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 \( A = \left( 1 - \frac{1}{1+i} \right)^n \times R \div i \) and \( R = A \times i \times \left( 1 - \frac{1}{1+i} \right)^n \) relate the quantities

\[ \begin{align*}
A &= \text{amount borrowed} \\
R &= \text{monthly payment} \\
i &= \text{monthly interest rate (APR/12), and} \\
n &= \text{total number of payments}
\end{align*} \]

• 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: \( A = 9,000, \ i = 0.009, \text{ and } n = 60 \)
  \[
  R = A \times i \div \left( 1 - \frac{1}{(1 + i)^n} \right) = 9000 \times 0.009 \div \left( 1 - \frac{1}{(1 + 0.009)^{60}} \right) = 194.79
  
  \]
  You will owe $194.79 per month

• Example: In the above example, what is amount paid in finance charges?
  Solution:
  \[
  \text{Amount Paid} = 194.79 \times 60 = 11,687.40
  \]
  \[
  \text{Finance Charge} = 11,687.40 - 9,000 = 2687.40
  \]

• Example: If you have a loan of $100 for 18 months at 11.5% APR, compute the finance charge
  Solution:
  \[
  A = 100
  \]
  \[
  i = \frac{0.115}{12} = 0.009583
  \]
  \[
  n = 18
  \]
  \[
  R = A \times i \div \left( 1 - \frac{1}{(1 + i)^n} \right) = 100 \times 0.009583 \div \left( 1 - \frac{1}{(1 + 0.009583)^{18}} \right) = 6.075 \text{ per month}
  \]
  \[
  \text{Total amount you pay} = 6.075 \times 18 = 109.35
  \]
  \[
  \text{Finance Charge} = 109.35 - 100 = $9.35
  \]

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.
  \[
  I = PRT = ( 4,720 - 1,000 ) \times 0.016 = 59.52
  \]
  \[
  \text{You owe} = \text{unpaid balance} + \text{interest} + \text{new charges} = 3,720 + 59.52 + 1,070 = 4,849.52
  \]
  \[
  \text{Balance owed} = 4,849.52 \times 0.02 = $96.99
  \]
• 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:

<table>
<thead>
<tr>
<th>Month</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>600</td>
</tr>
<tr>
<td>1</td>
<td>$600 + 0.012(600) – 10 = 597.20</td>
</tr>
<tr>
<td>2</td>
<td>597.20 + 0.012(597.20) – 10 = 594.37</td>
</tr>
<tr>
<td>3</td>
<td>594.37 + 0.012(594.37) – 10 = 591.50</td>
</tr>
</tbody>
</table>

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