

Stage 5 Mathematics

All students at North Sydney Girls' High School study Stage 5.3 Mathematics.

In Stage 5, students operate with irrational numbers and extend their knowledge of the number system to include all real numbers. Algebraic skills are extended to rearranging literal equations, expanding the special binomial products and factorising monic and non-monic quadratic expressions, using a variety of techniques. Students solve complex linear equations, non-monic quadratic equations, simple cubic equations, and simultaneous equations involving one linear and one non-linear equation and apply these techniques to practical problems. On the Cartesian plane, students generate, describe and graph straight lines, parabolas, cubics, hyperbolas and circles and use formulas to calculate midpoint, gradient and distance and determine the equations of straight lines.

Students solve problems involving the surface areas and volumes of pyramids, cones and spheres, and related composite solids. They explore similarity relationships for area and volume. They are introduced to trigonometry in right-angled triangles in two and three dimensions and then extend their study to include angles of any size to solve problems in non-right triangles.

Their knowledge of a wide range of geometrical facts and relationships is used to prove general properties in geometry, extending the concepts of similarity and congruence to more generalised applications including circle geometry.

Students use standard deviation to analyse data, and interpolate and extrapolate from bivariate data using lines of best fit. They investigate statistical reports and explore how data is used to inform decision-making processes.

By the end of Stage 5.3, students use deductive reasoning in problem solving and in presenting arguments and formal proofs. They interpret and apply formal definitions and generalisations and connect and apply mathematical ideas from different parts of the course. They demonstrate fluency in selecting, combining and applying relevant knowledge, skills and understanding in the solution of familiar and unfamiliar problems.

In addition to the curricular work, students are offered enrichment opportunities through participation in the Australian Mathematics Competition and the Challenge and Enrichment programs offered by the Australian Mathematics Trust.