Rs 300 and every year by Rs 30. Hence his salary figures in successive years will be in AP with a common difference of Rs 30. Similarly, the salary figures of Y in successive half-years will be in AP with a common difference of Rs 15. For X, December 31, 1959 falls in the 10th year of service and for Y it falls in the 20th half year. Thus for the two AP series, we have

Men	Initial term (a)	Common difference (d)	No. of Terms (n)
X	300	30	10
Y	280	15	20

Using the first formula of (1), we have, the salaries as on December 31, 1959 are

$$t_{10} = Rs\{300 + (10-1)\times 30\} = Rs.\ 570 \quad (\text{for X})$$

$$t_{20} = Rs\{280 + (20-1)\times 15\} = Rs.\ 485 \quad (\text{for Y})$$

For determining the total amount paid to each of them, we apply the second formula of (2). Taking one month's salary from each year, the total amount paid to X in each of the 12 months during the 10 year period is $S_{10} = Rs\{2\times 300 + (10-1)\times 30\}\frac{10}{2} = Rs\ 4350$

So, the total amount paid to X throughout the period is Rs $4350 \times 12 = Rs\ 52200$

Similarly, taking one month's salary from each half-year, the total amount paid to Y in each of the 6 months during the 20 half years is $S_{20} = Rs\{2\times 280 + (20-1)\times 15\}\frac{20}{2} = Rs\ 6850$

So, the total amount paid to Y throughout the period is $= Rs\ 6850 \times 6 = Rs\ 41100$.

6.2 Compound Interest

Introduction: For any financial transaction, there is always one who is a lender and other who is a borrower. The money lender charges some extra amount in addition to the initial amount of money, known as interest. The interest is charged because of the time value of the money. Interest plays a very crucial role in business. Many individuals and agency are engaged directly in this business of lending money to individuals or organizations. There are two types of interest — simple and compound. To study the compound interest, we must know the concept of simple interest. The sum of money lent initially is called **principal**. If the interest is calculated on the principal alone, then it is known as **simple interest**. Again if the interest is calculated on the combined total of principal and prior interest, it is known as **compound interest**. Hence, the principal remains the same in the simple interest but it increases time to time in the case of compound interest.

Definitions of Important terms:

Let us define the following terms, which are important in the mathematics of finance:

Principal: The amount of money that is lent or

borrowed initially, is called principal. It is denoted by P.

Interest : Interest is the amount charged in addition to the principal as the time value of money. We denote this by I

Time period The time period is the number of years or quarters or months or the fraction of these for which the principal is lent or borrowed. Usually the time period is denoted by n.

Amount: The amount is the total of principal and interest earned in a specified period of time. Alternatively, it is known as accrued amount or future value. It is denoted by A.

Hence, Amount = Principal + Interest, i.e., $A = P + I$

Rate of interest : It is the sum of money payable to the lender for the use of unit principal for a unit period of time. The rate of interest is reckoned on Rs. 100 as unit principal and one year as unit time period. We denote the rate of interest as r%. Again interest per annum (year) on Rs 1 is denoted by i, i.e., $r = 100i$

Simple Interest

Let P be the given principal borrowed for n years at the rate of interest r% per annum. Then the simple interest is given by the formula

$$I = \frac{P \times r \times n}{100} = P \times i \times n$$