

Grade 12 Mathematics: Paper 1 Key Topics Summary

Grade 12 | Mathematics | Study Guide | 2024

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Paper 1 Topics at a Glance

Mathematics Paper 1 (3 hours, 150 marks) covers: Algebra, Equations & Inequalities, Patterns & Sequences, Functions & Graphs, Financial Mathematics, Differential Calculus, and Probability.

Quick Reference: Algebra

Quadratic formula:	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Sum of roots:	$\alpha + \beta = -b/a$
Product of roots:	$\alpha \cdot \beta = c/a$
Completing square:	$x^2 + bx = (x + b/2)^2 - (b/2)^2$

Quick Reference: Sequences

Arithmetic Tn:	$a + (n-1)d$
Arithmetic Sn:	$n/2(2a + (n-1)d)$
Geometric Tn:	$a \cdot r^{n-1}$
Geometric Sn:	$a(r^n - 1)/(r - 1)$
Infinite geo:	$a/(1-r), r < 1$
Sigma notation:	$\sum_{k=1}^n T_k = S_n$

Quick Reference: Financial Mathematics

Simple interest:	$A = P(1 + in)$
Compound:	$A = P(1 + i)^n$
Depreciation:	$A = P(1 - i)^n$
Future annuity:	$F = x[(1+i)^n - 1]/i$
Present annuity:	$P = x[1 - (1+i)^{-n}]/i$
Effective rate:	$(1 + in/m)^m - 1$

Quick Reference: Calculus

f'(x) from 1st:	$\lim [f(x+h) - f(x)]/h \text{ as } h \rightarrow 0$
Power rule:	$d/dx[x^n] = nx^{n-1}$
Turning point:	Set $f'(x) = 0$
Max/Min test:	$f''(x) < 0 \rightarrow \text{max}; f''(x) > 0 \rightarrow \text{min}$
Inflection:	$f''(x) = 0$ AND sign changes

Exam Tips

- Show ALL working ? method marks are available even if final answer is wrong
- Answer every question ? leave no blank spaces in the exam

Check units in financial maths (monthly rate vs annual rate)

- For calculus sketching: find ALL intercepts, turning points, and inflection
- Read inequalities carefully ? open vs closed intervals