Section 3.3: Installment Buying and Credit Cards

§1 Installment Buying

Installment buying is the process of purchasing something and paying for it at a later date. There is almost usually a finance charge associated with installment buying. The finance charge can be thought of as simple interest. So the principal would be the amount of money that is being financed, the rate would be the interest rate, the time would be the time the object is being paid off. The total cost would then be the price of the item plus any finance charges.

CAREFUL: the principal is not always equal to the price of the object. We need to include any down payments or other costs to calculate the principal.

Example 1

A TV is on sale for $800. Bob plans to buy the TV on an installment plan, i.e. making monthly payments until the item is paid off in full. The terms are $100 down, and the rest paid over 12 months at 15%. What will the monthly payments be?

Solution: First, determine the principal, or the amount that will be financed. This is the total price minus the down payment. Here, we get $800 - $100 = $700.

Next, calculate the interest. The formula for simple interest is \( I = Prt \). We get \( I = (700)(0.15)(1) = $105 \).

Third, we add the amount financed with the interest. The total charge here is $700 + $105 = $805.

To calculate the monthly payment, we divide $805 by 12, which is $67.08. Note that due to rounding, if Bob pays $67.08 for 12 months, he will pay 804.96. Make sure the sum of all the monthly payments is equal to the amount financed. If necessary, adjust the amount of the last payment. Hence his last payment need to be adjusted. His first 11 payment will be ($67.08) * 11 = $737.88, and his last payment will be $67.12.

Example 2

A car is bought for $12500. Ann decides to pay $1000 down and finance the rest at a rate of 5% over 5 years. Find the interest charged and the monthly payment.

Solution:

First determine the amount financed (total amount – down payment):

Determine the interest charged using the simple interest formula \( I = Prt \):

Determine the total amount financed:

Determine the monthly payment and the last payment:
Credit card companies calculate their finance charges a little differently. First, let's look at some terms.

Billing cycle – the number of days between credit card statements. For example, if a billing cycle runs from April 10 – May 9, then there are 30 days in the billing cycle, because April has 30 days. If a billing cycle runs from August 20 – September 19, then there are 31 days in the billing cycle.

Average Daily Balance – the average of the daily balances for all the days in the billing cycle.

Example 3

To calculate the average daily balance, we find the balance for every day of the billing cycle, add them together, and divide by the number of days in the billing cycle. For example, if a credit card has a balance of $50 for the 10 days, then a balance of $90 for the 12 days, and a balance of $105 for 9 days, find the average daily balance.

Solution: We could add $50 + $50 + $50 …. ten times, then do the same for $90 and $105, but this will take too long. Note that we could multiply $50(10) + $90(12) + $105(9) and divide the result by 31. We get $81.45.

Example 4

Find the average daily balance for a credit card that has a balance of $15 for 8 days, $50 for 13 days, $75 for 5 days, and $100 for 4 days.

Solution:

First, find the total of each value. Multiply each dollar value times its number of days. The answer is:

Then, divide the total value divided by the number of days in the billing cycle to get the average daily balance. The answer is:

Example 5

To calculate the monthly finance charge, use the following formula:

Monthly finance charge = (Average daily balance) x (APR/365) x (# of days in billing cycle)

Note that we divide the APR by 365 to get the daily interest rate, and multiply that by the # of days in the billing cycle. So for Example 3, if the APR was 19.99%, we can calculate the monthly finance charge as follows: ($81.45) x (0.1999/365) x 31 = $1.38.
Example 6

This is problem #15 from the book. The first day of the billing cycle was April 17, and the balance was $78.30. The next purchase was made on April 20. So for three days, the balance on the credit card was $78.30.

A payment was made on April 20. So on April 20, the balance on the credit card became $78.30 - $50.00 = $28.30. The next purchase wasn’t made until May 1, so for 11 days the balance on the credit card was $28.30.

On May 1, a purchase was made for $29.20. The balance on the card became $167.50, and since the end of the billing cycle was May 16, this balance remained for 16 days.

<table>
<thead>
<tr>
<th>Dates</th>
<th># of days</th>
<th>Balance Due</th>
<th># of days x balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 17-19</td>
<td>3</td>
<td>$78.30</td>
<td>$234.90</td>
</tr>
<tr>
<td>April 20-April 30</td>
<td>11</td>
<td>$28.30</td>
<td>$311.30</td>
</tr>
<tr>
<td>May 1-May 16</td>
<td>16</td>
<td>$57.50</td>
<td>$920.00</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td></td>
<td>$1466.20</td>
</tr>
</tbody>
</table>

The average daily balance will then be $1466.20 / 30 = $48.87. At an APR of 5.2%, the monthly finance charge will be ($48.87) * (0.052/365) * 30 = $0.21. Hence, the balance due on May 17 will be $57.50 + $0.21 = $57.71.

Example 7

This is problem 16 in the book. Try to fill in the table, and use the table to calculate the average daily balance, the finance charge, and the balance due.

<table>
<thead>
<tr>
<th>Dates</th>
<th># of days</th>
<th>Balance Due</th>
<th># of days x balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 19 – 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 23-November 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 1 – December 9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 10 – December 18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average Daily Balance:

Finance Charge:

Balance due on December 19: