FINANCIAL MATHEMATICS 18 FEBRUARY 2013

Lesson Description:

In this lesson we will:

- Look at investments, loan repayments and compound interest.
- The types of questions we will look at are:
    - How long will it take R100, invested at 5% compound interest, to grow to R1 000?
    - How much money do you need to save each month if you want to have enough money to buy a car in 2 years time?
    - What is a sinking fund?
    - How are home loan repayments calculated?

Key Concepts

Example A

How long will it take R100, invested at 5% compound interest, to grow to R1 000?

Example B

Definition: Annuity

The term annuity is used in financial mathematics to refer to any terminating sequence of REGULAR fixed payments over a SPECIFIED period of time.

- Ordinary Annuity: This is an annuity whose payments are made at the END of each period.
- (end of the week, month, half year, year, etc)
- Annuity Due: This is an annuity whose payments are made at the BEGINNING of each period.

Formula

Future Value Annuity: Investment

$$F_v = x\left[\frac{(1+i)^n - 1}{i}\right]$$

i. Manuel invests R300 per month into an ordinary annuity account that pays 14% p.a. compounded monthly for a period of 5 years. How much does Manuel have at the end of 5 years?

ii. Manuel's friend Trevor invests R300 per month into an account that pays 14% p.a. compounded monthly for a period of 5 years. Trevor's first payment is immediately, and his last payment is on the day the investment matures. How much does Trevor have at the end of 5 years?

Questions:

Question 1

A photocopier valued at R24 000 depreciates at a rate of 18% p.a. on the reducing-balance method. After how many years will its value be R15 000.

Question 2

A lump sum of money is invested at 11.72% p.a. compounded quarterly. How long should it be invested in order for it to double?

Question 3

How much money do you need to save each month if you want to have enough money to buy a car in 2 years time?

Setting the scene:

Let's say you would like to buy R100 000 car in cash. The investment is made into an ordinary annuity at 8% p. a. compounded monthly.

Question 4

How long will it take Maria to become a millionaire if she deposits R1 000 into an ordinary annuity at 12% p.a. compounded monthly?