Symbol	Description	Symbol	Description
B	Outstanding Balance	i	Periodic or Monthly Interest Rate
mi	Monthly Interest Payment.	R	Monthly Payment
mp	Monthly Principal Payment		

1. B is the outstanding balance. Each month the outstanding balance is diminished by the amount of the monthly payment, R, paid to principal.
2. i is the periodic or monthly interest rate. Compute $i = \frac{APR}{N \times 100}$, where APR is the Annual Percentage Rate and N is the number of payment periods in a year. N is the number of months in a year. $i = \frac{APR}{1200}$. For example, *i*=0.0067 when *APR*=8.
3. R is the monthly payment. A fixed payment is made every month. Part of the payment is allocated to interest, mi, and the remaining part is used to reduce the outstanding balance. The part used to reduce the outstanding balance is mp. $R = \frac{Pi}{1-(1+i)^{-n}}$, where P is the principal – the amount borrowed, i is the monthly interest rate, and n is the number of periods in the term – *n* is the number of months in the term. For example, the monthly payment on a loan of $100,000 to be repaid over a term of 30 years at 8 APR is $733.36.

To compute a mortgage amortization we need to find the sequence of outstanding balances $B_0, B_1, \cdots, B_n$ where $B_0 = P$ and $B_n = 0$ - where the initial balance is equal to the amount borrowed and the last balance is equal to zero – the mortgage is paid in full.

Use the following equations to determine the sequence of outstanding balances.

1. $mi_i = B_i i$. Find the amount paid to interest first. Find the amount paid to interest by computing the produce of the outstanding balance times the monthly interest rate.
2. $mp_i = R - mi_i$. Find the amount used to reduce the outstanding balance next. Find the difference between the monthly payment and the amount paid to interest.
3. $B_{i+1} = B_i - mp_i$. Find the next outstanding balance. Subtract the amount of the monthly payment used to reduce the outstanding balance from the outstanding balance.

Exercises:

1. Find the amount paid to reduce the outstanding balance in the third payment of a loan of $100,00 whose APR is 6 and whose term is 30 years.
2. Find the outstanding balances in the first five payments of a loan of $50,000 at 8 APR for a term of 15 years.