r . To find the loan amount P , subtract the down payment D from the cost C . The total amount T is the sum of the down payment D and all the monthly payments nM .

Loans with Down Payment

$D = rC$ where D = down payment
 r = percent for down payment
 C = cost

$P = C - D$ where P = loan amount
 C = cost
 D = down payment

$T = nM + D$ where T = total amount
 n = number of payments
 M = monthly payment
 D = down payment



EXAMPLE 3 Joan's aunt and uncle just bought a boat for \$14,950 at an interest rate of 12% for 5 years. They are very excited because they were required to make only a 10% down payment. Joan is worried that her aunt and uncle will end up in the same position as her parents did. She wonders whether they could have saved money if they had made a down payment of 20% or 30% instead of 10%.

QUESTION How much money could they have saved if they had made a down payment of 20% or 30%?

SOLUTION

The cost is \$14,950 and the interest rate is 12% for 5 years. For 10% down, the down payment is $0.10(14,950) = 1,495$ and the loan amount is $14,950 - 1,495 = 13,455$. Use the monthly payment formula to find the monthly payment and multiply the monthly payment by the number of payments to find the total amount.

Percent Down, r	Down Payment, D	Loan Amount, P	Monthly Payment, M	Total Amount, T	Savings over 10% Down
10%	\$1495	\$13,455	\$299.30	\$19,452.94	
20%	2990	11,960	266.04	18,952.62	\$ 500.32
30%	4485	10,465	232.79	18,452.29	1000.65

They could have saved \$500.32 with 20% down and \$1000.65 with 30% down. How much do you think they would have saved with 40% down?

EXAMPLE 4 Maria knows that there is another way to lower the total cost of each loan if she cannot reach a decision on a car in time for the one-day 5% financing offer. She wants to know how much money she can save if she makes a down payment of 20% and therefore borrows only 80% of the cost of the car.

QUESTION How much will Maria save on loans of \$4200, \$5500, \$6325, \$8275, and \$9750 at 8% over periods of 3 years, 4 years, and 5 years if she makes a down payment of 20% instead of borrowing the entire amount?

SOLUTION

Use a spreadsheet program to find the total amount for the 8% loan without a down payment and with a 20% down payment. Then find the difference (savings).

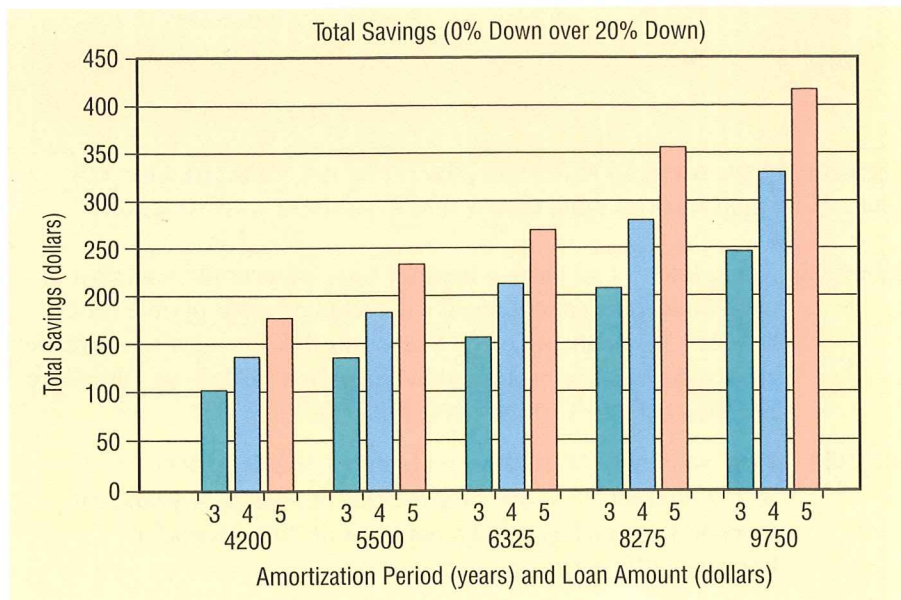


	A	B	C	D	E	F	G
1	Loan	Loan Amount	Number	Total Payment	Total Payment	Total Amount	Total
2	Amount	20% Down	of Years	0% Down	20% Down	20% Down	Savings
3	4200	3360	3	4,738.06	3790.45	4,630.45	107.61
4	4200	3360	4	4,921.65	3937.32	4,777.32	144.33
5	4200	3360	5	5,109.65	4087.72	4,927.72	181.93
6	5500	4400	3	6,204.60	4963.68	6,063.68	140.92
7	5500	4400	4	6,445.01	5156.01	6,256.01	189.00
8	5500	4400	5	6,691.21	5352.97	6,452.97	238.24
9	6325	5060	3	7,135.29	5708.23	6,973.23	162.06
10	6325	5060	4	7,411.76	5929.41	7,194.41	217.35
11	6325	5060	5	7,694.89	6155.91	7,420.91	273.98
12	8275	6620	3	9,335.10	7468.08	9,123.08	212.02
13	8275	6620	4	9,696.81	7757.45	9,412.45	284.36
14	8275	6620	5	10,067.23	8053.78	9,708.78	358.45
15	9750	7800	3	10,999.06	8799.25	10,749.25	249.81
16	9750	7800	4	11,425.25	9140.20	11,090.20	335.05
17	9750	7800	5	11,861.69	9489.35	11,439.35	422.34

+A3-0.2*A3

0.2*A17+E17

Use the graph function of your program to show the savings for each amortization period and loan amount.



EXAMPLE 5 Bernard is going to buy a stereo for \$1200 on which he will make monthly payments. He has collected information about the terms of various loans. These loans have different amortization periods, rates of interest, and down payment requirements. He can amortize the loan over 1 year, 2 years, or 3 years. He can finance it at 9% or 12%. He can make a down payment of 10% or 20%.

QUESTION Which combination of amortization period, interest rate, and down payment yields the lowest total payments? Which yields the highest?

SOLUTION

Use your calculator and the monthly payment formula.



Number of Years	Percent Down	Down Payment	Loan Amount	Total Amount at 9%	Total Amount at 12%
1	10%	\$120.00	\$1080.00	\$1253.37	\$1271.48
1	20%	240.00	960.00	1247.44	1263.54
2	10%	120.00	1080.00	1304.15	1340.14
2	20%	240.00	960.00	1292.58	1324.57
3	10%	120.00	1080.00	1356.37	1411.37
3	20%	240.00	960.00	1339.00	1387.89

The lowest total payment is \$1247.44, which occurs with the shorter amortization period, the higher down payment, and the lower interest rate. The highest total payment is \$1411.37, which occurs with the longer amortization period, the lower down payment, and the higher interest rate.

TRY YOUR SKILLS

Mindy is going to purchase new furniture. She has compared prices and interest charges at two stores. She can purchase a dining room set for \$3300, a living room set for \$4200, and a bedroom set for \$1800 at both stores. One store offers an interest rate of 15%, and the other store offers an interest rate of 10%. Both stores require that the loan be repaid in 3 years. At neither store will she be required to make a down payment. How much money can she save on each item by financing at 10% instead of 15%? Use the monthly payment formula and your calculator to complete the following chart.

	Cost of Item	Monthly Payment at 15%	Total Payment at 15%	Monthly Payment at 10%	Total Payment at 10%	Total Savings
1.	\$3300					
2.	4200					
3.	1800					

Determine the total savings on a loan of \$12,450 at 8.5% for 25 years if you make a down payment of 20% or 30% instead of 10%.

	Percent Down	Down Payment, D	Loan Amount, A	Monthly Payment, M	Total Amount, T	Total Savings Over 10%
4.	10%					
5.	20%					
6.	30%					

EXERCISE YOUR SKILLS

1. What is discretionary income?
2. Why does increasing the size of your down payment for a purchase save you money in the long run?
3. Why would a financial institution encourage you to make a smaller down payment and increase the amortization period for an installment loan?

Steve bought the items listed below and amortized the payments at 12% over 3 years with no down payment. Use the monthly payment formula and your calculator to determine how much he could have saved if the interest rate had been 9% instead of 12%.

CD player for \$500
 Computer for \$2500
 Stereo cassette deck for \$250
 TV/VCR for \$1000

KEY TERM

discretionary
income

	Item Cost	Monthly Payment at 12%	Total Payment at 12%	Monthly Payment at 9%	Total Payment at 9%	Total Savings
4.	\$ 500					
5.	2500					
6.	250					
7.	1000					

Use your results from Exercises 4–7 to determine how much Steve would have saved if he had made a down payment of 30% instead of making no down payment. The interest rate remains at 12%.

	Item Cost	Monthly Payment 0% Down	Total Payment 0% Down	Loan Amount 30% Down	Monthly Payment 30% Down	Total Payment 30% Down	Total Savings
8.	\$ 500						
9.	2500						
10.	250						
11.	1000						

Daniel is going to buy a new all-terrain vehicle for \$42,000 on which he will make monthly payments. He has collected information about the terms of various loans. These loans have different amortization periods, rates of interest, and down payment requirements. He can amortize the loan over 3 years, 4 years, or 5 years. He can finance it at 6% or 8%. He can make a down payment of 10% or 20%. Create a spreadsheet program to find the total payments for each situation.



	Number of Years	Percent Down	Down Payment	Loan Amount	Total Payment at 6%	Total Payment at 8%
12.	3	10%	\$4200.00	\$37,800	\$45,598.17	
13.	3	20%				
14.	4	10%				
15.	4	20%				
16.	5	10%				
17.	5	20%				

- Which combination of amortization period, interest rate, and down payment yields the lowest total payments?
- Which combination of amortization period, interest rate, and down payment yields the highest total payments?
- Use the results of Exercises 12–19 to write a general statement about the effect of amortization period, interest rate, and down payments on total payments.

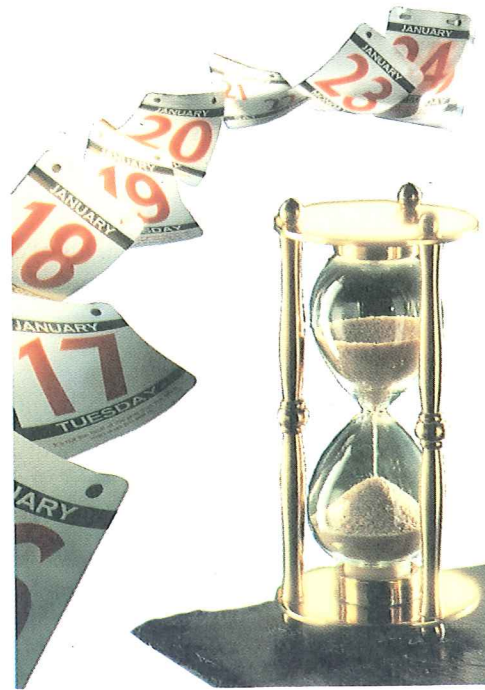
MIXED REVIEW

- You are a real-estate agent who has just sold a house for \$325,000. Determine your total commission if you earn 5% on the first \$150,000 and 8% on any amount over \$150,000.
- You just received a check with your full first name, middle initial, and full last name. Write your name as you would to endorse the check.
- You have \$446.77 in your checking account, and you write a check for \$57.49. Show how you would enter this check in your check register.
- Determine the interest for 6 months if the principal is \$5525, the rate is 5%, and the interest is compounded quarterly.
- You earn \$26,000 per year plus 15% of your salary in fringe benefits. Find your yearly earnings, including benefits.
- What percent of your take-home pay (excluding mortgage payments) is regarded as a “manageable” level (safer than “dangerous” but not as safe as “comfortable”)?
- Given a choice, which method would you prefer your bank to use when determining whether a service charge will be imposed; the minimum-balance method or the average-balance method? Explain your answer.

The cost function for a small business is $c = 2.8n + 40$. The revenue function for the business is $r = 6n$.

- Graph the cost and revenue functions.
- Find the break-even point.

AMORTIZATION SCHEDULES: SHRINKING INTEREST PAYMENTS



Maria knows that she must be careful to choose a loan for which she can afford the monthly payment. Patrick recently told her that he received a raise from Paradise Department Store. Maria hopes that she will receive a pay increase in the next six months too. Her boss also indicated that she might receive a holiday bonus. She plans to save any additional money that she earns.

Maria wonders whether she can pay off her loan early if her financial situation continues to improve. Patrick has read that there can be penalties associated with prepaying a loan.

However, Maria's uncle has just told the family that he saved over \$500 by paying the remainder of his car loan 15 months early. She also knows that her mother prepaid her contract on her microwave oven. Therefore Maria is certain that there must be substantial advantages to prepaying a loan.

Maria has a feeling that the money she can save if she prepays her loan is related to the portion of her monthly payment that is interest. Since her monthly loan payment is fixed, she wonders whether her monthly interest payment is constant also.

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

- *Compute the interest due, note reduction, and unpaid balance on her loan on a monthly basis.*
- *Create an amortization schedule for a loan.*
- *Determine prepayment amounts paid on a loan.*
- *Identify the amount saved by prepaying a loan.*