FINANCE AND GROWTH

- **Simple Interest**
- **Hire Purchase Agreements**
- **Compound Interest**
- **Inflation**
- **Population Growth**
- **Exchange Rates**

SIMPLE INTEREST

- **Interest is based only on the original sum of money**
- **Rand value of interest remains constant**
- **Formula:** **A = P(1 + n.i)**

A = Total Amount

P = Principle

i   = Interest Rate (where $i = \dfrac{\mathrm{int}\,erest\_rate}{100}$)

n = Number of Years

Example 1:   R1500 is invested for 2 years at 18% per annum (p.a.) simple interest.

- **Value of investment after 1 year:**
A = R1500 + 18% of R1500
    = R1500 + R270
    = R1770

- **Value of investment after 2 years:**
A = R1770 + 18% of R1500
    = R1770 + R270
    = R2040
Therefore value of interest remains constant.

- **Using the Simple Interest formula:**
 A = P(1 + i.n)
 A = R1500(1 + 0,18 x 2)
 A = R2040

Example 2: R50 000 is invested for 18 years at 16% p.a. simple interest. Determine:
a) the value of the investment after 18 years
b) the simple interest earned after 18 years

P = R50 000 ; I = 0.16 p.a ; n = 18 years

- a) A = P(1 + i.n)
     A = R50 000 (1 + 0,16.18)
     A = R194 000

- b) Interest received
     = A - P
     = R194 000 – R50 000
     = R144 000.

Example 3: How much was invested 4 years ago if the value of the investment is currently worth R7 000? The interest rate was 7% p.a. simple interest.

A = R7000 ; n = 4 years ; i = 0.07

A = P(1+i.n)

R7000 = P(1 + 0,07 x 4)

R7000 = P(I + 0,28)

R7000 = P(1,28)

$$\frac{R7000}{1,28} = P$$

P = R5468,75

Example 4:   R1 600 accumlates to R3 000 after 4 years. Find the interest rate if the investment earned simple interest.

A = R3000   ;   P = R1600   ;   n = 4 years

A = P(1 + i.n)
R3000 = R1600(1 + i.4)
R3000 = R1600 + 4800i
R3000 – R1600 = 4800i
R1500 = 4800i
R1500 ÷ 4800 = i
i = 0,3125
r = i x 100
    = 0,3125 x 100
    = 31,25%

Simple Interest Calculator

EXERCISE

1. Sarah invests R5000 for 6 years at a simple interest rate of 8% p.a. Determine:

- (a) the future value of the investment.
- (b) the simple interest received after 6 years

2. Kabelo invests R15000 for 15 years at a simple interest rate of 8% per annum. Calculate:

- (a) the future value of the investment.
- (b) the simple interest received after 16 years

3. In 3 years' time John wants to have saved R25 000 in order to visit his cousin who lives in England. He manages to receive an interest rate of 12% per annum simple interest. How much must he invest now in order to achieve his goal?

4. Sandesh wants to invest a sum of money now so as to afford a new play station costing R5000, three years from now. He receives a simple interest rate of 6% p.a. Calculate how much Sandesh should invest?

5. Calculate how long it would take an investment of R3900 to grow to a value of R5500 if the simple interest rate received is 12% per annum.

6. Calculate how long it would take for an investment of R5800 to double if the simple interest rate is 14% p.a.

7. In order for R5000 to grow to R10000 over a period of 5 years, what simpleinterest rate would you need to secure?

8. Ronald has R5000 to invest and wishes to increase this amount to R6000 over a period of 2, 5 years.
   What simple interest rate will he need to receive in order to achieve this?

9. An amount of R2000 is invested at 14% p.a. simple interest. A further R1400 is invested at 12% p.a. simple interest. By when will both investments have the same accumulated values?

HIRE PURCHASE AGREEMENTS

- **A Hire Purchase Agreement (HP) is a short-term loan. Furniture, cars and household appliances, such as refrigerators, are generally bought on HP.**

- Buyers sign an agreement with the seller to pay a specified amount per month.

- **The interest paid on a hire purchase loan is simple interest and it is calculated on the full value of the loan over the repayment period.**

- Normally a deposit is paid initially and the balance is paid over a short time period

Example 1:

Pumzile buys a DVD player for R7 800 .She takes out a hire-purchase loan involving equal monthly payments over 2 years. The interest rate charged is 14, 5% per annum simple interest. She also takes out an insurance premium of Rl0, 35 per month, to cover the cost of damage or theft.

Calculate:
 a) the actual amount paid for the DVD player.
 b) the interest paid.
 c) how much must be paid each month.

- **a) P = R7 800; n = 2 years (24 months); I = 14.5% p.a.**

$$A = P(1 + i.n)$$
$$A = R7\ 800\ [1 + (0,\ 145)(2)]$$
$$A = R10\ 062$$

- **b) Interest paid = A – P**
$$= R10\ 062 – R7\ 800$$
$$= R2\ 262$$

- **c) The monthly loan repayments:**
    R10 062 ÷ 24 months
    = R419,25
    Add in the monthly insurance premium,
    the total amount to be paid each month is:
    R419,25 + R10,35
    = R429,60 p. m

Example 2:

Jo - Ann buys a laptop priced at R13 495. She takes out a 12-month hire purchase agreement. She pays a deposit of 20% and the interest charged on the balance is 15% per annum simple interest.

What will she actually pay for the laptop and what will her monthly payments be?

- **Deposit :**
  = 0, 2 x R13 495
  = R2 699
- **Balance on HP:**
  = R13 495 - R2 699
  = R10 796
- **A=P(1+i.n)**
  A = R10 796(1 + 0, 15 x 1)
  A = Rl2 415,40
- **Jo - Ann will actually pay :**
  R2 699 + R12 415
  = R15 114 for the laptop.
- **Her monthly repayments will be:**
  R15 114   12
  = R1 259,50 p. m

Example 3:

A car radio costs R960. Megan buys her car radio on HP and agrees to pay a deposit of R100 and 24 monthly repayments of R45 p.m. Calculate:

(a) the total simple interest paid.

(b) the rate of simple interest.

a) **Total amount paid:**
= R100 + 24 x R45
= R1 180

Total interest paid:
= R1 180 – R960
= R220

b) The 24 amounts of R45 that must be paid will add up to R1 032, which is A, the final value.
The deposit of RI00 is paid at the start of the HP, so the balance (P) to be paid is therefore R860.

P = R860   ;   A = R 1 080;
n = 24 months = 2 years   ;   i = ?

A = P (I + i.n)
R1 080 = R860(1 + i x 2)
R1 080 ÷ R860 = 1 + 2i
1,255813953 = 1 + 2i
1,255813953 – 1 = 2i
0.255813953 = 2i
0,2558139532 ÷ 2 = i
r = 12,8 %

EXERCISE

1. Mpho buys a furniture suite for R9895. He takes out a hire-purchase loan involving equal monthly payments over five years.   The interest rate charged is 15, 25% per annum simple interest. He also takes out   an insurance premium of RI2 per month to cover the cost of damage or theft. Calculate:

   (a) the actual amount paid for the furnituresuite.
   (b) the interest paid.
   (c) how much must be paid each month.

2. Greg buys a laptop priced at R12 535. He takes out a 24-month hire purchase agreement. He pays a deposit of 10% and the interest charged on the balance is 16,125% per annum simple interest. What will he actually pay for the laptop and what will his monthly payments be?

3. A play station 11 costs R4593. Daniel buys a play station on HP and agrees to pay a deposit of R450 and 36 monthly payments of R150. Calculate the total simple interest paid and the rate of simple interest.

4. A hire purchase contract for a sound system requires OJ to pay a deposit of R550 and then make 6 monthly payments of R 185. If the price of the sound system is R1 401. Calculate the total simple interest paid and the rate of simple interest.

5. Mr Sibanda bought a computer costing R22 253 on hire purchase. He traded in an old computer for R2000 and paid a deposit of R1500. The balance was paid by means of monthly installments of RI 120,50 over two years. Calculate the total simple interest paid and the rate of simple interest.