

MATH FOR EXCELLENCE CURRICULUM

Excel 4

Review (from Excel 3)

1. Operations with fractions – review from Excel 3
2. Linear equations and linear function
3. Pythagorean theorem

System of three linear equations with three variables

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

Set of complex numbers

1. Definition of a complex number
2. Algebraic operations in the set of complex numbers
3. Complex coordinates

Quadratic functions

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



Quadratic equations

1. Trinomials, factorization of trinomials - Review
2. Definition of a quadratic equation
3. Solutions of a quadratic equation, quadratic formula
4. The discriminant
5. Viète's formulas for the solutions of a quadratic equation
6. Word problems related to the quadratic equation

Reasoning of mathematics

1. Foundations in mathematics:
 - a. Early stages of the development of mathematics
 - b. Greek mathematicians and Euclid's geometry
 - c. Hilbert's axioms and modern geometry
 - d. First definitions, axioms and theorems
 - e. Geometry of Lobachevski
2. Inductive reasoning and conjecturing
3. Deductive reasoning
4. The connecting words: and, or, not
5. Statements
6. If...then statements
7. Converse statement
8. Contrapositive statement
9. Direct and indirect proof
10. Proof by counterexample
11. Venn diagram
12. Proofs of some theorems
13. Word problems related to reasoning in mathematics

Congruency and construction of triangles

1. Definition of congruency of triangles



2. Four theorems of congruency for triangles
3. Proofs in geometry
4. Elements of construction of a triangle
5. Four stages in construction of triangles
6. Problems related to construction of triangles

