Grade 12 Mathematics: Exam Preparation & Mixed Practice Guide

Grade 12 | Mathematics | Study Guide | 2024

Free Study Resources for South African Matric Learners

1. Paper 1 Topics Quick Reference

- Algebra: equations, inequalities, nature of roots (discriminant), quadratic formula
- Patterns: arithmetic and geometric sequences; sigma notation; infinite series
- Functions: parabola, hyperbola, exponential, logarithm; transformations
- Finance: simple/compound growth and decay; annuities; present and future value
- Calculus: limits; differentiation rules; curve sketching; optimisation; integration
- Probability: counting principles (permutations, combinations); Venn diagrams; probability rules

2. Paper 2 Topics Quick Reference

- Statistics: bivariate data; scatter plots; regression (least squares); correlation coefficient r
- Analytical geometry: distance, midpoint, gradient; equations of lines/circles
- Trigonometry: general solutions; compound angles; solving 2D and 3D problems
- Euclidean geometry: circle geometry theorems (8 theorems + converses)

3. Finance Formulas

Future value (annuity):	`F = x[(1+i)^n - 1] / i`
Present value (annuity):	`P = x[1 - (1+i)^(-n)] / i`
Where:	`x = regular payment, i = interest rate per period, n = number of perio`
Inflation:	`A = P(1 + i)^n using inflation rate`
Depreciation (reducing balance):	`A = P(1 - i)^n`
Depreciation (straight line):	`A = P(1 - in)`

4. Circle Geometry Theorems

- Line from centre perpendicular to chord bisects the chord (and converse)
- Angle at centre = 2 x angle at circumference (same arc)
- Angles in same segment of circle are equal
- Opposite angles of cyclic quadrilateral are supplementary (add to 180 deg)
- Exterior angle of cyclic quad = interior opposite angle
- Tangent perpendicular to radius at point of contact
- Tangent-chord angle = angle in alternate segment (Tan-chord theorem)
- Two tangents from same external point are equal in length

5. Exam Tips

- Memorise the 8 circle theorems AND their converses (reason must be stated)
- For calculus: find f'(x), set to 0 for stationary points, use f''(x) to determine nature
- For probability: draw Venn diagram or tree diagram before calculating
- For geometry proofs: state reason for EVERY statement (theorem name, not just "because")
- Check: does your answer make sense? (negative length? probability > 1?)

TIP Calculus integration is the reverse of differentiation. Check your answer by differentiating the result - you should get back to the original function. Remember +C for indefinite integrals.