Mat114
Review of Chapter 5.

1. Simple Interest Formula

\[ FV = P(1 + rt) \]

where \( FV \) is the future value, \( P \) is the principal, \( r \) is the interest rate (per year), \( t \) is the number of years (no necessarily an integer).

2. Compound Interest Formula

\[ FV = P(1 + i)^n \]

where \( FV \) is the future value, \( P \) is the principal, \( i \) is the rate per compounding period, and \( n \) is the number of periods.

3. Annuities

- **Ordinary annuity** - payment at the end of each payment period.

\[ FV = pymt \frac{(1 + i)^n - 1}{i} \]

- **Annuity due** - payment in the beginning of each payment period.

\[ FV = pymt \frac{(1 + i)^n - 1}{i} (1 + i), \]

where \( pymt \) is the payment, \( i \) is the rate per period, \( n \) is the number of periods.

- **Present value** of an ordinary annuity is the amount \( P \) such that

\[ P(1 + i)^n = pymt \frac{(1 + i)^n - 1}{i}. \]
4. Amortized loans

- Simple interest amortized loan has the payment \( pymt \) such that

\[
pymt \frac{(1 + i)^n - 1}{i} = P(1 + i)^n,
\]

where \( P \) is a loan amount, \( i \) is the rate per payment period, and \( n \) is the number of periods.

- Simple interest amortized loan has the interest portion of each payment equal to a simple interest on an outstanding principal.

- Unpaid balance

\[
P(1 + i)^m - pymt \frac{(1 + i)^n - 1}{i},
\]

where \( P \) is a loan amount, \( i \) is the rate per period, \( m \) is the number of the period from the beginning to the point when the loan is paid off.