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11.2 Personal Loans and Simple Interest

Credit or **principal of the loan** – money a bank is willing to lend.

Security or **collateral** – anything of value pledged by the borrower that the lender may sell or keep if the borrower does not repay the loan.

**Cosigners** – other persons who guarantee the loan will be repaid.
**Personal note** – document that states the terms and conditions of the loan.

**Interest** – money the borrower pays for the use of the lender’s money.

**Simple interest** – based on the entire amount of the loan for the total period of the loan.

\[
\text{Interest} = \text{principal} \times \text{rate} \times \text{time} \quad (I=prt)
\]

where

- \( p \) = amount of money lent
- \( r \) = rate of interest expressed as a percent
- \( t \) = number of days, months, years, etc.

\( r \) and \( t \) must correspond.

\( r = \text{annual rate unless it specifically says otherwise.} \)
1. **Ordinary interest** – on the due date of a simple interest note (or ordinary interest), the borrower must pay principal and interest.

2. **Discount note** – interest is paid at the time the borrower receives the loan (called the **bank discount**).
The United States Rule

If a partial payment is made on a loan, interest is computed on the principal from the first day of the loan until the date of the partial payment. The partial payment is used to pay the interest first and then to reduce the principal of the loan. This process may be repeated.

The Banker’s Rule is used to calculate simple interest when applying the U.S. rule. (A year is 360 days. Any fractional part of the year is the exact number of days of the loan.)
5. **Bank discount note** KwameAdebele borrowed $2500 for 5 months from his bank using US government bonds as security. The bank discounted the loan at 8%.

\[ p = 2500, r = 8\% = 0.08, t = \frac{5}{12} \text{ years} \]

a. How much did Kwame pay the bank for the use of the money?

\[ i = prt = 2500(0.08)\left(\frac{5}{12}\right) = 83.33 \]

b. How much did he receive from the bank?

\[ 2500 - 83.33 = 2416.67 \]

c. What was the actual rate of interest he paid?

\[ i = prt \]

\[ 83.33 = \left(2416.67\right)(r)\left(\frac{5}{12}\right) \]

(carry 6 decimal places)

\[ 83.33 = 1006.945833r \]

\[ \frac{83.33}{1006.945833} = r \Rightarrow r = 0.082755 \text{ or } 8.2755\% \]
6. Find the exact time from the first date to the second date:

May 19 to Sept. 17

134th day 260th day

260 - 139 = 121

7. Determine the due date of the loan, using the exact time if the loan is made on the given date for the given number of days:

July 5 for 210 days

186th day

July 5th  Dec. 31st

186th  365th

365 - 186 = 179 days

How many more days do we need?

210 - 179 = 31 (days into next year)

Due date: January 31
8. A partial payment is made on the date indicated. Use the US rule to determine the balance due on the note on the date of maturity:

<table>
<thead>
<tr>
<th>Principal</th>
<th>7500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>12%</td>
</tr>
<tr>
<td>Effective date</td>
<td>Apr. 15</td>
</tr>
<tr>
<td>Maturity date</td>
<td>Oct. 1</td>
</tr>
<tr>
<td>Partial paymt.</td>
<td>$1000</td>
</tr>
<tr>
<td>Date</td>
<td>Aug. 1</td>
</tr>
</tbody>
</table>
1. Number of days between effective date and partial payment = 108
   \[ \frac{213}{3} - 105 = 108 \]

2. Interest on partial payment date = principal \times rate \times (no. of days in #1) = \$270.
   \[ 7500 \times 0.12 \times \frac{108}{360} = \$270. \]

3. Principal paid on partial payment date = partial payment - interest paid = \$730.
   \[ 1055 - 270 = 730 \]

4. New principal = original principal - amount paid in #3 = \$6770.
   \[ 7500 - 730 = 6770 \]
5. **NUMBER OF DAYS BETWEEN PARTIAL PAYMENT DATE AND MATURITY DATE**
   
   
   Aug. 1
   
   213
   
   Oct. 1
   
   274
   
   274 - 213 = 61

6. **INTEREST IN MATURITY DATE** = NEW PRINCIPAL \times RATE \times \left(\frac{\text{NO. OF DAYS IN #5)}}{360}\right)

   \[ i = \frac{p \times r \times t}{360} \]

   \[ i = (6770)(.12)(\frac{61}{360}) = 137.66 \]

7. **BALANCE DUE ON MATURITY DATE** = NEW BALANCE + INTEREST ON MATURITY DATE

   \[ 6907.66 + 137.66 = 6907.66 \]
9. A partial payment is made on the date indicated. Use the US rule to determine the balance due on the note at the date of maturity.

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal</td>
<td>$1000</td>
</tr>
<tr>
<td>Rate</td>
<td>12.5%</td>
</tr>
<tr>
<td>Effective Date</td>
<td>January 1</td>
</tr>
<tr>
<td>Maturity Date</td>
<td>February 15</td>
</tr>
<tr>
<td>Partial Payment</td>
<td>$300</td>
</tr>
<tr>
<td>Date</td>
<td>January 15</td>
</tr>
</tbody>
</table>
1. NUMBER OF DAYS BETWEEN EFFECTIVE DATE AND PARTIAL PAYMENT = 14

\[ 15 - 1 = 14 \]

2. INTEREST ON PARTIAL PAYMENT DATE = PRINCIPAL \times RATE \times (NO. OF DAYS IN #1) = 4.86
\[ \text{rate} = \frac{1000 \times 0.125 \times 14}{360} \]
\[ = 4.86 \]

3. PRINCIPAL PAID ON PARTIAL PAYMENT DATE = PARTIAL PAYMENT - INTEREST PAID = 295.14
\[ 300 - 4.86 = 295.14 \]

4. NEW PRINCIPAL = ORIGINAL PRINCIPAL - AMOUNT PAID IN #3 = 704.86
\[ 1000 - 295.14 = 704.86 \]
5. NUMBER OF DAYS BETWEEN PARTIAL PAYMENT DATE AND MATURITY DATE = 31

Jan 15
Feb 15

46 - 15 = 31

6. INTEREST IN MATURITY DATE = NEW PRINCIPAL x RATE x (NO. OF DAYS IN #5) = 7.59

\[ i = 704.86 \times 0.125 \times \frac{31}{360} = 7.59 \]

7. BALANCE DUE ON MATURITY DATE = NEW BALANCE + INTEREST ON MATURITY DATE = $712.45

\[ 704.86 + 7.59 = 712.45 \]