Section 4.3
Amortization and Sinking Funds

To **amortize** means to pay off a debt by installment payments.

**Amortization Formula**

The periodic payment \( E \) on a loan of \( P \) dollars to be amortized over \( n \) periods with interest charged at the rate of \( i \) per period is

\[
E = \frac{Pi}{1 - (1 + i)^{-n}}
\]

**Sinking Fund**

A fund that is set up for a specific purpose at some future date is called a **sinking fund**.

**Sinking Fund Formula**

The periodic payment \( E \) required to accumulate a sum of \( F \) dollars over \( n \) periods with interest charged at the rate of \( i \) per period is

\[
E = \frac{iF}{(1 + i)^n - 1}
\]

Example 1: Kelly wishes to buy a car that costs $32,998. The car dealer tells her that they can finance the car at 6.25% per year compounded monthly for 60 months. She decides to secure the loan from the dealer. How much will her monthly payments be?

**Amortization**

\[
E = \frac{Pi}{1 - (1 + i)^{-n}}
\]

**Sinking Fund**

\[
E = \frac{iF}{(1 + i)^n - 1}
\]
Example 2: A person would like to have $200,000 in an account for retirement 15 years from now. How much should be deposited quarterly in an account paying 6% per year compounded quarterly to obtain this amount?

Amortization
\[ E = \frac{Pi}{1 - (1 + i)^{-n}} \]

Sinking Fund
\[ E = \frac{iF}{(1 + i)^n - 1} \]

Example 3: The cash price of the sailboat you wish to purchase is $16,000. You pay 15% down and secure a loan for the remaining balance. How much are your monthly payments if 18% per year compounded monthly is charged over a period of 6 years?

Amortization
\[ E = \frac{Pi}{1 - (1 + i)^{-n}} \]

Sinking Fund
\[ E = \frac{iF}{(1 + i)^n - 1} \]
Example 4: A company anticipates needing to replace one of their assembly line machines in 3 years at a cost of $25,000. An account at their credit union pays 4.5% per year compounded monthly. How much would they need to deposit in this account each month to reach their goal in 3 years?

Amortization
\[ E = \frac{P_i}{1 - (1 + i)^{-n}} \]

Sinking Fund
\[ E = \frac{iF}{(1 + i)^n - 1} \]

Example 5: In order to expand their growing business, a company purchased a piece of property at a cash price of $450,000. They made a $25,000 down payment, and financed the rest through a lender. If the lender will charge 3.25% per year compounded semiannually for 7 years, find the company’s semiannual payment.

Amortization
\[ E = \frac{P_i}{1 - (1 + i)^{-n}} \]

Sinking Fund
\[ E = \frac{iF}{(1 + i)^n - 1} \]

Try this one: You bought an RV at a cost of $125,000. You made a down payment of $3,000. How much are your monthly payments to the creditor over 20 years at 2.25% per year compounded monthly?