

GRADE 10 | 2024

Financial Mathematics: Interest and Growth

Mathematics

CAPS ALIGNED

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1. Simple and Compound Interest (Revision)

FORMULA: Simple Interest: $A = P(1 + in)$

Compound Interest: $A = P(1 + i)^n$

(i = annual interest rate as decimal, n = number of years)

2. Nominal and Effective Interest Rates

When interest is compounded more than once a year, we distinguish between nominal and effective rates.

FORMULA: Effective annual rate $= (1 + i/m)^m - 1$

m = number of compounding periods per year

(m=12 monthly, m=4 quarterly, m=2 semi-annually)

EXAMPLE: Effective rate

12% nominal, compounded monthly:

Effective $= (1 + 0.12/12)^{12} - 1 = (1.01)^{12} - 1 = 12.68\%$

3. Inflation

Inflation is the general rise in prices over time. The inflation rate erodes purchasing power.

FORMULA: Future cost $= \text{Present cost} \times (1 + \text{inflation rate})^n$

EXAMPLE: Inflation

A car costs R200000 today. If inflation is 6% per year, what will it cost in 5 years?

$= 200000 \times (1.06)^5 = 200000 \times 1.3382 = \text{R}267641$

4. Present and Future Value

FORMULA: Future Value (FV) $= PV \times (1+i)^n$

Present Value (PV) $= FV / (1+i)^n$