NUMBERS AND ALGEBRA

- Number sets N, Z, Q, R i C
  - understand number sets N, Z, Q, R and C (natural numbers, integers, rational numbers, real numbers and complex numbers)
  - compare numbers
  - understand and use intervals and interval notation
  - write down subsets of real numbers as intervals and represent them on a number line
  - use standard and trigonometric form of complex numbers
- Elementary operations
  - add, subtract, multiply and divide
  - determine the rounded numbers and the absolute value of the numbers
  - use a calculator
- Percentage and ratios
  - understand and use percentages
  - understand and use ratios
- Algebraic expression and algebraic fractions
  - calculate with powers and roots
  - add, subtract and multiply algebraic expressions
  - use identities for square and cub of binomial, for difference of squares and cubes and for sum of
  - add, subtract, multiply and divide algebraic fractions
  - isolating a one variable by another from algebraic equation
  - understand and apply binominal theorem
- Units of measurements
  - use fundamental measures (units of length, , area, volume, mass, time and money)
  - Convert unit of measurement
  - Use unit of measurement in geometry and word problems
- Mathematical modeling
  - apply mathematical models related to algebraic expressions and calculations to solve problems in everyday life

FUNCTIONS

- Functions – definition of a function
  - use functions define algebraically, graphically, numerically in tables, or by verbal descriptions
  - add, subtract, multiply, divide and compose functionsž
- Linear and quadratic functions, absolute value functions, second root function, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions
  - determine the domain of a function

    - find the image of a function
    - calculate function values
    - draw/sketch/construct the graph of a function
    - sketch the table of a function
    - interpret the graph of a function
    - calculate zeros of the function
    - find the point of intersection between function graph and x/y-axis
    - determine the function which corresponds to the given graph
    - determine intervals on which the function increases/decreases
    - interpret the graph of the function
    - determine if a function is even or odd
    - Quadratic functions
    - determine coefficients and discriminate
    - find the local minimum/maximum and the vertex of parabola
    - Polynomial and rational functions
    - draw the graph of polynomials (of degree 1, 2 and 3)
    - draw the graph of rational function (with polynomials of degree 1 or 2 in numerator and denominator)
    - Exponential and logarithmic functions
    - draw the graph of composition of linear and exponential or logarithmic functions
    - apply exponential and logarithmic basic identities
    - Trigonometric functions
    - define trigonometric functions on the unit circle
    - determine the fundamental period of a function and apply properties of periodic function to trigonometric functions
    - use basic trigonometric identities
    - apply trigonometric formulas for angle sum
    - apply product-to-sum and sum-to-product trigonometric identities
    - recognize and graph trigonometric functions of thr form
        - f(x) = Asin(Bx C) D
        - f(x) = Acos(Bx C) D
- Sequences
    - recognize the given sequences
    - recognize the arithmetic sequences
    - determine the nth term and the term sum of arithmetic sequence
    - recognize the geometric sequences
    - determine the nth term and the term sum of geometric sequence
- Derivation of functions
    - find derivation of the constant function, polynomial functions and trigonometric functions
    - find the derivation of the sum, difference, product, quotient and composition of functions
    - determine the tangent line at a point of the graph of the differential function
    - use the differential calculus to analyze functions
    - apply mathematical models related to algebraic expressions and calculations to solve problems in everyday life

- Mathematical modeling
    - apply mathematical models related to functions to solve problems in everyday life

EQUATIONS AND INEQUATIONS

- Linear equations and inequations
    - solve linear equations and inequations
- Quadratic equations and inequations
    - solve quadratic equations and inequations
    - use Vieta's formulas
- Absolute value equations and inequations, root equations and inequations
    - solve absolute value equations and inequations
    - solve root equations and inequations
- Simple polynomials and rational equations and inequations
    - solve equations/ inequations by factoring
    - solve equations/ inequations by substitution; for instance biquadratic equation
- Exponential and logarithmic equations and inequations
    - solve exponential equations/ inequations with same base
    - solve equations/ inequations using definition of logarithm
    - solve equations/ inequations by logarithm both sides of equation/inequation
    - solve equations/inequations using basic properties of logarithms and exponents
    - solve equations/inequations which can be reduced to quadratic equation/inequation by substitution
- Trigonometric equations
    - find general and particular solution of trigonometric equation using definition of trigonometric functions
    - find general and particular solution of trigonometric equation using trigonometric identities
- Systems of equations and inequations
    - solve systems of equations or inequations algebraically and graphically
    - explain graphical solutions of system of equations or inequations
- Mathematical modeling
    - use mathematical models related to equations or inequations to solve problems in everyday life

BASIC GEOMETRY

- Geometry basics in planimetry
    - measure angles
    - classify triangles
    - use notions of congruent and similar triangles

    - determine congruent triangles
    - determine similar triangles
    - calculate the scale (homotetic) factor
    - apply Pythagorean theorem
    - use properties of parallelograms, trapezoids and regular polygons
    - determine and use parts of circle and disc (center, radius, arc, sector, central and inscribed angle, chord and tangent)
    - use the Inscribed angle theorem and Thales theorem
    - calculate the area and the circumference of circle
- Interrelation among geometric objects in tree-dimensional space
    - determine the relationship between lines and planes in 3D space
    - determine the intersection of a line and plane in 3D space
    - determine the orthogonal projection of a point and a line segment onto a plane
    - determine the angle between two lines and between a line and a plane
- Geometry basics in stereometry (prisms, pyramids, cylinders, cones, sphere)
    - recognize and name of these solids
    - determine parts of these solids (base, apex, height – altitude, lateral faces)
    - find the surface area and the volume of these solids

TRIGONOMETRY

- Trigonometry for right-angle triangles; Trigonometry for scalene triangles
    - use the definition of sine, cosine and tangent in a right-angled triangle
    - use the law of sine and the low of cosine
    - aplly trigonometry in planimetry and stereometry (solid geometry)

ANALYTIC GEOMETRY

- Coordinate system on a line and on a plane
    - read and plot coordinates in the coordinate system
    - calculate the distance between two given points
    - find the coordinates of the midpoint of a line segment
- Vectors
    - understand vector operations
    - use coordinate vector
    - find the length of a vector
    - find the angle between two vectors
- Equations of a line
    - use explicit and implicit equation of a line
    - find the equation of the line given by a point and a slope
    - find the equation of the line given by two points
    - find the angle between two lines
    - use the condition for parallel and perpendicular lines

    - calculate the distance from a point to a line
- Second-order curves
    - determine the equation of a circle in standard form
    - determine the equation of a ellipse in standard form
    - determine the equation of a hyperbola in standard form and find the equation of asymptotes
    - determine the equation of a parabola in standard form
    - find the interrelation between a second-order curve and a line
    - determine the equation of tangent line to a curve
    - apply the condition for a line to be tangent to the second –order curve
- Mathematical modeling
    - use mathematical models related to geometry to solve problems in everyday life