Gymnázium
Olomouc – Hejčín

MATURITNÍ TÉMATA

Školní rok:			**2023/2024**	
Ředitel školy:			PhDr. Karel Goš	
Předmětová komise:			Matematika a deskriptivní geometrie	
Předseda předmětové komise:			Mgr. Martin Minařík	
Předmět:			**Matematika/Mathematics**	
			VI. A6	RNDr. Karel Pohaněl
			VI. B6	Mgr. Ivana Krčová
Schváleno předmětovou komisí dne:			29. 8. 2023	Podpis:
Schváleno ředitelem školy dne:			22. 9. 2023	Podpis a razítko:
Počet výtisků:	8	Výtisk č.:		

1. **Sets and Logic.**
   - Definition of a set and operations with sets including Cartesian product
   - Statement and the basic operations with statements
   - Tautologies
   - Proofs in Mathematics

2. **Linear Functions, Solving Linear Equations and Inequalities, Simultaneous Equations and Inequalities.**
   - Definition of a linear function, basic properties and their significance
   - Different methods of solving linear equations and inequalities including absolute value

3. **Quadratic Functions, Equations and Inequalities.**
   - Definition of a quadratic function, basic properties and their significance
   - Different methods of solving quadratic equations including absolute value

4. **Congruent and Similar Mappings.**
   - Isometric mappings, their definitions, properties, and classification
   - Definition of a similar mapping and its basic properties
   - Homothety – definition, basic properties
   - Constructive tasks

5. **Solving Right-angled Triangle.**
    - Definition and basic properties of a right-angled triangle
    - Fundamental statements concerning a right-angled triangle
    - Metric properties of a right-angled triangle

6. **Solving Scalene Triangles.**
    - Definition and basic properties of scalene triangles
    - Fundamental statements concerning the scalene triangle and its metric properties

7. **Functions and Their Basic Properties.**
    - Cartesian product, binary relations and functions
    - Definition of a function and its basic properties
    - Classification of functions

8. **Trigonometric Functions and Equations.**
    - Definition and basic properties of trigonometric functions
    - Basic formulas concerning trigonometric functions
    - Solving trigonometric equations

9. **Exponential Functions, Equations and Inequalities.**
    - Definition, graph, and basic properties of exponential functions
    - Basic methods of solving exponential equations and inequalities

10. **Logarithmic Equations and Inequalities.**
    - Definition, graph and basic properties of logarithmic functions
    - Basic methods of solving logarithmic equations and inequalities

11. **Geometry in Space.**
    - Parallel projection
    - Configuration of lines and planes in space
    - Section of solids
    - Angles between lines and planes in space
    - Distances in space

12. **Volumes and Surface Areas of Solids.**
    - Basic solids
    - Surface area and volume of a solid

13. Complex Numbers.

- The set of complex numbers and its geometrical model
- Basic forms of complex numbers
- Moivre's theorem and binomial equations

14. Vectors.

- Characteristics of vectors, basic operations
- Scalar and vector products and their applications
- Mixed product and its application

15. Vector Geometry in the Plane - Lines.

- Equations of lines in a plane
- Configurations of lines in a plane
- Metric properties of lines.

16. Vector Geometry in Space.

- Equations of lines and planes in space
- Configurations of lines and planes in space
- Metric properties of lines and planes

17. Vector Geometry in the Plane - Conics.

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

18. Combinatorics and Probability.

- Permutations with and without repetition
- Combinations
- Probability, conditional probability, binomial probability

19. Binomial Theorem.

- Definition of factorial, binomial coefficients and their properties
- Binomial theorem and its proof

20. Arithmetic Progression.

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

21. Geometric Progression.

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

22. Infinite Geometric Series.

- Series and their basic properties
- Convergent infinite geometric series

23. Limit and Derivative of Function.

- Definition of the first derivative, its geometrical and physical significance
- Rules for differentiation
- Differentiation of implicit functions

24. Curve Sketching.

- The role of derivatives in curve sketching

25. Indefinite Integral.

- Antiderivative of function
- Rules for integration
- Integration by parts and by substitution

26. Definite Integral.

- Definition of a definite integral, evaluation of definite integrals
- Geometrical applications of definite integral