

Section 3 – Installment Buying

- With **installment buying** you repay a loan on a monthly basis. You get charged interest, known as a **finance charge**, which is worked into the monthly price. The advantage is that you get to have the product right away, even though you haven't completely paid for it.
- The **cash price** is the amount of the item you want to buy. The **amount you finance** is the total you borrow. The **down payment** is the amount of money you pay right away. They are related by the equation below.

$$\text{Amount Financed} = \text{Cash Price} - \text{Down Payment}$$

- The **total installment price** is the total amount you pay (all monthly payments plus down payment)

$$\text{Total Installment Price} = (\text{Monthly payment}) \times (\text{Number of payments}) + \text{Down payment}$$

- The **finance charge** is the amount you pay for borrowing the money (the interest paid)

$$\text{Finance Charge} = \text{Total Installment Price} - \text{Cash Price}$$

- *Example:* The cost of a new car is \$14,000. You can pay \$280 down and finance the rest for \$315 per month for 60 months. Find the amount financed, total installment price and finance charge.

Solution: $\text{Amount Financed} = 14,000 - 280 = \$13,720$

$$\text{Total Installment Price} = (315) 60 + 280 = \$19,180$$

$$\text{Finance Charge} = 19,180 - 14,000 = \$5180$$

The Formula Involved in Borrowing:

- The interest rate per year is called the **Annual Percentage Rate** (APR), and lenders are required by law to inform you of the APR on any loan.
- The formulas $A = \left(1 - 1 \div (1 + i)^n\right) \times R \div i$ and $R = A \times i \div \left(1 - 1 \div (1 + i)^n\right)$ relate the quantities
 A = amount borrowed
 R = monthly payment
 i = monthly interest rate (APR/12), and
 n = total number of payments
- These formulas will prove to be useful in two cases. 1) you can compute the monthly payment on a given loan, or 2) you can compute the amount of money paid in finance charges.
- Let's make sure we can use our calculator to find these values. Go to the Practice Problems.

- *Example:* If you purchase a truck for \$9000 with no money down at 0.9% per month for 60 months what is your monthly payment?

Solution: $A = 9,000$, $i = 0.009$, and $n = 60$

$$R = A \times i \div (1 - 1 \div (1 + i)^n) = 9000 \times 0.009 \div (1 - 1 \div (1 + 0.009)^{60}) = 194.79$$

You will owe \$194.79 per month

- *Example:* In the above example, what is amount paid in finance charges?

Solution:

$$\text{Amount Paid} = 194.79 (60) = 11,687.40$$

$$\text{Finance Charge} = 11,687.40 - 9,000 = 2687.40$$

- *Example:* If you have a loan of \$100 for 18 months at 11.5% APR, compute the finance charge

Solution:

$$A = 100$$

$$i = 0.115/12 = 0.00958\bar{3}$$

$$n = 18$$

$$R = A \times i \div (1 - 1 \div (1 + i)^n) = 100 \times 0.00958\bar{3} \div (1 - 1 \div (1 + 0.00958\bar{3})^{18}) = 6.075 \text{ per month}$$

$$\text{Total amount you pay} = 6.075 (18) = 109.35$$

$$\text{Finance Charge} = 109.35 - 100 = \$9.35$$

Credit Cards:

- **Balance Due** on a **Credit Card** depends on not only the interest rate but also how it is calculated.
- Credit cards companies can calculate your interest on either the
 - Unpaid Balance:* The balance on the first day of the billing period less payments/credits
 - Previous Balance:* The unpaid balance on the first day of the billing period
 - Average Daily Balance:* The average of the daily balance, found by adding the unpaid balances for each day in the period and dividing by the number of days in the billing period
- The **Balance Owed** depends on the way the company calculates it, which often depends on how much you owe. For example, if you owe less than a certain amount (say \$360) there is a minimum payment (probably about \$10-\$20). But if you owe more than that amount, you owe a percentage of the balance (which varies from 2% to 10%).
- *Example:* Here is your bill for a credit card charging 1.6% per month using the *unpaid balance* method.

May 1 Unpaid Balance \$4,720

Payment Received May 8: \$1,000

Purchases: \$1,070

Solution: Using the unpaid balance method, with balance due at 2% if over \$360.

$$I = PRT = (4,720 - 1,000) 0.016 = 59.52$$

$$\text{You owe} = \text{unpaid balance} + \text{interest} + \text{new charges} = 3,720 + 59.52 + 1,070 = \$4,849.52$$

$$\text{Balance owed} = 4,849.52 (0.02) = \$96.99$$

- Why is carrying a balance on a credit card a bad idea?

Example: Say your unpaid balance on a credit card with a 1.2% per month interest rate is \$600. For this card, the minimum payment is \$10. The interest rate is computed using the previous balance method. If you only pay the minimum and make no other purchases, we can track your bill.

Solution:

Month	Balance
0	600
1	$Prev\ Bal + Interest - Payment = 600 + 0.012(600) - 10 = 597.20$
2	$597.20 + 0.012(597.20) - 10 = 594.37$
3	$594.37 + 0.012(594.37) - 10 = 591.50$
etc.	

You'll find it will take you over 8.9 years to pay this off! Which at \$10 a month is about \$1,070!