



MEA 2013-2014  
Teacher: Claudia Valle  
Start Date:

Course: Math Models B  
Student: \_\_\_\_\_  
Completed Date:

## Unit 2: Credit

**Objectives:** Students will use algebraic formulas, graphs, and amortization models to solve problems involving credit.

**Essential Questions:** How can you decide whether to use credit or not?

**TEKS Standards: M.1.A, M1.B, M.1.C, M.6.A**

Mathematical Models with Applications

(1) The student uses a variety of strategies and approaches to solve both routine and non-routine problems. The student is expected to:

(A) compare and analyze various methods for solving a real-life problem;

(B) use multiple approaches (algebraic, graphical, and geometric methods) to solve problems from a variety of disciplines; and

(C) select a method to solve a problem, defend the method, and justify the reasonableness of the results.

(6) The student uses algebraic formulas, graphs, and amortization models to solve problems involving credit. The student is expected to:

(A) analyze methods of payment available in retail purchasing and compare relative advantages and disadvantages of each option;

Turn In:

Assignment #	Activity	TEKS
12	<del>It's the Law</del>	<del>M.1.A, M1.B, M.1.C, M.6.A</del>
13	What's In an Advertisement?	M.1.A, M1.B, M.1.C, M.6.A
14	Consumer Credit	M.1.A, M1.B, M.1.C, M.6.A
15	<del>Ins and Outs of Installment Buying</del>	M.1.A, M1.B, M.1.C, M.6.A
16	<del>Credit Check</del>	<del>M.1.A, M1.B, M.1.C, M.6.A</del>
17	Unit 2 Test	M.1.A, M1.B, M.1.C, M.6.A

## What's In an Advertisement? Cards

### Group A

#### Advertisement 1

45-inch flat screen HDTV  
\$1,500

You can have it for  
\$135 per month for 12 months

#### Advertisement 2

45-inch flat screen HDTV  
\$1,500

You can have it for  
\$75 per month for 24 months

### Group B

#### Advertisement 1

Washer and Dryer Set  
\$2,500

You can have it for  
\$115 per month for 24 months

#### Advertisement 2

Washer and Dryer Set  
\$2,500

You can have it for  
\$82 per month for 36 months

### Group C

#### Advertisement 1

Complete Set of Living Room Furniture  
\$3,250

You can have it for  
\$154 per month for 24 months

#### Advertisement 2

Complete Set of Living Room Furniture  
\$3,250

You can have it for  
\$86 per month for 48 months

## What's In an Advertisement? Recording Sheet

Group A

Example

Calculation	Advertisement 1	Advertisement 2	Conclusions
Total paid	\$1,620	\$1,800	Sample: Although it costs less per month to take it out for more months, you end up paying more interest.
Interest paid	\$120	\$300	
Ratio of interest to total price	$\frac{I}{P} = \frac{120}{1500} = \frac{2}{25}$	$\frac{300}{1500} = \frac{1}{5}$	
Percent of interest	$\frac{2}{25} \cdot 100 = 8.0\%$	20.0%	

Group B Example

Calculation	Advertisement 1	Advertisement 2	Conclusions
Total paid	\$2,760	\$2,952	
Interest paid	\$260	\$452	
Ratio of interest to total price	$\frac{260}{2500} = \frac{13}{125}$	$\frac{452}{2500} = \frac{113}{625}$	
Percent of interest	10.4%	18.1%	

Group C

Do:

Calculation	Advertisement 1	Advertisement 2	Conclusions
Total paid			
Interest paid			
Ratio of interest to total price			
Percent of interest			

# Notes

## Consumer Credit KEY

Installment buying occurs when consumers borrow money to finance purchases and repay the money with periodic payments. Two types of consumer credit are available:

- Closed-ended credit involves borrowing a specific amount of money and paying it back with set amounts at specific intervals until the loan is paid off. Automobile loans and home mortgages are examples of closed-ended credit. Others include loans for furniture, large appliances, student loans, etc.
- Open-ended credit involves loans in which the amount fluctuates with additional purchases. The amounts paid at specific intervals can vary and payments are made continually on the account until it is paid off. Examples of open-ended credit include department store credit cards and bank charge cards such as Master Card®, Visa®, Discover®, etc.

In the 1960's the United States Congress enacted measures to protect consumers. One of these was the Truth in Lending Act (TILA). It required that all credit contracts disclose the amount financed, the total finance charges, and the total amount paid in payments. Contracts must also state the actual annual interest rate or annual percentage rate (APR). These disclosures allow consumers to compare credit options that are available.

### Installment Purchases and APR

Since APR is difficult to calculate, tables are available that can be used to calculate payments or APR from purchase options.

APR Table: Finance Charge per \$100 of Financed Amount									
Month of Payments	8.0%	8.5%	9.0%	9.5%	10.0%	10.5%	11.0%	11.5%	12.0%
12	4.39	4.66	4.94	5.22	5.50	5.78	6.06	6.34	6.62
24	8.54	9.09	9.64	10.19	10.75	11.03	11.86	12.42	12.94
36	12.81	13.64	14.48	15.32	16.16	17.01	17.86	18.71	19.57
48	17.18	18.31	19.45	20.59	21.74	22.90	24.06	25.23	26.40
60	21.66	23.10	24.55	26.01	27.48	28.96	30.45	31.96	33.47

### Sample 1

Jaclyn found the following advertisement in the newspaper. What would be the annual percentage rate (APR) on the installment loan?

Washer and Dryer Set  
 \$2,500

It is yours for  
 \$82 per month for 36 months

$$\frac{\text{finance charge}}{\$100} = \frac{\text{finance charge}}{\text{financed amount}}$$

$$\frac{x}{100} = \frac{452}{2500}$$

$$x = 18.08$$

36 months and 18.08 matches an APR of approximately 11.0%

# Notes

## Consumer Credit KEY

### Sample 2

Jaclyn found the same washer and dryer combination at another store for \$1,995. This store will finance the set at 8.0% APR for 24 months. If Jaclyn pays \$295 down, what will be her monthly payment?

$$\frac{\text{finance charge}}{\$100} = \frac{\text{finance charge}}{\text{financed amount}}$$

$$\frac{8.54}{100} = \frac{x}{1700}$$

$$x = 145.18$$

$$(\$1700 + 145.18) \div 24 = \$76.88 \text{ monthly payment}$$

### Credit and Charge Cards

Credit limits are established when the cards are issued. Payments are determined by finding a percentage of the balance. Some bank cards have an annual fee. In order to save money when using credit cards, you should use cards with no annual fee and pay off the balance each month. If the balance is not paid off each month, the credit card company will charge interest on the balance. This is done one of two ways, interest on the unpaid balance or interest on the average daily balance. Interest on the average daily balance is most often used today.

When calculating interest using the unpaid balance method, interest is calculated only on the unpaid balance and is not affected by payments or new purchases.

### Sample 3

Selena received her monthly statement for Cavazos Clothing where she has a charge card. Her previous balance was \$630. She made a payment that was 10% of the unpaid balance and then charged an additional \$123.53 for a pair of shoes. The charge card has an annual interest rate of 16%. Determine the new balance on Selena's account.

$$\text{Payment} = 0.10(630) = \$63.00$$

$$\text{Interest} = prt$$

$$\text{Interest} = (630)\left(\frac{0.16}{12}\right)(1 \text{ month}) = \$8.40$$

Beginning unpaid balance	630.00
Payment	- 63.00
Purchase	+123.53
Interest	<u>+ 8.40</u>
New balance	\$698.93

*Notes*  
**Consumer Credit KEY**

When calculating interest using the average daily balance method, interest is calculated not only on the unpaid balance but also on payments or new purchases made that month. (The sample problem for the unpaid balance interest will be used in order to make comparisons.)

Sample 4

Selena received her monthly statement for Cavazos Clothing where she has a charge card. Her previous balance was \$630. She made a payment that was 10% of the unpaid balance and then charged an additional \$123.53 for a pair of shoes. The charge card has an annual interest rate of 16%. Determine the new balance on Selena's account.

April 3	billing date
April 12	payment
April 20	shoe purchase
May 3	next billing date

Date	Transaction	Balance
April 3	Unpaid balance	\$630
April 12	Payment	$630 - 63 = \$567$
April 20	Purchase	$567 + 123.53 = \$690.53$

Date	Balance Due	Days Until Balance Changed	Balance Due x Number of Days
April 3	\$630.00	9	\$5,670.00
April 12	\$567.00	8	\$4,536.00
April 20	\$690.53	13	\$8,976.89
<b>Total</b>		30	\$19,182.89

Total balance ÷ Total days =  $19182.89 \div 30 = \$639.43$

Interest =  $(639.43) \left( \frac{0.16}{12} \right) (1 \text{ month}) = \$8.53$

New balance =  $690.53 + 8.53 = \$699.06$

How do the two methods compare? Which method appears better for the credit company?

Answers will vary.

Sample: The average daily balance method will cost the consumer more when they make additional purchases during the month. It also appears to be the method that will favor the credit company.

## Consumer Credit

### Practice Problems

- Cesar purchased a \$4,500 sound system for his new entertainment center. He paid \$500 down and financed the remainder for 48 months. His monthly payments were set at \$102.41. Find the finance charge and the APR.
- Sassy Sails is featuring a special financing plan this month with a 9.0% APR for 36 months. If Jules purchases a sail board for \$1,350 with no money down, what will be his monthly payments?
- The table below is a summary of the transactions for Alice's credit card. Use the unpaid monthly balance method to fill in the table. The card is at a 15% annual interest rate. Assume that each month she pays 12% of her unpaid balance.

Month	Unpaid balance at beginning of month	Finance charge	Purchases	Payments
August	\$432.20		\$42.50	
September			\$245.00	
October			\$124.60	
November				

- Using the information below, calculate the new credit card balance on September 1 by the average daily balance method. Assume an annual percentage rate of 12.5%.

Billing date 8/1	Balance	\$132.10
8/10	Condo rental	\$750.00
8/13	Payment	\$500.00
8/20	School clothes	\$175.65

Date	Balance Due	Days Until Balance Changed	Balance Due x Number of Days
<b>Total</b>			