ASSOCIATION KANGOUROU SANS FRONTIÈRES
WWW.AKSF.ORG
ASSOCIATION LOI 1901
7 rue de Castellane | 75008 Paris, FRANCE

Math Kangaroo Curriculum for grades 11 and 12

1a. Geometry – plane geometry

- lines, segments, polygons
- congruence and similarity
- symmetry
- Pythagorean theorem
- area of simple plane figures (including those that can be solved by breaking a shape into smaller self-similar shapes)
- angle calculations (parallel and normal angles, angles in a circle, angles in triangles and polygons)
- circles and parabolas
- concurrency, collinearity and concyclicity
- rotation, reflection, translation, homothety (i.e. isometries and similarities)
- regular polygons

1b. Geometry – plane analytic geometry

- point coordinates, equations of the line, the circle and the parabola
- calculating points and lines in the plane
- triangle calculations with trigonometric methods

1c. Geometry – solid geometry

- spatial relationships (chirality/spatial orientation, nets of solids)
- cubes, prisms, pyramids
- spheres, cones, cylinders
- Platonic solids
- point coordinates
- volume
- projections
- 3-d movement of one- and two-dimensional objects, i.e. knots, folding, etc.

2. Number Theory

- number puzzles
- powers of numbers
- prime numbers

Math Kangaroo Curriculum for grades 11 and 12

- prime factorisation
- triangular numbers
- Diophantine equations
- divisibility and simple modulo calculations, parity considerations

3a. Functions, Sequences

- interpreting graphs
- simple arithmetic and geometric sequences, other well-defined sequences (e.g. by recursion)
- simple functional equations

3b. Algebra

- absolute value
- powers and roots
- logarithms (only elementary properties, no change of base)
- systems of equations; replacement or change of variables
- simple inequalities; solutions with sets written as intervals
- factorising simple polynomials
- quadratic equations / polynomial equations
- solving worded or situational questions by applying algebraic methods

4a. Combinatorics and Probability

- n! (permutations)
- binomial coefficients; number of subsets
- inclusion/exclusion principle
- systematic counting (by analysing cases)
- calculating with probability trees

4b. Logic / Puzzles

- interpretation of a problem: the possibility of reduction of the problem to another problem in any other subject
- semantics and syntax: inference of facts from partial information in a network of logically connected statements
- models: puzzles created from a specific set of axioms and/or rules
- language structure
- Boolean problems (e.g. truth-tellers and liars)