8.1 Single-Payment Loans

A **single-payment loan** is a loan that you repay with one payment after a special period of time. A business may be short of funds and need to borrow money to meet its payroll or pay for inventory and supplies. The business owner could sing a promissory note with its financial institution. A **promissory note** is a written promise to pay a certain sum of money one a specific date in the future. The maturity value of the loan is the total amount you must repay. It includes both the principal and interest owed. **Principal** is the amount borrowed.

A loan's term is the amount of time for which the loan is granted. For example, a single-payment loan may be granted for a number of years, months, or days. When the term is specific number of days, the lending agency may calculate interest in one of two ways:

1. **Ordinary interest** is based on 360-day year.
2. **Exact interest** is based on 365-day year.

The following formulas are used:

Interest = Principal X Rate X Time

$$\text{Ordinary Interest} = \text{Principal} \times \text{Rate} \times \frac{\text{Time}}{360}$$

$$\text{Exact Interest} = \text{Principal} \times \text{Rate} \times \frac{\text{Time}}{365}$$

Maturity Value = Principal + Interest

Ex1: Anita Sloan's bank granted her a single-payment loan of $7,200 for 91 days to pay for new merchandise for her candle shop. Determine the maturity value of the loan if the rate is **(a)** 6% ordinary interest or **(b)** 6% exact interest.

A) Step 1: Find ordinary interest

$OI = P \times R \times \frac{T}{360}$ so $OI = 7200(.06)\left(\frac{91}{360}\right)$

$OI = \$109.20$

Step 2: Find Maturity value

$MV = P + I$

$= 7200 + 109.20$

$= \$7309.20$

B) Find exact interest first

$I = 7200(.06)\left(\frac{91}{365}\right) = \$107.70$

Then find maturity value

$7200 + 107.70 = \$7307.70$

Ex. 2) Parker Logan purchased a new surfboard costing $600 and financed it at 9% ordinary interest for 90 days. Compute **(a)** the interest and **(b)** the maturity value for his loan.

A) $OI = P \times R \times \frac{T}{360}$

$OI = 600(.09)\left(\frac{90}{360}\right)$

$OI = \$13.50$

B.) $MV = 600 + 13.50$

$= \$613.50$

Ex. 3) Holmes Ostendorf added a tack room to his barn costing $4,850 financed at 7% exact interest for 120 days. Compute **(a)** the interest and **(b)** the maturity value for his loan.

A) $I = 4850(.07)\left(\frac{120}{365}\right) = \$111.62$

B) $MV = 4850 + 111.62$
$= \$4961.62$

Ex. 4) Our class borrowed $ 5400 to go on a class trip to Texas at 7.3 % exact/ordinary interest for 90 days. Compute **(a)** the interest and **(b)** the maturity value for our loan.

A) $5400(.073)\left(\frac{90}{365}\right) = \$97.20$

B) $5400 + 97.20 = \$5497.20$

Ex. 5) Which is better for the short-term borrower: ordinary interest or exact interest?

Exact interest
b/c more days to divide by
so lowers interest

Ex.6) Suppose your bank has a minimum loan charge of $55 when you borrow at 5.5% exact interest for 73 days. What principal borrowed will result in a $55 interest charge?

$EI = P(R)\left(\frac{T}{365}\right)$

$55 = P(0.055)\left(\frac{73}{365}\right)$

$\left(\frac{365}{4.015}\right)55 = \frac{4.015P}{365}\left(\frac{365}{4.015}\right)$ $\frac{1465.47}{1465.47}P$

$\$5000 = P$

Ex. 7) Sally Wong borrowed $8, 500 and agreed to pay back $8619 in 90 days. What ordinary interest rate was she paying? (Round answer to the nearest tenth of a percent.)

$MV = P + I$

$8619 = 8500 + I$

$-8500 \quad -8500$

$119 = I$

$I = P \times R \times \frac{t}{360}$

$119 = 8500(R)\left(\frac{90}{360}\right)$

$\frac{119}{2125} = \frac{2125R}{2125}$

$.056 = R$

Rate = 5.6%

Assignment: p. 307 #4-10, 11, 13 #17 EC