

LESSON FOURTEEN

REAL ESTATE FINANCE
MATHEMATICS

STUDENT LEARNING OUTCOMES



1. *Differentiate between the "straight note" and the "amortized note".*
2. *Apply the formula, $I = PRT$, to compute interest amount, interest **R**ate, **P**rincipal, and **T**ime factor or $I = R \times V$.*
3. *Calculate mortgage payments and mortgage balances.*
4. *Discuss some of the ways in which amortization tables can be used.*
5. *Compute effective yields when points are charged, with and without the time value of money considered.*
6. *Make a judgment as to whether it is profitable to refinance an existing loan.*

- A. Interest is the charge or price paid for the use or forbearance of money. This "rent" may be paid either at the end of the period, the maturity date, or more commonly at periodic intervals, usually in monthly installments.
- B. Calculation. One of the most common problems found in the area of real estate finance is calculating the amount of interest. This is accomplished by the formula, Interest = Principal x Rate x Time, or $I = PRT$ or $I = R \times V$. Referred to as the simple interest rate formula, it was initially demonstrated in Lesson One. Now we go into much more detail.

- c. Principal is the amount of money borrowed. It is the face value of the promissory note upon which interest is paid
- D. Rate is the percent of interest charged on the principal and is usually expressed on an annual basis.
- E. Time denotes the interval between payments of principal and/or interest. It is expressed as a fraction of a year. The terms of a loan may call for interest only payments, with the principal repaid at maturity (straight note calculation). Most real estate loans require repayment of principal and interest through monthly installments.

- A. **Straight Note** The debt is paid in one lump-sum, at maturity. Periodic payments of interest are made, usually semi-annually, quarterly, or monthly.
- B. **Amortized Note** Installment payments are made at stated intervals, usually every month. Two variations exist:
 - c. By example, assume you have a \$100,000 loan at 12% per annum for a 30-year term. The principal payment per month will be \$277.78 ($100,000 / 360$ months). The first month's interest payment will be \$1,000.00 ($100,000 \times 12\% / 12$ months). The payment for the first month will be \$1,277.78. Each month, the interest will be recalculated on the new loan balance and again divided by 12 months.

- A. Amortization is the periodic reduction of the principal balance through installment payments of principal and interest. The basic formula, $I = PRT$ or $I = R \times V$, takes into account that interest is computed on the unpaid principal balance, regardless of the variation in the amortized note.
1. Definition. A balloon payment is, as the name implies, a large remaining balance due before the loan would mature if it were fully amortized. Monthly payments in many junior mortgages are expressed as a percent of the face value of the note, referred to as pay-back rate, pay-back percentage, pay-off rate, or payment rate.