GRADE 11 STUDY GUIDE | 2024

Number Patterns and Finance Applications

Mathematical Literacy

1. Number Patterns

- Arithmetic (linear) sequence: constant DIFFERENCE between consecutive terms
- Geometric sequence: constant RATIO between consecutive terms
- The nth term (formula) allows calculation of any term without listing them all

Arithmetic: $T_n = a + (n-1)d$

Where a = first term, d = common difference

Geometric: $T_n = a \times r^{(n-1)}$

Where r = common ratio

Example: Sequence: 4, 7, 10, 13, ...

a = 4, d = 3. Formula: $T_n = 4 + (n-1) \times 3 = 3n + 1$

$T_{10} = 3(10) + 1 = 31$

2. Timetables and Schedules

- Bus, train and flight timetables use 24-hour time to avoid am/pm confusion
- Calculate travel time: subtract departure time from arrival time
- Plan journeys: check connections, allow layover time, calculate total trip time

Example: Train departs 08:45, arrives 13:20. How long is the journey?

13:20 - 08:45 = 4 hours 35 minutes

3. Taxation

Income Tax (PAYE)

South Africa uses a progressive tax system -- higher income earners pay a higher percentage. Tax is calculated using SARS tax tables.

- Tax-free threshold: income below a certain amount (tax rebate) is not taxed
- Marginal tax rate: rate applied to the next rand earned (not the rate on ALL income)
- Effective tax rate = Total tax paid / Total income x 100

VAT (Value-Added Tax)

VAT-inclusive price = Original price x 1.15 (if VAT = 15%)

VAT amount = VAT-inclusive price / 1.15 x 0.15

Zero-rated items in SA: basic foods (bread, milk, fruit, vegetables, eggs)

4. Cost, Break-Even and Profit

Total cost = Fixed cost + (Variable cost per unit x Number of units)

Total revenue = Selling price per unit x Number of units

Profit = Total revenue - Total cost

Break-even point: Total cost = Total revenue (no profit or loss)

Example: Fixed cost = R5000. Variable cost = R12/unit. Selling price = R20/unit.

Break-even: 5000 + 12n = 20n => 8n = 5000 => n = 625 units

Profit at 800 units: Revenue = 800x20 = 16000; Cost = 5000+800x12 = 14600; Profit = R1400