

GRADE 11 STUDY GUIDE | 2024

Financial Mathematics

Mathematical Literacy

1. Income and Expenditure

- Gross income: total earnings BEFORE deductions
- Net income (take-home pay): gross income MINUS deductions
- Deductions: income tax (PAYE), UIF (1% employee contribution), medical aid, pension fund
- Fixed expenses: stay the same every month (rent/bond, loan repayment, insurance)
- Variable expenses: change from month to month (food, entertainment, clothing, transport)
- Budget: plan for income and expenses; surplus = income > expenses; deficit = income < expenses

2. Simple and Compound Interest

$$\text{Simple Interest: } A = P(1 + i \times n)$$

$$\text{Compound Interest: } A = P(1 + i)^n$$

Where: A = final amount, P = principal, i = interest rate (as decimal), n = number of periods

Example: R10 000 invested for 3 years at 8% per annum

Simple: $A = 10000(1 + 0.08 \times 3) = 10000 \times 1.24 = \text{R}12\,400$

Compound: $A = 10000(1.08)^3 = 10000 \times 1.2597 = \text{R}12\,597.12$

Difference: R197.12 more with compound interest.

3. Inflation and Purchasing Power

$$\text{Future price} = \text{Current price} \times (1 + \text{inflation rate})^n$$

Inflation reduces the purchasing power of money -- the same amount of money buys less over time. The Consumer Price Index (CPI) measures inflation in South Africa.

Example: If inflation is 6% per year, what will a R500 item cost in 4 years?

Future price = $500 \times (1.06)^4 = 500 \times 1.2625 = \text{R}631.24$

4. Hire Purchase and Loans

- Hire Purchase (HP): buy now, pay in instalments; deposit + monthly payments; interest on ORIGINAL price
- Total HP cost = Deposit + (Monthly payment x Number of months)
- Bank loan: interest calculated on REDUCING BALANCE (cheaper than HP in most cases)
- Comparison: always calculate total cost, not just monthly payment

5. Exchange Rates

To convert Rand to foreign currency: $\text{Foreign amount} = \text{Rand amount} / \text{Exchange rate}$

To convert foreign currency to Rand: $\text{Rand amount} = \text{Foreign amount} \times \text{Exchange rate}$

Example: R1 = \$0.055. How many Rand for \$200?

$$\text{Rand} = 200 / 0.055 = \text{R}3\,636.36$$