Algebra and Precalculus (Year 11)

(54 hrs Term I — 16 hrs, 1 hr per week, Term II — 38 hrs, 2 hr per week, reserve – 18 hrs)

Table of contents	
1.	**Exponential and logarithm function** Features and graphs of exponential function. Logarithms and their features. Features and graph of a logarithm function. The simplest exponential and logarithm equations and inequations.
2	**Integral and usage of integral** Initial function and its features. Definite integral and its geometrical sense. Calculation of area of flat figures.
3.	**Elements of combinatorics, probability theory, and mathematical statistics** Elements of combinatorics. Shifts, placements, and combinations (without repetitions). Classical definition of probability of an accident. Sample features: sample size, mode, median, and mean. Graphic representation of information on the sample.

Expected results

Pupil:

- knows how to build and research the simplest mathematical models of real facilities, processes, phenomena, and tasks related to them using mathematical objects and the relevant mathematical tasks;
- knows where to get the necessary operative information to understand the set mathematic task, its features and peculiarities, knows how to specify source data, the goal of the task, to find necessary additional information; means of solving the tasks; to rephrase the task; divide tasks into components and establish links between them, and make a plan of solving a task; choose the means of solving a task, compare them and use the optimal of them; check the correct solving of the task; analyze and interpret the obtained result, assess its suitability from different positions; generalize the task, view the tasks from different angles; make decisions based on the results of solving the task;
- has mastered calculation techniques in a rational combination of oral, written and instrumental calculation, specifically, the approximate ones;
- knows how to design and conduct algorithmic and heuristic activities using mathematic materials;
- knows how to work with formulas (understands the concept of each formula element, knows how to find their numeric values with the set variable values, and how to express one variable through the other one);
- understands and is able to build functional dependence graphs, and knows how to study them;
- knows how to assess the probability of events.

Geometry. Year 11

(51 hrs. Term I — 32 hrs, 2 hr per week,

Term II — 19 hrs, 1 hr per week, reserve – 14 hrs

Table of contents	
1.	**Polygons.** Polygon and its elements. Polytopes. Prism. Straight and regular prism. Parallelepiped. Pyramid. Regular pyramid. Polygon sections. Area of lateral and full surfaces of a prism and pyramid.
2	**Rotating bodies.** Cylinder, cone, and their elements. Cylinder and cone sections: axial cylinder and cone sections; axial cylinder and cone sections with planes parallel to the core. Solid sphere and sphere. Section of a ball with a plane.
3.	**Volumes and areas of the surfaces of geometric bodies.** Concept of a volume of a body. Typical volume properties. Volumes of a prism, parallelepiped, pyramid, cylinder, cone, and solid sphere. Area of lateral and full surfaces of a cylinder and cone. Area of a sphere.

Expected results

Pupil:

- knows how to classify and create geometric figures on the plane and in space, describe their features, make solid figures and their elements, and build on images;
- knows how to measure geometric variables on the plane and in space describing the position of geometric figures (distances and angles), and to find quantitative features of figures (area and volume).