MATURITNÍ TÉMATA

Školní rok:			**2025/2026**	
Ředitel školy:			PhDr. Karel Goš	
Předmětová komise:			Matematika a deskriptivní geometrie	
Předseda předmětové komise:			Mgr. Martin Minařík	
Předmět:			**Matematika/Mathematics**	
			VI. A6	Mgr. Ivana Krčová
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Schváleno předmětovou komisí dne:			26. 8. 2025	Podpis:
Schváleno ředitelem školy dne:			28. 8. 2025	Podpis a razítko:
Počet výtisků:	**8**	Výtisk č.:		

1. **Set Theory**
   - Definition of a set and operations on sets including Cartesian product
   - Graphical representation of sets
   - Number sets

2. **Logic**
   - Simple statement and its negation
   - Compound statements and their negation
   - Proofs in Mathematics

3. **Linear and Quotient Functions, Linear and Rational Equations and Inequalities, Simultaneous Equations and Inequalities**
   - Definition of a linear function, its graph and basic properties
   - Definition of a quotient function, its graph and basic properties
   - Different methods of solving linear and rational equations and inequalities, including linear and rational equations and inequalities with absolute value
   - Different methods of solving simultaneous equations and inequalities

4. **Quadratic Functions, Quadratic Equations and Inequalities, Radical Equations and Inequalities**
   - Definition of a quadratic function, its graph and basic properties
   - Different methods of solving quadratic equations and inequalities, including quadratic equations and inequalities with absolute value
   - Nth root of a number, solving radical equations and inequalities

5. **Congruent and Similar Mappings**
   - Isometry of the plane – definition, properties
   - Types of isometries and their definitions
   - Homothety – definition, basic properties
   - Solving problems using isometry or homothety

6. **Solving a Right-angled Triangle**
   - Definition of a right-angled triangle and its basic properties
   - Fundamental theorems concerning a right-angled triangle and their proofs
   - Trigonometric functions of an acute angle

7. **Solving Scalene Triangles**
   - Definition of a triangle, classification of triangles, theorems about triangles
   - Trigonometry of scalene triangles – Law of Sine, Law of Cosine, formulas for the area of a triangle
   - Construction of triangles

8. **Functions and Their Basic Properties**
   - Cartesian product, binary relation, mapping and a function
   - Domain, range, graph, and properties of a function
   - Elementary functions, their graphs and properties

9. **Trigonometric Functions and Equations**
   - Definitions, graphs, and basic properties of trigonometric functions
   - Trigonometry formulas
   - Solving trigonometric equations

10. **Exponential Functions, Equations and Inequalities**
    - Definition, graph, and basic properties of exponential functions
    - Relationship with logarithmic functions
    - Solving exponential equations and inequalities

11. **Logarithmic Equations and Inequalities**
    - Definition, graph, and basic properties of logarithmic functions
    - Relationship with exponential functions
    - Solving logarithmic equations and inequalities

12. Geometry in Space.

- Parallel projection and its basic rules
- Configurations of lines and planes in space
- Section of solids – basic rules
- Angles between lines and planes in space
- Distances in space

13. Volumes and Surface Areas of Solids

- Basic solids and their definitions
- Surface area and volume of a solid
- Volume of a solid of revolution by integration

14. Complex Numbers

- Set of complex numbers and its geometric interpretation
- Algebraic and modulus-argument form of complex numbers
- Operations with complex numbers
- Moivre's theorem and binomial equations

15. Vectors

- Vector and its characteristics, basic operations on vectors
- Scalar (dot) and vector(cross) products of two vectors, and their applications
- Mixed (triple) product of vectors, and its application

16. Vector Geometry in the Plane – Lines

- Equations of a line in a plane
- Configurations of lines in a plane
- Angle between two lines, distance between two parallel lines in a plane

17. Vector Geometry in Space

- Equations of a line and a plane in space
- Configurations of lines and planes in space
- Angle between two lines, two planes, line and plane in space
- Distance from a point to a line and a plane in space

18. Vector Geometry in the Plane – Conics

- Definitions and equations of conics
- Configurations of lines and conics in a plane
- Tangent to conics

19. Combinatorics

- Definition of n factorial
- Permutations with and without repetition
- Combinations without repetition

20. Probability

- Events in probability
- Classical definition of probability
- Conditional probability and binomial probability

21. Binomial Theorem

- Binomial coefficients and their properties
- Binomial theorem and its proof
- Pascal´s triangle

22. Arithmetic Progression

- Definition of sequence and its basic properties
- Arithmetic progression, its basic properties and applications
- Limit of a sequence

23. Geometric Progression

- Definition of sequence and its basic properties
- Geometric progression, its basic properties and applications
- Limit of a sequence

24. Infinite Geometric Series

- Series and their basic properties
- Convergent infinite geometric series

25. Limit and Derivative of a Function

- Limit of a function, types of limits and their calculation
- Definition of the first derivative and its geometrical meaning
- Rules for differentiation including the chain rule
- Implicit differentiation

26. Curve Sketching

- Role of derivatives and limits in curve sketching

27. Integral of a function

- Antiderivative of a function
- Rules for integration, integration by parts and by substitution
- Definition of a definite integral and its calculation
- Definition of a definite integral, evaluation of definite integrals
- Geometrical applications of definite integrals