Saturday X-tra

Grade 11 Finance

Key Concepts
In this session we will focus on summarising what you need to know about:
- Simple and Compound interest
- Depreciation

Terminology & definitions
Straight line depreciation- this is using simple interest and this means that the article or possession will have no value at all at the end of the time period.
Reducing balance depreciation- this is using compound interest and this means there is always some value in the article or possession.
Semi annually- interest is calculated every six months or twice a year.

Symbols, Units & Equations
\[
\begin{align*}
A &= P(1 + i \cdot n) \\
A &= P(1 + i)^n \\
A &= P(1 - i \cdot n) \\
A &= P(1 - i)^n
\end{align*}
\]

X-planation
- Always decide what type of interest you are working with and then select the correct formula. If the incorrect formula is selected, you will receive no marks.
- Make a point of identifying \( A = \) ; \( P = \) ; \( i = \) ; \( n = \) as you read through the question. This helps you to identify what you are solving for.

X-ample Question 1
A bank offers two account options:
A: 14.5 % per annum simple interest
B: 14 % per annum compounded monthly
You have R10 000 to invest for one year. Which option would be the best for you?
Show your working.
X-ample Question 2
You have R12 500 to invest and your financial advisor suggests two options:

Option 1. “Saver’s Special”: 12% p.a. interest, compounded quarterly
Option 2. “Real Returns”: 11% p.a. interest, compounded monthly

a) Calculate the effective interest rate for each investment.

b) How much money would you accumulate if you invested your money in the Saver’s Special account for 10 years?

c) How much longer would you have to invest your money in the Real Returns account, to accumulate the same amount as investing in the Saver’s Special for 10 years? Give your answer to the nearest month.

X-ample Question 3
A special investment opportunity has someone investing R8 000 at 10,25% p.a. for 6 years, interest compounded quarterly, and then it can be changed to 10,5% p.a., interest compounded monthly. A friend ignores this offer and invests R7 500 at 10,6%p.a., interest compounded monthly.

a) Calculate the first person’s amount after 10 years.

b) Whose choice produced a better value after 10 years?

X-ample Question 4
A company buys computers at a cost of R 325 000. The computers depreciate at a rate of 18,5% per annum calculated semi-annually on a reducing balance basis. Determine the value of the computers at the end of the third year.

X-ample Question 5
You purchase a car for R100 000 and the depreciation rate will be 13% per annum on a reducing balance. Inflation is expected to be 8% per annum for the next 5 years.

a) In which year will your car lose the greatest value?

b) What will the value of your car be after 5 years?

c) What would the cost of a new car be in 5 years time?

d) If you used your old car as a trade in 5 years time, how much more will you need to buy a similar new car?

X-ample Question 6
Convert an effective interest rate of 12,3% p.a. to a nominal annual interest rate compounded daily (correct to ONE decimal digit).

X-ample Question 7
Fred takes out a loan of R350 000 in order to start his business. He repays R150 000 two years later. Four years after taking out the loan, he expands his business and borrows a further R560 000. He pays off his total debt by means of a payment of Rx three years later. The interest rate is 18% p.a. compounded monthly. Calculate x.
X-ample Question 8
Lebo wants to buy a car in three years time. The car she wants to buy currently costs R65 000. She invests R10 000 now in a bank account. In a year she plans to deposit another R10 000 into the account and in a further 6 months another R15 000. The interest rate she will earn on the investment is 12% per annum compounded quarterly now. After 2 years the interest rate will be 14,5% per annum compounded monthly. In three years from now her father will give Lebo the difference between what the car costs and the money which she has saved.

(a) What will be the price of the car three years' time from now, if car inflation is 7,5% per year?
(b) Calculate the balance of the bank account after three years.
(c) Calculate how much Lebo must receive from her father in order to buy the car.

X-ercise 1
Sandra wants to trade in this car and buy herself a new car. She has been enquiring about interest rates. One of the interest rates quoted was an effective rate of 17,7% per annum. Convert this to a nominal annual interest rate compounded weekly.

X-ercise 2
Calculate the depreciation rate (using the reducing balance) for a brand of vehicle that will depreciate to be half of its original value in exactly 6 years.

X-ercise 3
Alison deposits R5000.00 into a savings account with an interest rate of 6,25% p.a. compounded monthly.

a) Is the interest rate given, a nominal or an effective amount?
b) Calculate the amount in the account at the end of 4 years.

X-ercise 4
The value of a new car R195 000.
If the annual compound rate of depreciation is 18% per annum, calculate the value of the car when it is 8 years old.

a) Another vehicle depreciates on a simple (straight line) basis. If it is worth nothing after 8 years, calculate the annual rate of simple depreciation.

X-ercise 5
Tom takes out a loan of R820 000 in order to start his own business. He repays R350 000 two years later. Four years after taking out the loan he expands his business and borrows a further R560 000. He pays off his total debt by means of a payment three years later. The interest rate is 18% p.a. compound semi-annually for the first three years and 16% p.a. compound monthly for the remaining time. Calculate how much he paid to settle the loan.
Exercise 6
Thabi deposits R240 000 into a fixed deposit saving account for 5 years. The accumulated amount after 5 years is R390 000. Calculate
(a) The effective annual interest rate.
(b) The nominal interest rate if interest is compound monthly.
(c) The nominal interest rate if interest is compound daily.

Exercise 7
Lindiwe invested R5 000 at 10% per annum compounded semi-annually (every six months). After 2 years the interest rate changed to 12% per annum compounded monthly. Find the value of the investment after 3 years.

Exercise Answers

Exercise 1
16,32%

Exercise 2
10,9%

Exercise 3
a) nominal
b) b) R6415,96

Exercise 4
a) R39860.75
b) 12,5%

Exercise 5
R2713916,51

Exercise 6
a) 10,2%
b) 9,75%
c) 9,71%

Exercise 7
R6848,31