4-1 | Introduction to Consumer Credit

Key Math Concepts

- Amount of down payment = decimal percent of down payment × purchase price
- $\dfrac{\text{amount financed}}{\text{monthly payment}}$ = months to pay off loan
- Total cost = down payment + sum of payments
- Sum of payments = number of payments × amount of payments
- Finance charge = total cost − purchase price

Guided Exercises

1. Monique purchases a $5,100 dining room set. She can't afford to pay cash, so she uses the installment plan, which requires an 18% down payment. How much is the down payment?

   Amount of down payment = decimal percent of down payment × purchase price

   Amount of down payment = 0.18 × 5,100 = _____ | Write the percent as a decimal. |

   Monique will pay a down payment of _____.

2. Depot Headquarters has a new promotional payment plan. All purchases can be paid off on the installment plan with no interest, as long as the total is paid in full within twelve months. There is a $25 minimum monthly payment required. If the Koslow family buys a hot tub for $4,355, and they make only the minimum payment for 11 months, how much will they have to pay in the 12th month?

   Sum of payments = amount of monthly payments × number of payments

   Sum of payments = _____ × _____ = _____

   Last payment = purchase price − sum of payments

   Last payment = _____ − _____ = _____

   The Koslow's twelfth payment will be _____.

Exercises

3. Joe wants to purchase an electric keyboard. The price of the keyboard at Macelli's, with tax, is $2,344. He can save $150 per month. How long will it take him to save for the keyboard?

4. Lisa purchases a professional racing bicycle that sells for $3,000, including tax. It requires a $200 down payment. The remainder, plus a finance charge, is paid back monthly over the next $2\frac{1}{2}$ years. The monthly payment is $111.75. What is the finance charge?

5. Carey bought a $2,100 computer system on the installment plan. He made a $400 down payment, and he has to make monthly payments of $79.50 for the next two years. How much interest will he pay?

6. The Hut sells a $2,445 entertainment system credenza on a six-month layaway plan. If the monthly payment is $440, what is the sum of the monthly payments? What is the fee charged for the layaway plan?

7. Jessica has $70,000 in the bank and is earning 5% compounded monthly. She plans to purchase a used car, for which the down payment is $500 and the monthly payments are $280. Will her monthly interest cover the cost of the down payment? Explain. Will her monthly interest cover the cost of the monthly payment?

8. The price of a stove is *s* dollars. Pedro makes a 10% down payment for a two-year installment purchase. The monthly payment is *m* dollars. Express the finance charge algebraically.

Name _____ Date _____

Key Math Concepts

- Number of thousands = loan amount ÷ 1,000
- Monthly payment = cost per thousand × number of thousands

- $$M = \dfrac{P\left(\dfrac{r}{12}\right)\left(1+\dfrac{r}{12}\right)^{12t}}{\left(1+\dfrac{r}{12}\right)^{12t}-1}$$

Guided Exercises

Table of Monthly Payments per $1,000 of Principal

Rate	1 yr	2 yr	3 yr	4 yr	5 yr	10 yr
6.50%	86.30	44.55	30.65	23.71	19.57	11.35
6.75%	86.41	44.66	30.76	23.83	19.68	11.48
7.00%	86.53	44.77	30.88	23.95	19.80	11.61
7.25%	86.64	44.89	30.99	24.06	19.92	11.74
7.50%	86.76	45.00	31.11	24.18	20.04	11.87
7.75%	86.87	45.11	31.22	24.30	20.16	12.00
8.00%	86.99	45.23	31.34	24.41	20.28	12.13
8.25%	87.10	45.34	31.45	24.53	20.40	12.27
8.50%	87.22	45.46	31.57	24.65	20.52	12.40
8.75%	87.34	45.57	31.68	24.77	20.64	12.53
9.00%	87.45	45.68	31.80	24.89	20.76	12.67

1. What is the total amount of the monthly payments for a $6,100, two-year loan with an APR of 8.75%? Round to the nearest dollar.

   Number of thousands = _____ ÷ _____ = _____

   Use the table.
   The monthy payment cost per thousand dollars is _____ .

   Monthly payment = cost per thousand × number of thousands

   Monthly payment = _____ × _____ ≈ _____

   Round to the nearest cent.

   Total cost = _____ × 24 = _____

   The total amount of the monthly payments is _____ .

2. Cecilia bought a new car. The total amount she needs to borrow is $29,541. She plans to take out a 4-year loan at an APR of 6.3%. What is the monthly payment?

   $$M = \dfrac{P\left(\dfrac{r}{12}\right)\left(1+\dfrac{r}{12}\right)^{12t}}{\left(1+\dfrac{r}{12}\right)^{12t}-1}$$ Substitute. $$M = \dfrac{\left(\dfrac{}{12}\right)\left(1+\dfrac{}{12}\right)^{12(\underline{})}}{\left(1+\dfrac{}{12}\right)^{12(\underline{})}-1}$$

   $$M = \underline{}$$

   Ceilia's monthly payment will be _____ .

Exercises

3. Claire needs to borrow $12,000 from a local bank. She compares the monthly payments for an 8.1% loan for three different periods of time. What is the monthly payment for a one-year loan? a two-year loan? a five-year loan?
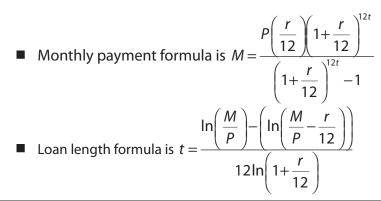
4. Refer to the table in Exercise 1. Mia borrows $66,000 for four years at an APR of 7.25%. What is the monthly payment?

5. Liz found an error in the monthly payment her bank charged her for a four-year, $19,500 loan. She took the loan out at an APR of 9%. Her bank was charging her $495.26 per month What is the correct monthly payment? Liz noticed the error just before making the last payment. The bank told her that they would credit all of the overpayments and adjust her last month's payment accordingly. What should her last month's payment be after the adjustment? Explain.

6. The Bartolotti family took out a loan to have a garage built next to their house. The ten-year, 10.4% loan was for $56,188. The monthly payment was $475, but the promissory note stated that there was a balloon payment at the end. What is the sum of all but the last monthly payment? If the finance charge is $34,415.60, what must the total of all of the monthly payments be? What is the amount of the balloon payment for the final month of this loan?
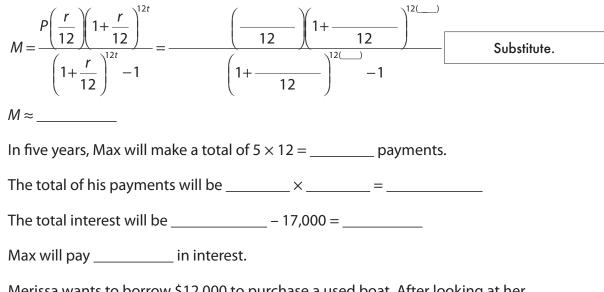
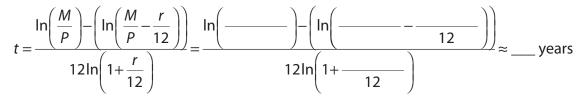## 4-3 Loan Calculations and Regression

Key Math Concepts

- Monthly payment formula is $M = \dfrac{P\left(\dfrac{r}{12}\right)\left(1+\dfrac{r}{12}\right)^{12t}}{\left(1+\dfrac{r}{12}\right)^{12t}-1}$

- Loan length formula is $t = \dfrac{\ln\left(\dfrac{M}{P}\right)-\left(\ln\left(\dfrac{M}{P}-\dfrac{r}{12}\right)\right)}{12\ln\left(1+\dfrac{r}{12}\right)}$

Guided Exercises

1. Max is taking out a 5.1% loan in order to purchase a $17,000 car. The length of the loan is five years. How much will he pay in interest?

$$M = \frac{P\left(\dfrac{r}{12}\right)\left(1+\dfrac{r}{12}\right)^{12t}}{\left(1+\dfrac{r}{12}\right)^{12t}-1} = \frac{\left(\dfrac{}{12}\right)\left(1+\dfrac{}{12}\right)^{12(\underline{})}}{\left(1+\dfrac{}{12}\right)^{12(\underline{})}-1}$$ $\boxed{\text{Substitute.}}$

$M \approx$ _____

In five years, Max will make a total of $5 \times 12 =$ _____ payments.

The total of his payments will be _____ $\times$ _____ $=$ _____

The total interest will be _____ $- 17{,}000 =$ _____

Max will pay _____ in interest.

2. Merissa wants to borrow $12,000 to purchase a used boat. After looking at her monthly budget, she realizes that all she can afford to pay per month is $250. The bank is offering a 6.1% loan. What should the length of her loan be so that she can keep within her budget? Round to the nearest year.

$$t = \frac{\ln\left(\dfrac{M}{P}\right)-\left(\ln\left(\dfrac{M}{P}-\dfrac{r}{12}\right)\right)}{12\ln\left(1+\dfrac{r}{12}\right)} = \frac{\ln\left(\dfrac{}{}\right)-\left(\ln\left(\dfrac{}{}-\dfrac{}{12}\right)\right)}{12\ln\left(1+\dfrac{}{12}\right)} \approx \underline{} \text{ years}$$

Merissa should take out a loan for about _____.

Exercises

3. What is the monthly payment for a 10-year, $20,000 loan at 4.625% APR? What is the total interest paid on this loan?

4. Tom and Kathy want to borrow $35,000 in order to build an addition to their home. Their bank will lend them the money for 12 years at an interest rate of $5\frac{3}{8}$%. How much will they pay in interest to the bank over the life of the loan?

5. Ansel wants to borrow $10,000 from the Hampton County Bank. They offered him a 6-year loan with an APR of 6.35%. How much will he pay in interest over the life of the loan?

6. Neville is considering taking out a $9,000 loan. He went to two lending institutions. Sunset Park Company offered him a 10-year loan with an interest rate of 5.2%. Carroll Gardens Bank offered him an 8-year loan with an interest rate of 6.6%. Which loan will have the lowest interest over its lifetime?

7. JFK Federal Bank offers a $50,000 loan at an interest rate of 4.875% that can be paid back over 3 to 15 years. Write the monthly payment formula for this loan situation. Let *t* represent the number of years from 3 to 15 inclusive.

4-4 Credit Cards

--- **Key Math Concepts** ---

- Monthly interest rate = ARP ÷ 12
- Average daily balance is the average of the amounts owed each day of the billing period.
- Finance charge = monthly interest rate × average daily balance

Guided Exercises

Mr. Reis had these daily balances on his credit card for his last billing period. He did not pay the card in full the previous month, so he will have to pay a finance charge. The APR is 19.8%. Answer Exercises 1-2.

six days @ $341.22	**ten days @ $987.45**
three days @ $2,122.33	**eleven days @ $2,310.10**

1. What is the average daily balance?

The number of days in the billing cycle are: 6 + 3 + 10 + 11 = 30

Find the sum of the daily balances:

$6 \times 341.22 = 2,047.32$
$3 \times 2,122.33 = 6,366.99$
$10 \times 987.45 = 9,874.50$
$\underline{11 \times 2,310.10 = 25,411.10}$
Total   _____

Average daily balance = sum of the daily balances ÷ days in the billing cycle

_____ ÷ _____ = _____

Mr. Reis' average daily balance is _____.

2. What is the finance charge?

Monthly interest rate = _____ ÷ _____ = _____

Finance charge = monthly interest rate × average daily balance

Finance charge = _____ × _____

Finance charge = _____ × _____ = _____ | Write the percent as a decimal. |

The finance charge is _____.

Name _____ **Date** _____

Exercises

3. Mrs. Cykman's credit card was stolen, and she did not realize it for several days. The thief charged a $440 watch while using it. According to the Truth-in-Lending Act, at most how much of this is Mrs. Cykman responsible for paying?

4. Mrs. Fagin's daily balances for the past billing period are given below.

For five days she owed $233.49.   For three days she owed $651.11.
For nine days she owed $991.08.   For seven days she owed $770.00.
For seven days she owed $778.25.
Find Mrs. Fagin's average daily balance.

5. Brett and Andy applied for the same credit card from the same bank. Brett was given a card with an APR of 12.6%. What was his monthly percentage rate? Andy was given a card with an APR of 16.2%. What was his monthly percentage rate? If each of them had an average daily balance of $7,980, and had to pay a finance charge, how much more would Andy pay than Brett?

6. A set of daily balances are expressed algebraically below.

w days @ r dollars   5 days @ x dollars n days @ q dollars p days @ $765
If the APR is 21.6%, express the finance charge algebraically.

7. Tomika's credit rating was lowered, and the credit card company raised her APR from 18% to 25.2%. If her average daily balance this month is $8,237, what is the increase in this month's finance charge due to the higher APR? If this amount is typical of Tomika's average daily balance all year, how much would the rise in interest rate cost her in a typical year? Round to the nearest ten dollars.

4-5 Credit Card Statement

Key Math Concepts

- New balance = previous balance – payments + new purchases + finance charges + late charge
- Available credit = credit line – new balance

Guided Exercises

1. Examine the summary section of a monthly credit card statement. Calculate the new balance.

SUMMARY	Previous Balance	Payments / Credits	Transactions	Late Charge	Finance Charge	New Balance	Minimum Payment
	$876.34	$800.00	$1,009.56	$30.00	$29.67		$18.00

New balance = previous balance – payments + new purchases + finance charges + late charge

New balance = 876.34 – 800 + 1,009.56 + 29.67 + 30 = _____

The new balance is _____.

2. Jack set up a spreadsheet to model his credit card statement. The summary statement portion of the spreadsheet is shown. Write the formula for available credit that would be entered in cell J32.

	D	E	F	G	H	I	J
	D	**E**	**F**	**G**	**H**	**I**	**J**
31	Previous Balance	Payments	New Purchases	Late Charge	Finance Charges	Credit Line	Available Credit
32							

New balance = pervious balance – payments + new purchases + finance charges + late charge

New balance = _____ – _____ + _____ + _____ + _____

Available credit = credit line – new balance

J32 = _____ – (_____ – _____ + _____ + _____ + _____)

Name _____ Date _____

Exercises

3. Lizzy has a credit line of $9,000 on her credit card. Her summary is shown. What is her available credit balance?

SUMMARY	Previous Balance	Payments / Credits	Transactions	Late Charge	Finance Charge	New Balance	**Minimum Payment**
	$6,500.56	$5,200.00	$978.45	$20.00	$12.88		

4. Rich had a previous balance of *x* dollars and made an on-time credit card payment of *y* dollars where $y < x$. He has a credit line of 10,000 dollars and pays an APR of 15.4%. Rich made purchases totaling $1,300.30. Write an algebraic expression that represents his current available credit.

5. Marianne has a credit card with a line of credit at $15,000. Marianne made the following purchases: $1,374.90, $266.21, 39.46, and $903.01. What is Marianne's available credit?

6. Luke has a credit line of $8,500 on his credit card. He had a previous balance of $4,236.87 and made a $3,200.00 payment. The total of his purchases is $989.42. What is Luke's available credit?

7. Sheila's monthly periodic rate is 2.41%. What is her APR?

4-6 Average Daily Balance

———— Key Math Concepts ————

■ Average daily balance = average of the amounts owed each day of the billing period.
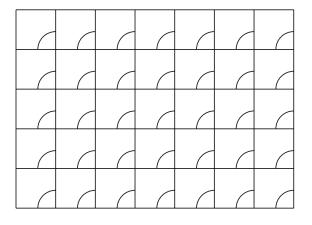
Guided Exercises

Use Liam DeWitt's FlashCard statement and the blank credit calendar for Exercises 1-6.

Liam DeWitt
6915 Maple Creek Dr.
West Chester, OH

ACCOUNT INFORMATION					
Account Number	4-10700000		Billing Date	13 Sept	**Payment Due** 30 Sept

TRANSACTIONS		DEBITS / CREDITS (−)
22 Aug	Propane Home Heat	$250.50
23 Aug	TJ Marsha's Department Store	$87.60
25 Aug	Brighton University	$1,300.00
1 Sept	Middle Island Auto Parts	$470.63
2 Sept	Payment	- $2,000.00
3 Sept	Al's Mobal Gas Station	$34.76
5 Sept	Stop, Shop and Go	$102.71
10 Sept	Federal Express	$45.90
12 Sept	Computer Depot	$848.60

SUMMARY	Previous Balance	Payments / Credits	Transactions	Late Charge	Finance Charge	New Balance	**Minimum Payment**
	$3,240.50			$0.00			$30.00

		Average Daily Balance	# Days in Billing Cycle	APR	Monthly Periodic Rate
Total Credit Line	$ 5.000.00				
Total Available Credit	$ 5,000.00				
Credit Line for Cash	$ 4,000.00		30	19.8%	
Available Credit for Cash	$ 4,000.00				

1. Enter the billing date of Sept.13 on the last day of the calendar and number the days backwards.

Write the previous balance of $3,240.50 from the first day of the billing cycle to Aug. 21.

Write the charge of +$250.50 on Aug. 22 over the new balance of $3,491. Write the next charge of _____ on Aug. 23 over the new balance of _____.
Continue, adding the debits to the balance and subtracting the credit.

When there are no new transactions, the balance is carried over for each day until the next transaction.

2. What is Liam's average daily balance?

Average daily balance = sum of daily balances ÷ days in the billing cycle

Average daily balance = _____ ÷ _____ = _____

Liam's average daily balance is _____.

Exercises

3. What is Liam's monthly periodic rate?

4. What is Liam's finance charge?

5. What is Liam's new balance?

6. What is Liam's available credit?