

MATH FOR EXCELLENCE CURRICULUM

Excel 4

Review (from Excel 3)

- Operations with fractions – review from Excel 3
- Linear equations and linear function
- Pythagorean theorem

System of three linear equations with three variables

- Methods of substitution for the solution of three linear equations with three variables
- Word problems related to the system of three linear equations with three variables

Set of complex numbers

- Definition of a complex number
- Algebraic operations in the set of complex numbers
- Complex coordinates

Quadratic functions

- Definition of quadratic function $f(x) = x^2$
- Graphs of functions $f(x) = a x^2$, $f(x) = a x^2 + b$, $f(x) = a (x - b)^2 + c$
- Graph of function $f(x) = a x^2 + b x + c$
- Domain and range of a quadratic function, zeros, maximum and minimum
- Quadratic inequalities
- Word problems related to the quadratic equation
- Intersection of graphs of linear function and quadratic function

Quadratic equations

- Trinomials, factorization of trinomials - Review
- Definition of a quadratic equation
- Solutions of a quadratic equation, quadratic formula
- The discriminant
- Viète's formulas for the solutions of a quadratic equation

- Word problems related to the quadratic equation

Reasoning in mathematics

- Foundations in mathematics:
 - o Early stages in development of mathematics
 - o Greek mathematicians and Euclid's geometry
 - o Hilbert's axioms and modern geometry
 - o First definitions, axioms and theorems
 - o Geometry of Lobachevski
- Inductive reasoning and conjecturing
- Deductive reasoning
- The connecting words: and, or, not
- Statements
- If...then statements
- Converse statement
- Contrapositive statement
- Direct and indirect proof
- Proof by counterexample
- Venn diagram
- Proofs of some theorems
- Word problems related to reasoning in mathematics

Congruency and construction of triangles

- Definition of congruency of triangles
- Four theorems of congruency for triangles
- Proofs in geometry
- Elements of construction of a triangle
- Four stages in construction of triangles
- Problems related to construction of triangles