www.learnxtra.co.za

SESSION 12: FINANCE

KEY CONCEPTS:

- Simple Interest
- Compound Interest
- Applications of Interest
- Exchange Rates

TERMINOLOGY

Simple interest: the interest calculated only on the initial amount that you invested.

Compound interest: the interest earned on the principal amount and on its accumulated interest.

X-PLANATION

Simple Interest

Simple Interest depends on three factors:

(a) The amount of money invested or loaned, denoted by P.

(b) The duration of the investment or loan (*n*).

(c) The interest rate per period, denoted by r. In Financial Maths, we say that $i = \frac{r}{100}$ (the rate divided by 100, i.e. a decimal)

The formula which helps us to calculate the future value (A) of an original amount P, which has been invested for *n* years at a rate of *r* % simple interest is:

$$A = P(1 + in)$$

A **Hire Purchase Agreement** (HP) is a short-term loan. Household appliances and furniture are often bought on HP. The buyer signs 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. The buyer will be required to pay the total interest charged on the loan even if the loan can be paid off in a shorter time period.

Compound Interest

If interest is calculated on the original sum plus interest already earned, then it is called **compound interest**. In practice, financial institutions use compound interest. The interest or growth on your money is reinvested back into your investment. In this sense, money makes money.

Compound Interest depends on three factors:

(a) The amount of money invested or loaned, denoted by P.

(b) The duration of the investment or loan (*n*).

The interest rate per period, denoted by r . In Financial Maths, we say that $i = \frac{r}{100}$ (the rate divided by 100, i.e. a decimal)

The formula which helps us to calculate the future value (A) of an original amount P, which has been invested for *n* years at a rate of *r* % simple interest is:

$$A = P(1+i)^n$$

Applications of compound interest formula

Inflation is the steady compounded increase in prices over time throughout the economy. A motor vehicle, which costs R130 000 today, cost about R40 000 ten years ago. The effect of inflation is to erode the buying power of money over time. In other words, in five years time, you will not be able to buy the things you could buy with R1000 000 today.

Population growth occurs as a compound increase over time.

Foreign Exchange different countries have different currencies. When people travel, import or export goods they need to use the agreed foreign exchange rate to complete transactions. The exchange rate between two currencies is given as a ratio.

X-AMPLE QUESTIONS:

Question 1:
Aaron invests R45 000 for 12 years at an interest rate of 13% per annum simple interest.

Calculate:

(a) the accumulated amount (future value) of the investment in 12 years time.
(3)

(b) the simple interest received at the end of the 12th year.
(1)

(c) the simple interest received each year.
(1)

Question 2:
(a) Simphiwe started to save money six years ago. The current value of her investment is R38 000. The interest rate for the investment was 7% per annum simple interest. How much did she invest six years ago?
(3)

(b) Itumeleng invested R6000 and it accumulated to R10 000 after 3 years. Find the interest rate if the investment earned simple interest. Round off your

answer to one decimal place.

(3)

Question 3

Brenda buys a tumble dryer for R4000. She takes out a **hire-purchase loan** involving equal monthly payments over three years. The interest rate charged is 14% per annum simple interest. She also takes out an insurance premium of R12,40 per month to cover the cost of damage or theft. Calculate:

(a) the actual amount paid for the tumble dryer.

(3)

(b) the interest paid.

(1)

(c) how much must be paid each month.

(3)

Question 4:
Raymond invests R18000 for 6 years at 15% p.a. compounded annually. Find the future value of his investment after 6 years and the interest he receives.

(4)

Question 5:
Refiwe has just opened a small supermarket and takes out a loan to provide the initial capital to start the business. She agrees to repay the loan four years later by means of a payment of R800 000. The bank charges her an interest rate of 18% per annum compounded annually. What was the amount of money she originally borrowed? (3)

Question 6:
R6800 is invested for 6 years and grows in value to R12 500. Find the interest rate if interest is compounded annually. (3)

Question 7:
You have R5000 to invest. You are offered a choice of two plans:

Plan A: 8,5% simple interest per annum
Plan B: 4,00% compound interest per annum

You are not sure how long you want to keep the money invested.

a.) Draw a graph to compare the value of the investment over 10 years
b.) Over which time period would it be better to invest in plan A?
c.) Over which time period would it be better to invest in plan B?

Question 8:
A motor vehicle currently costs R400 000. If the rate of inflation is 11% p.a. compounded annually, how much will this car cost in 7 years' time? (3)

www.learnxtra.co.za

Question 8:
According to the latest census, South Africa currently has a population of 57 000 000.

a.) If the annual growth rate is expected to be 1,2%, calculate how many South Africans there will be in 10 years time (correct to the nearest hundred thousand).

b.) If it is found after 10 years that the population has actually increased by 10 million to 67 million, what was the growth rate?

Question 10:
Alison is going on holiday to Europe. Her hotel will cost € 200 per night. How much will she need in Rand to cover her hotel bill, if the exchange rate is € 1 = R 9,20?
(3)

Question 11:
Jason wants to buy the latest DJ equipment, which has been advertised in a US catalogue for $1400. He wants to order and pay for the equipment online. The current rand/dollar exchange rate is R8,45 to the US dollar. Calculate the cost in Rand of the DJ equipment. (3)

Question 12:
If the exchange rate to the Rand for Japanese Yen is ¥ 100 = R 6,2287 and for Australian Dollar is 1 AUD = R 5,1094, determine the exchange rate between the Australian Dollar and the Japanese Yen. (4)

X-ercises

1. Lerato buys a computer priced at R12 000. She pays a 10% deposit and then takes out a 24-month hire purchase agreement on the balance. The interest charged on the balance is 16% per annum simple interest. What will her monthly payments be? (6)

2. Sibongile borrows money from a bank in order to finance a new business. The bank charges her an interest rate of 14% p.a. compounded annually. Calculate the amount she originally borrowed, if she pays off the loan in 6 years time with a payment of R500 000.
(4)

Solutions to X-ercises

1. Monthly payment = R594

2. P = R 227793,27