Grade 8 Mathematics Teacher Packet
AoPS Introduction to Algebra and Brilliant

Nantucket New School

Course Overview

Grade 8 completes the AoPS Introduction to Algebra path and pushes into quadratics, special factorizations, complex numbers, advanced inequalities, functions, polynomials, exponential growth, and sequences. Brilliant is used for graphing, transformations, and structural insight.

Core AoPS Chapters

Primary text: *AoPS Introduction to Algebra*

- Chapters 9 through 22

Unit and Resource Map

Unit	AoPS focus	Brilliant focus (main courses)
Quadratic equations and special factorizations	Chapter 10 Sections 10.1–10.4 and Chapter 11 Sections 11.1–11.3 with optional enrichment from 11.5. Factoring quadratics, solving by factoring, and special identities.	*Quadratics*, *Visual Algebra* factor puzzles, and selected structural tasks from core Brilliant algebra courses.
Complex numbers and graphing quadratics	Chapter 12 Sections 12.1–12.3 and Chapter 14 Sections 14.1–14.3. Complex numbers, quadratic formula, graphing parabolas in several forms, and completing the square.	*Quadratics*, *Functions*, and *Coordinate Geometry* lessons that show vertex form, roots, and transformations.
Inequalities beyond linear	Review from Chapter 9 Sections 9.3–9.5 and Chapter 15 Sections 15.1–15.3. Quadratic inequalities, compound inequalities, and solution sets on number lines and graphs.	*Functions* comparison tasks, *Real World Algebra* constraint problems, and core *Strategy Puzzles* that involve region reasoning.

Unit	AoPS focus	Brilliant focus (main courses)
Functions, graphs, and polynomials	Chapter 16 Sections 16.1–16.5, Chapter 17 Sections 17.1–17.3, Chapter 18 Sections 18.1–18.2. Function concepts, domain and range, composition, inverse ideas, and polynomial operations.	*Functions*, *Visual Algebra*, and *Coordinate Geometry* strands that stress function machines, transformations, and graph interpretation.
Exponentials, sequences, and special manipulations	Chapter 19 Sections 19.1–19.4, Chapter 20 Sections 20.1–20.4, Chapter 21 Sections 21.1–21.4, Chapter 22 Sections 22.1–22.3. Exponential functions, simple logarithm ideas, arithmetic and geometric sequences, series, and structural manipulations.	*Exponential Functions*, relevant pieces from *Real World Algebra* that involve growth and decay, and carefully chosen Brilliant lessons on sequences and patterns.

Planning Notes

- Use Brilliant graphs whenever a new quadratic or function form is introduced.

- Keep AoPS as the driver for sustained practice, with Brilliant saved for concept building and synthesis.