

Chapter XII. Mathematics - general part and standards

Article 61. Mathematics - General Part

Introduction

In modern times, mathematics is an integral part of life. It is used in all areas of human activity: in science and technology, in medicine, in economics, in the protection and restoration of the environment, in the adoption of social decisions. It is also worth mentioning the role of mathematics in the development of humanity and the establishment of modern civilization. Developing digital technologies, better understanding of the space-time structure, discovering many regularities of the nature clearly illustrates the scientific and cultural value of mathematics. The important thing is that, mathematics promotes the development of human mental abilities. It provides an effective, laconic and unambiguous communication. Mathematics is used to illustrate difficult situations, explanation of events and foreshadow their results. Abstract systems and theoretical models created in mathematics are used to study regularity, analyze the situation and solve problems.

In the solution of the problem it is necessary to access its entity, select adequate mathematical apparatus, and in the absence of such a task - to develop it, to create a studied process or object-oriented model, to make the conclusions conveyed through the received model and then interpret. Practical and scientific problems, in turn, provide mathematics with important and interesting tasks. Consequently, the importance of teaching mathematical methods should be taken into consideration during the study, in the management of social-economic or technical processes, solving household and scientific problems, and forming a logically organized system and imparting this knowledge to others. Additionally, in math learning, focusing on the practical as well as the scientific problem is the ability to motivate pupils and arise the interest in mathematics.

Goals and objectives of math teaching

The basic purposes of teaching mathematics in the institution of general education are the following:

- Establishing a pupil as an active citizen, who will be able to investigate and analyze the issues related to the real situation, be creative and organized;
- Creating profitable background for the development of mathematical science in the country.

Mathematical knowledge means possessing mathematical concepts and procedures, the ability to use them in solving real problems; As well as the means of communication that are needed to obtain and transmit information using mathematical language and means.

Due to educational aims, the curriculum envisages solving of specific tasks. Such tasks are as follows:

Developing skills of thinking, discussing, approving the opinions, developing the ability of events and facts analysis for pupils:

- Conjecturing the assumption and its research in private cases;
- Selecting and organizing the initial data;
- Selecting the way of approval, confirming;
- Considering the usefulness of the chosen strategy and utilization of its borders;
- Development of the line of arguing, searching alternative ways, justifying the correctness and efficiency of the received decision;

Mastering mathematics as a universal language of description of the universe and science:

- Evaluation of the place and importance of mathematics in different disciplines, in business, arts, and human activities;
- To observe the mathematical objects and processes in the usual environment (daily life) and use their properties when modeling, solving practical (present) tasks;
- Mastering and using the means and methods of presenting the information; making an interpretation of the information presented in various ways, discuss about them and connect them with each other;
- Understanding and analyzing others' perceptions; presenting the essence of the matter in the transmission of information.

Preparing for the next level of study or professional activities; imparting the necessary knowledge to solve the life problems and develop the skills to use the very knowledge:

- Mastering the ways and methods of arranging and planning the work;
- Perciving the task content, understanding-marking off and analyzing the tasks' data and index quantities;
- Determining the problem and formulating it;
- Solving the complex problem gradually, dividing it into simple tasks and in stages;
- Selecting and using the necessary strategies and resources to solve the problem;
- Critical assessment of the obtained result taking into account the context;
- Selecting and using the adequate supporting techniques and technologies in solving the problem.

Arranging the Mathematics Teaching

Mathematics is taught in each class of each level of general education as a compulsory subject.

Evaluation in mathematics

In order to follow the standard requirements, it is recommended to use a wide variety of mathematical tasks to evaluate pupils. The types of tasks can be as follows:

1. To read the text of the mathematical content (including the text containing the diagrams and tables), make a conclusion by the received data analysis (based on calculations or logical reasoning) and substantiate it;
2. The task in which a pupil is required to prove or deny the given fact of the given (e.g. theorem approval);
3. To calculate the value of numerical symbol, solve the equation, simplify the lettering image; select the correct answers between several possible responses of the task, establish compliance, sort the data in a sequence;
4. Geometric task in which the pupil is required to determine the characteristics of the divided part of the figure, define the measures, draw divided parts of a figure;
5. To draw a diagram or graphic, make a spatial slips or model, and so forth.

The components of mathematical task evaluation are as follows:

1. To know and use mathematical concepts and regulations;
2. To establish links and relationships between mathematical objects;
3. To identify mathematical objects and mathematical language;
4. To argue - approve;
5. To present the essence of the matter in the transmission of information;
6. To establish a task;
7. To divide the complex task into simple ones in stages;
8. Mathematical modeling;
9. Finding and realizing the way of solving the problem;
10. Choosing the optimal method of calculation; Accuracy of calculating implementation;
11. To use auxiliary technical means and informational technologies.

The pupil's living skills are included in the evaluative focus:

1. Creativity;
2. Cooperation (with partner, group members);
3. Intelligible use of strategies for promoting educational activities;
4. Quality of participation in study activities.

Note: In assessing students in primary classes, special attention will be paid to the following skills:

1. Writing down and naming the numbers;
2. Performing arithmetic operations and verbal description;
3. Identify and describe the geometric figures;
4. Designing the figures;
5. Knowing and using the measuring a distance and defining facilities / ways for it;

6. Verbal and schematic description of the direction, movement and route;
7. Terms: "all", "every", "each", "some", "one", "none", "only" are used when determining the connection between the numbers or the numbers' unity;
8. Classifying, grouping and sorting the data according to the pointed criteria;
9. Use measuring units and know (distance, time, money units) the relationship between them.

The component of summary tasks

The component of the summary tasks is related to the study-teaching results. This component should evaluate the results achieved through the study and processing of one study section (topic, chapter, paragraph, issue). Upon completion of a particular study unit, the pupil should be able to demonstrate the knowledge and skills defined by the program of mathematics. Consequently, the summary tasks should evaluate the results defined by the Mathematical Subjects Program.

Types of summary tasks:

To follow the standard requirements, it is recommended to use the various forms of summary tasks. The types of mathematical summary tasks can be as follows:

1. Choosing open or closed type of work (the correct answer between several possible responses, establishment of conformity and correct order) related to the textual task;
2. To read the text, convey the obtained conclusion by the result of the data analyses (including text, containing diagrams and tables) and approve it (based on calculations or logical reasoning);
3. To solve equation, simplify lettering, calculate the index quantity of numerical image;
4. Geometric task in which the pupil is required to determine the characteristics of the figure, define the measures, construct the figure;
5. The task in which the pupil is required to approve or deny the fact based on the data defined in advance (e.g. theorem approval).

The requirements, which should be satisfied by the summary evaluations:

1. Each type of task should be accompanied by a general rubric of its evaluation;

2. General rubric should be approved in accordance with the specific work condition and learned material;

It should be indicated those results of the standard, for the evaluations of which the summary work is defined.

Article 62. Mathematical Standard

Mathematics on the primary level

Introduction

The Mathematical Curriculum has four directions: **numbers and operations; geometry and perception of space; data analysis, statistics and probability; Regularities and algebra.**

These trends are in close relationship and include knowledge and skills that the pupil must acquire in general education. The division of the directions does not mean a similar division of the course, it only shows the spectrum of the study material and gives the possibility to determine to what direction the attention should be paid on this or that level of teaching.

1. Direction: Numbers and operations

- Numbers, their utilization and the means of numbers' representation;
- Operation numbers and numerical correlations;
- Assessment and approximation of number;
- Quantities, size units and other utilization of numbers.

The main objectives of this direction are to develop "number sense", master the calculative principles, study arithmetic operations and their properties, master methods of calculation and exploitation of the results of the evaluation of the number; study mutual comparison and utilization of the arithmetic operations during the process of their fulfillment and estimation of the practical tasks; learn the number system.

On the **primary** level, it should be developed the arithmetic operations and their adequate utilization; understanding the properties of arithmetic operations and their connections; developing the ability to evaluate the effect of the arithmetic operations and the importance of numerical image.

In addition, the pupil should be able to develop a comprehensive understanding of the decimal positional system and the ability to use it when performing multi-digit numbers; the perception of the whole parts (half, third, fourth), the ability to demonstrate, construct and compare them.

2. Direction: Geometry and perception of space

- Geometric objects: their properties, interaction and constructing;
- Size and means of measurement;
- Transformations and symmetry of figures;
- Coordinates and their using in geometry.

The main purpose of this direction is to study geometric objects and their qualities, measurements, geometrical transformations and geometric objects, algebraic methods, present applied aspects of the geometry.

On the **primary** level the main objective of the direction is to develop the ability of depicting the mutual deployment of geometric objects and demonstrating them; the ability to identify the components of geometric objects and describe their interaction; recognize the figure and create the model according to the attributes of the figure-group, verbal descriptions, develop the ability of making evaluation and in the standard units measurement of the length of a distance between the two points, the skill of description and schematic imagery of the route.

3. Direction: Analysis, probability and statistic of data

- Data sources and means of obtaining data sources;
- Data regulation methods and means of data representation;
- Summarizing numerical characteristics of data;
- Probable models;
- Selective method and numerical characteristics of the selection.

The aim of the introduction of statistical concepts and apparatus in the general educational establishment is to regulate the pupil's intuitive representations about the data, develop the skills of establishing the intuition of the pupils in the structural way and the ability of using the probabilistic statistical methods.

The aim of the direction on the **primary** level is to let the pupils to get acquainted with the elements of descriptive statistics - the means of collecting, regulating, presenting, and interpreting qualitative and discreet quantitative data.

4. Direction: Regulations and Algebra

- Sets, reflections, functions and their use;
- Discrete math elements and their use;
- Algorithms and their use;
- Algebraic operations and their properties.

The main objective of this direction is to make a pupil develop the ability of identifying and describing the regulations, algebraic relationships and functional attitudes, as well as the ability of modeling and solving problems by them.

The aim of the direction on the **primary** level is to develop the ability to recognize dependence between the ordinary regularities and quantities, study the use of arithmetic operations and lettering indications.

The Standard of I-IV class

a) The results to be achieved at the end of the IV class

Definition of indices

On the primary level each crossed off outcome of the standard is preceded by the index, which indicates the subject, the level of teaching and the number of the standard results; for example, **math.pr. (I).1**:

"**math**" - indicates the subject of "mathematics";

"**pr.** " - indicates the primary levels;

"**(I)**" - indicates that the standard includes I-IV classes;

"**1**" - indicates the resulting number.

Mathematics Standard (I-IV Classes)		
	Results Index	Standard results
1. Direction - Numbers and operations		
Sub directions		
numbers, using and presenting number means	math.pr.(I) 1	A pupil should master and use the concept of the number and present the means of number; He must be able to compare and classify numbers.
operations on numbers and numerical ratios	math.pr.(I).2	A pupil should be able to make basic arithmetic operations on numbers.
Number evaluation and rounding off	math.pr.(I).3	A pupil should be able to evaluate the results of the actual effect on the natural numbers and round the numbers off.
Values, size units other using of numbers	math.pr.(I).4	A pupil should be able to use different units of the size and connect with each other.

2. Direction - Geometry and perception of space		
Sub directions		A pupil should be able to:
Geometric objects: their properties, interconnecting and constructing them	math.pr.(I).5	make identification, classification, depiction of figures.
Size and measurement means	math.pr.(I).6	find the distance between the dimensions of the figures, the subjects and the objects.
Coordinates and their use in geometry	math.pr.(I).7	orientate on the plane.
3. Direction - Regularities and Algebra		
Sub directions		A pupil should be able to:
Sets, depicting, functions and their use	math.pr.(I).8	extend, depict and analyze the given correspondence between the subjects or the subjects and their attributes.
Algebraic operations and their properties	math.pr.(I).9	draw the equality containing the number image and its use for solving the problem.
4. Direction - Data Analysis, Probability and Statistics		
Sub directions		
Data sources and means of data obtaining	math.pr.(I).10	A pupil should have basic ideas about the means of obtaining information.
Data regulating methods and means of data representation	math.pr.(I).11	A pupil should master the ways/means of the information arrangement and display
Data summarizing numerical characteristics	math.pr.(I).12	A pupil should be able to interpret qualitative and quantitative data and elementary analysis.
5. Direction – Discussing-Substantiating, Problem Solving		
Sub directions		
Discussing-Substantiating Solving problem	math.pr.(I).13	A pupil should be able to solve simple tasks concerning everyday life or when it is caused by the field of natural science.

B) content

1. The concept of number. Use of numbers (e.g., notch, row);
2. Natural numbers within a million. Decimal positioning system. Simplistic introduction on other numerical systems (numerical alphabets and letter numbers, roman system);

3. Arithmetic operations on natural numbers. Divide with the remainder. Comparing numbers and evaluating the results of arithmetic operations. Features of arithmetic operation: Commutation of addition and multiplication (transferability), associativity (pairing off numbers) and distributivity towards multiplication (scheduling);
4. Textual tasks that are explained by numerical depiction of addition, subtraction, multiplication and division;
5. To measure the units, connections between units and using size units;
6. Geometric figures (flat, spatial). Figure elements and depiction;
7. Classification of figures with different marks (e.g. flat and spatial);
8. Figure dimensions: measuring tools and length measuring units. Perimeter of polygon;
9. Spatial shapes models, divided parts of a figure.
10. General representations of the qualitative and quantitative data (task): gathering means: to measure, observe, survey; Data picking from the simplest sources (e.g. from the reference book);
11. Organizing qualitative and quantitative data: data grouping; sorting of quantitative data on growth and convergence; Quality data ordering (e.g. with a lexicographic method);
12. The means of data presentation: table, pictogram, diagram;
13. Summarizing numerical data for qualitative and quantitative data: the total number of data, the greatest and the smallest values.

The V-VI classes standard

a) The results to be achieved at the end of the VI class

Definition of indices

Each crossed off outcome of the standard on the primary levels is preceded by the index, which indicates the subject, the level of teaching and the number of the standard results; for example,

math.pr. (II).1.:

"**math**" - indicates the subject of "mathematics";

"**pr.**" - indicates the primary levels;

"**(II)**" - indicates that the standard includes V-VI classes;

"**1**" - indicates the resulting number.

Mathematics Standard (V-VI Classes)		
	Results Index	Standard results
1. Direction: Numbers and activities		
Sub directions		A pupil should be able to:
Numbers, their use and the means to represent them.	math.pr.(II).1.	depict, classify and use of natural and nonnegative rational numbers.
Operations on the numbers and numerical correlations.	math.pr.(II).2.	perform arithmetic operations on natural and nonnegative rational numbers.
Evaluation of the quantity and approximation.	math.pr.(II).3.	evaluate approximately the result of operations on natural numbers and round the numbers off.
Values, size units and other use of numbers.	math.pr.(II).4.	Connect and use different units of the size.
2. Direction: Geometry and perception of space		
Sub directions		A pupil should be able to:
Geometric objects: their properties, their interconnection and construction.	math.pr.(II).5.	identify, describe, and depict flat and spatial geometric figures and establish relations between the figures and the elements of the figure.
Size and measurement means.	math.pr.(II).6.	calculate a flat figure space and use it in the tasks according to the real condition.
Transformations and the symmetry of the figures.	math.pr.(II).7.	demonstrate geometrical transformations.
Coordinates and use them in geometry.	math.pr.(II).8.	orient on the space covered with the cells.
3. Direction: Regularities and Algebra		
Sub directions		A pupil should be able to:
Sets, depicting, functions and their use.	math.pr.(II).9.	depict and describe the dependence between the values.

Algebraic transactions and their properties	math.pr.(II).10.	draw Algebraic image and simplify it.
4. Direction: Data analysis, probability and statistics		
Sub directions		A pupil should be able to:
Data sources and means of their obtaining.	math.pr.(II).11.	obtain the qualitative and quantitative data required to solve the task.
Data arranging methods and data presentation means.	math.pr.(II).12.	presentation of solving the task given by the quantitative and qualitative data in the advantageous form
Summarizing numerical characteristics of the data.	math.pr.(II).13.	interpret qualitative and quantitative data and make elementary analysis.
5. Direction – Discussing-Substantiating, Problem Solving		
Sub directions		
Discussing-Substantiating Solving problem	math.pr.(II).14.	A pupil should be able to solve problems by calculating, variants counting, and using the relationships between objects and their properties.

B) The Content

1. Natural numbers and operation on them;
2. More than a million natural numbers (billion, trillion, etc.);
3. Introduction of other numerical systems;
4. Operations on non-negative fractions with different denominators;
5. Non-negative decimals; Connection of decimal and fraction, fraction and decimal (case of finite decimal);
6. Operations on non-negative decimals;
7. Relationship between length, area and volume units;
8. Time units (hours, minutes, seconds; year, leap-year);
9. Length and volume units and their connections;

10. Connections between two quantities, which are given by the depiction of addition, subtraction, multiplication and division;
11. Numerical and lettering units containing addition, subtraction, multiplication and division; their simplify, and use while solving the textual tasks;
12. Numerical inequalities, containing addition, subtraction, multiplication and division and their peculiarities;
13. Geometric transformations on flatness: axial symmetry, parallel transfer;
14. Area of the flat figure;
15. Quantitative attitude between elements of spatial figures (e.g. Eller's formula);
16. Models of spatial shapes, cubes and rectangular separated parts of parallelepiped;
17. Facilities for gathering qualitative and quantitative data: gathering means: measuring, observation, survey; Data picking from the simplest sources (e.g. from the reference book, internet, catalogue), statistical experiment;
18. Organizing qualitative and quantitative data: quantitative data grouped in intervals;
19. The featuring signs of the crossed off the data unity: recurrence type regulations;
20. The means of data presentation for quantitative and qualitative data: column and circular diagrams;
21. Data summary numerical characteristics for qualitative and quantitative data: central trend measuring -the average, greatest and least significances of data.

Chapter XXI. Mathematics - Annual programs according to classes

Article 84. Annual Programs of Mathematics

Mathematics on the primary level

I class

The results to be achieved at the end of the year and their indicators

Direction: Numbers and operations

Math I.1. The pupil is able to correspond numbers, numerals and quantities with one another.

The result is obvious if the pupil:

- Chooses and creates a set of relevant quantity of the given things – and, on the contrary, corresponds the sum of the given things with the number;
- Creates a crossed off set of things in an equal quantity by pairing them;
- Reads and writes numbers; depicts them using different models;
- Separates the corresponding quantity of groups of the indicated numbers in the pile (for example, three, five and ten in the pile).

Math. I.2 The pupil can use the ordinal numeral.

The result is obvious if the pupil:

- 1 Count the number ahead/back of any number, explains the names of 11 to 20; names the previous and next numbers of the given number;
- 2 In the order of the disciplines, names the row of the indicated subject; places the subjects in this sequence and the positions;
- 3 Uses the ordinal numeral when describing the sequence of events or actions;
- 4 Adequately use zero and its denoting symbol in relevant situations;
- 5 Differentiates and names the national currency signs (coins and banknotes) within 20.

Math. I.3 The pupil can connect with each other: counting, attitudes between the numbers and the operations of addition and subtraction.

The result is obvious if the pupil:

- Spells out the concepts of addition, subtraction, equality and result in various contexts (for example, "add", "subtract", increase, reduce, separate, differ);
- Conducts a clear demonstration of addition, subtraction, defines the difference (for example, "how much has it been increased / decreased?") and describes attitudes among the numbers;
- When orally counting, uses 1 equal step calculation or other method and demonstrates the interaction between the operations of addition, subtraction by using the model;
- For the given pile, names the proper additional quantity to fill up the quantity of the mentioned pile; orally counts through 10 makes the operations of addition, subtraction and demonstrates the used method.

Math. I.4 The pupil can measure and compare quantities.

The result is obvious if the pupil:

- Without counting names the exact number in the similar subjects pile of small size (the number of the subjects does not exceed 5) and checks his answer;
- Connects with each other the operations of addition, subtraction with the help of "more" / "less" and demonstrates it on the model;
- By pairing the subjects compares the quantity in the piles, uses the appropriate terms and indications ($>$, $<$, $=$) and defines the difference ("how much more / less?");
- Chooses one of the two piles in which the number of subjects approximately equals to the given number, checks his supposition.

Direction: Regularities and algebra

Math. I.5. The pupil can develop, present and compare periodic disposals of the subjects (sequences).

The result is obvious if the pupil:

- According to the given fragment sequence fills several successive open positions of this sequence;
- Compares two of the following sequences (in which the number of items is equal) and in the appropriate case indicates the sequences, which subordinate the same rule of the disposal;
- According to the rule, given verbally, disposes the subjects in sequence distinguished by only a single attribute (for example, such a sequence of balls of the same size: red ball, blue ball, red ball...).

Direction: Geometry and Spatial Perception

Math. I.6. A pupil can identify and describe a flat geometric figure.

The result is obvious if the pupil:

- Indicates the names of the flat figure mentioned in their subjects of household or their illustrations;
- Selects the pattern of the figure from the mixed pile;
- Describes the geometric figure (for example, the number of the axis of the given polygon).

Math. I.7. A pupil can depict a flat geometric figure and recognize the objects interdisposals.

The result is obvious if the pupil:

- By means of any method (for example by application or drawing) creates a model or image of a flat-shaped figure;
- Combines different flat-shaped models to get the image (drawing) on the sample;
- Correctly answers questions about objects (left / right, up / down, forward / back);
- Makes connections between a set of points and the plane and indicates the way to the pointed object on the simple scheme.

The Program Content

1. Natural numbers within 20 and 0;
2. Different aspects of the number concept;
3. Use of Numbers;
4. Periodic sequences presented by subjects;
5. Flat Figures: Triangle, Rectangle, Pentagon, Hexagonal, Circle;
6. Simple schemes on the plane curves (for example, the points connected with the curves).

II class

The results to be achieved at the end of the year and their indicators

Direction: Numbers and operations

Math II.1. A pupil can correspond with each other numbers, numerals, quantities and row.

The result is obvious if the pupil:

- Reads "single digit" and "double digit" numbers, names the previous and next numbers; from any number counts the front and back of the number and depicts the numbers in different ways (for example, writes down them by using the positional system or presents the number by the subject pile of the corresponding quantity);
- Counts the number of subjects together in different ways and compares the obtained results with each other; demonstrates the record by the decimal system with separating the decimal numbers from the subjects pile;

- In the double digit record indicates the categories of decimals and (one-digit) units, denotes the meaning of the digits in these categories and explains the purpose of using of 0 being in these categories; uses this knowledge in comparison with numbers;
- Names the number of the specified item in the arrangement of the figures or drawings; He names the number of subsequent or previous members.

Math. II.2. The pupil can connect with each other: counting, attitudes between the numbers and the operations of addition and subtraction.

The result is obvious if the pupil:

- Makes the operations of addition, subtraction by different subjects or their images, for example ("how much has increased, decreased?");
- When orally counting, uses 1 equal step calculation or other method (for example, grouping the category by full decimal , "jump over") and demonstrates the interaction between the operations of addition, subtraction; approves the result of the operations;
- Defines the names of the numbers in the Georgian language;
- Makes the operations of addition, subtraction through the tens and demonstrates using of the very method (for example, on the stairs of numbers or on the subjects pile);

Math. II.3. The pupil can make the halving-doubling activities, connect them with addition-subtraction and with each other;

The result is obvious if the pupil:

- Demonstrates the doubling action for the given subjects quantity group by adding the subjects group of the same quantity;
- Doubles the number within 10, also full 10s and full 20s; connects this action with the corresponding step (for example, explains the full number of relevant numbers in the Georgian language);
- Determines if the specified quantity is pointed in the half of other pointed quantity /in the case of dual concrete models (for example, subjects pairing);
- Selects the way of (eg, counting down or subtraction) and halves even numbers; demonstrates the inversion of halving-doubling action.

Math. II.4. The pupil can evaluate and compare the quantities within 100 number.

The result is obvious if the pupil:

- Chooses the method (for example, pairing), evaluates and compares the number of two piles; defines the difference between them ("how much / less?", "equal", "twice much/less");
- Chooses one number from the similar subjects of two piles, (in which the number of subjects differs significantly) in which the number of subjects is approximately equal to the given number and checks his supposition;
- Names the nearest 20s of the number, 10s, 5s; explains the answer.

Math. II.5. The pupil can use numbers and operations on them in the process of solving the tasks.

The result is obvious if the pupil:

- By determining the purpose of the task defines what is given and what is to be found;
- Chooses the appropriate action and the method of implementation of a simple task;
- Uses 1 equal step counting to and finds the second item, if the first item and sum is known; Uses the unit's step counting down for finding the unknown number to be subtracted by the number of addition and the result of subtraction and demonstrates the very method;
- Distinguishes, names and in the real/played situation uses the signs of the national currency (coins and banknotes within 100).

Direction: Regularities and algebra

II.6. The pupil can extend the periodicity (sequences) of subjects or drawings / figures, represent and compare them with each other.

The result is obvious if the pupil:

- 1 In the given sequence fills some omitted positions;
- 2 Compares some (not more than three) sequences with each other and names those sequences, which subordinate the same rules of disposal;
- 3 According to the given rule, presents the sequence only by one attribute (e.g. color or form) with different subjects or drawings / figures.

II.7. The pupil can use the operations of addition when solving simple tasks.

The result is obvious if the pupil:

- Checks whether the mentioned number is the meaning of the unknown component of the given equality (e.g. $\square + 7 = 10$);

- Makes up the equivalent full-numbered image containing one operation of addition / subtraction (for example, for such unity of two coins, which contains the same amount);
- Uses the commutation (transition) of addition and associative (grouped) properties to calculate the importance of numerical imaging.

Direction: Geometry and Spatial Perception

Math. II.8. The pupil can use qualitative and quantitative marks to describe the figures.

The result is obvious if the pupil:

- Compares and corrects flat figures according to the geometric attributes (e.g. according to the number of vertexes/ sides);
- Distinguishes the inside and outside of the figure; indicates the inside of the figure, outside and the points on the border;
- Indicates the general sides of the common boundary figures.

Math. II.9. The pupil can focus on the environment and describe the inter-disposal of objects.

The result is obvious if the pupil:

- Arranges the objects according to the pointed rules;
- Describes the location of the object with using the proper term concerning it (e.g. right, left, up, down);
- Issues and directs the directions of movement orientation.

Math. II.10. The pupil can compare and define the size of the figures.

The result is obvious if the pupil:

- Compares the rectilinear measures of the figure by reconciling them and expresses the comparison results with the corresponding terms (for example, long, short, equal);
- Finds samples of equal figures in his usual environment; demonstrates the equality of the figures by reconciling them;
- Finds the rectilinear measure of real object (for example, the classroom, sports hall) using the non-standard unit (for example, step).

Direction: Data analysis, probability and statistics

Math. II.11. The pupil can gather qualitative data about his immediate surroundings.

The result is obvious if the pupil:

- Gathers data from real objects;
- Picks several data from a short list of the similar data (not more than ten data);
- Picks the required data from the simplest (double-column or two- line) table.

Math. II.12. The pupil can regulate qualitative data.

The result is obvious if the pupil:

- Places the data in a given sequence or given positions (in case of sequentially assigned positions);
- Provides the every data combination with a place in a given group (the number of data does not exceed 10, and the number of groups is three);
- Classifies / divides into groups the data of one class objects (for example, geometric figures) by using a certain rule; explains the classifying/ grouping rule.

Math. II.13. The pupil can interpret qualitative data.

The result is obvious if the pupil:

- Verbally characterizes the data list (in which there are no more than 10 data) according to the total amount of data, recurrence, position, sequence;
- Verbally describes / explains the spelling in which a single symbol corresponds to a single data or data pair;
- Verbally describes / explains the data in the simplest (double- column or two- line) table.

The Program Content

1. Less than 100 natural numbers;
2. Decimal position systems and their demonstration;
3. Arithmetic operations on natural numbers and their demonstration;
4. National Money Signs;
5. Periodic sequences presented by subjects, drawings or figures;
6. Full numbers signs and their equivalence containing the operations of addition / subtraction (not more than two acts);

7. Commutation of the addition (transferability) and associativity (grouping) (informal and without relevant terms);
8. The equivalence containing one operation of addition / subtraction and one full number;
9. Flat figures: point, section, curved line, cord;
10. The inside and outside of the figure, the border of the figure;
11. Figures with common boundaries, their common sides and vertexes ;
12. Equal figures;
13. Distance: addition on the section, length measuring nonstandard units;
14. Orientation on flatness and inter disposal of objects;
15. Quality data gathering means: observation, data picking from data list and table;
16. Organization of qualitative data: data grouping;
17. Quantitative and qualitative indications of data regulated jointly: total number of data, recurrence, position and sequence together;
18. The means of data presentation for qualitative data: list, Table, pictogram (where one symbol matches one data or data pair).

III class

The results achieved at the end of the year and their indicators

Direction: Numbers and operations

Math. III.1. The pupil can depict natural numbers, compare and sort by using the positional system.

The result is obvious if the pupil:

- Reads and depicts numbers, explains the names of numbers in the Georgian language; demonstrates decimal positional systems by using different models;
- Names the relevant values of the digits in the numerical recording, presents the number in the form of addends for sorting or in another form;
- Uses a positional system to compare numbers, sorts numbers by growing or decreasing (numbers quantity does not exceed five);

- Names the previous and next numbers of the given number; Names the nearest ten, hundred- of the given number;
- Counts ahead/back from the given number by one step of calculation corresponding to the sorts;

Math. III.2. A pupil can use any of the methods for fulfillment the addition, subtraction.

The result is obvious if the pupil:

- Chooses a particular example and uses a different method of oral account (addition / subtraction); describes the used method and demonstrates it on the model. (for example: addition / subtraction) through sorting, by addition / subtraction of separate sorting, using the established regularities; using doubling during the addition; by dividing the sorts;
- Chooses and uses an adequate method for fulfillment the operations of addition / subtraction in case of a specific example;
- When fulfilling the operations of addition / subtraction before sorting uses filling/dividing method; explains the algorithm by the fulfillment of the actions in a written;
- Uses the sequence of actions in the process of oral account and of finding the importance of a simple numerical image (all arithmetic operations: for example, "What will we get if we add three sixties to seven hundred?").

Math. III.3. A pupil can make the multiplication-division operations, connect them with addition / subtraction operations and with each other.

The result is obvious if the pupil:

- Demonstrates the multiplication operation with multiple addition and as for division operation- by dividing into the groups of equal quantity;
- Connects multiplication-division with each other as inter inversed activities and demonstrates on the model;
- Orally makes multiplication-division in simple cases (e.g. multiplication of one-digit numbers; multiplication one and two-digit numbers by 10);
- According to the given quotient and divisor for determining the unknown dividend, selects any method or model; similarly, by the product and bracket determines the second bracket, interprets the used method. (within1000).

Math. III.4. The pupil can solve the problems related to calculations, counts and evaluations.

The result is obvious if the pupil:

- Names how many pairs, 5, 10, and so on... there are given in the number and approves the answer (for example, how many units are there in 412 are there, how many units remain, besides that?);
- Uses a certain method and finds the second addend, if it is known the first addend and sum - finds it by unknown subtrahend, given minuend and difference (at least within 1000);
- Uses verbal accounting methods to compare values of numerical expressions;
- Solves tasks on calculation / exclusion of variants (for example, filling numbers in the sample of the made addition using the written algorithm and substantiates the answer);
- Uses numbers and figures as notches for solving the problems; names the examples of using numbers and digits, as notches (for example, home, telephone, car number).

Direction: Regularities and Algebra

Math. III.5. The pupil can present, compare, and analyze periodic disposals (sequences) of subjects and drawings / figures.

The result is obvious if the pupil:

- Allocates the sequence period (the length of the period does not exceed three positions);
- Creates a similar sequence according to the following sequences using other objects;
- Compares several sequences to each other and separates similar sequences.

Math. III.6. The pupil can extend, examine and depict the correspondence between subjects or subjects and their attributes.

The result is obvious if the pupil:

- According to an analogy or preceding rule extends the given simple proper fragment (for example, for such a correspondence he chooses the items surrounding him: a sheet of paper-white, a bag- blue, a board- (?));
- In accordance with the orally given correspondence fills the donated table;
- Finds the corresponding element indicated in the table (for example, the table shows any pupil with the mark what he deserves, i.e. correspondence: "pupil mark", names all the pupils, who received 6).

Math. III.7. The pupil can draw the equation containing the numerical image and use it to solve the problem.

The result is obvious if the pupil:

- Generates real equivalent expressions of real situation (for example, balance of scales, chooses signs of money for representing and changing the pointed amount);
- For solving the task connected with the real situation, draws uses such a numerical image, which contains one operation of addition / subtraction;
- Finds (by selecting or other method) the value of an unknown component, containing the equation of the addition / subtraction action.

Direction: Geometry and Spatial Perception

Math. III.8. The pupil can identify and describe a geometric figure.

The result is obvious if the pupil:

- Recognizes spatial geometric shapes in the architectural and artistic designs or their illustrations, in household subjects or in the pile of figures patterns;
- Distinguishes the elements of the figure and uses geometrical terms to name them (e.g. the vertex, facet, rib);
- Uses the letter indicators of the geometric figure vertexes, when naming the elements of the figure (vertexes and sides).

Math. III.9. The pupil can create graphic images and models of flat figures.

The result is obvious if the pupil:

- By the verbal description of the geometric figure, creates the graphic image of this figure;
- Selects flat geometric shapes from the given pile and creates a specified configuration / figure;
- Divides a graphical image of a flat geometric figure or model to get a pointed figure / figures.

Math. III.10. The pupil can find the dimensions of the rectilinear measure of objects and figures and distance between the objects.

The result is obvious if the pupil:

- Finds the rectilinear measure of the object by nonstandard units (e.g. with a span), then evaluates it using standard units; discusses about the need for the using standard units;
- Compares and evaluates the rectilinear measures of the objects (including mutual combination) and represents the results of comparison with the relevant terms (e.g. long, short and equal);
- Measures the figures sides by the ruler and fixes the measuring results in any standard unit (e.g. 3 cm or 30 mm).

Direction: Data analysis, probability and statistics

Math. III.11.The pupil can gather qualitative and quantitative data concerning the given topic or examining subject.

The result is obvious if the pupil:

- Reads a short text (two-three simple sentences) and about the pointed object picks the data given in the text;
- Puts a question of yes / no type to obtain the data concerning the given topic or examining object and indicates the answer;
- Selects the proper means for gathering the data (observation, measurement) and uses it.

Math. III.12.The pupil can perform and improve the discreet quantitative and qualitative data.

The result is obvious if the pupil:

- Groups the data with no more than two signs and indicates the signs according to which he has grouped;
- Improves several quantitative data by increasing, decreasing;
- Creates pictogram with an inter-unequivocal rule on the graphical table prepared by the teacher (for example, each object in a graphic cell).

Math. III.13.The pupil can interpret qualitative and quantitative data.

The result is obvious if the pupil:

- Describes / explains the data presented in the form of pictogram and table in orally or written form;
- It is characterized by a group of gathered qualitative data in the total number of data, subgroups, and number of data in each subgroup and in conjunction with data repetition, position and sequence;

- Asks concrete questions about the data presented in the form of a pictogram or simplified (double -column or two- line) table.

The Program Content

1. Three digit natural numbers;
2. Demonstration and using of decimal positional system;
3. Arithmetic operations on natural numbers;
4. Use of Numbers;
5. Periodic sequences and periods presented by subjects, drawings or figures;
6. Correspondence between subjects, subjects and their attributes; depicting expression by the table; element point for the given the correspondence;
7. Extensive gatherings and their equivalents containing the addition / subtraction;
8. Equations of the full-numbers containing the operations of one unknown component and the addition / subtraction;
9. Spatial figures: Cube, Rectangular, Parallelepiped, Pyramid, Sphere;
10. Elements of spatial figures: vertex, facet, edge;
11. Rectilinear measures of the figure, measuring tools and length measuring units: meter, decimeter, centimeter;
12. Qualitative and quantitative data gatherings means: measurement, observation, survey; Picking the data from read text;
13. Qualitative and quantitative data organizing: data types - qualitative and quantitative data; Qualitative data grouping; Quantitative data grouping (for exception of dividing intervals into classes); Quantitative data arranging by increasing, decreasing;
14. The indicators of the quantitative and qualitative regulated data: the common quantity of the data in the combination and the data in the subgroups; data repetition, position and sequence in the joint / subgroups;
15. The means of data representation for quantitative and qualitative data: table, pictogram.

IV class

The results to be achieved at the end of the year and their indicators

Direction: Numbers and Operations

Math. IV.1. The pupil can depict, compare, and sort the numbers using the positive system.

The result is obvious if the pupil:

- Reads the numbers by using different models, depicts the numbers and demonstrates the position of the system (for example, the structure of the combined subjects, on the digital beam);
- Names the relevant values of the numbers in the digital categories, presents in the form of the sum of the addends
- Uses the position of the system in comparison with numbers, maximizes four or five digits by increasing or decreasing;
- Names the previous and next numbers of the given digits, as well as the nearest ten, the hundred, the thousand; from any four, five-digit number calculates the position corresponding to the decimal point forward / backward.

Math. IV.2. The pupil can perform the operations of addition / subtraction on the natural numbers by different ways and evaluate the results of them.

The result is obvious if the pupil:

- Orally performs the operations of addition / subtraction using any method and explains the used method;
- Performs the operations of addition / subtraction using the different ways (evaluation, verbal report, written algorithms); for a particular example, he chooses more favorable of them;
- Compares the outcome of the calculation to the answer received by the preliminary assessment and discusses the correctness of the results of the calculation;
- Fills the sample / samples the operations of addition / subtraction with the missing digits using the written algorithm and establishes the answer.

Math. IV.3. The pupil can perform any method for implementing the multiplication-division operations by using any method.

The result is obvious if the pupil:

- Orally divides the two-digit number by one-digit, in the appropriate case names the quotient and the remainder; establishes the answer;
- Expresses the rules of multiplication operation of number 100 and 1000 and the reduced rules of multiplication operation of the digits ended in zero; uses them for calculations;
- Uses the algorithm to perform the multiplication-division operation on the numbers and explains the method of using (when dividing by one digit number); in the appropriate case indicates the remainder;
- When solving the tasks on calculations, in case of division with the remainder, interprets the remainder taking into consideration the context of the task.

Math. IV.4. The pupil can differentiate, name parts of the whole numbers (half, a third, and quarter) and compare them with each other.

The result is obvious if the pupil:

- Recognizes and names half the third / fourth of all parts of the model (section, rectangle and circle models, for example, cake, clock, chocolate tile);
- Demonstrates the result of either the division of the whole into the equal parts or the result of the division in groups of the quantity of the piles having the structure of the subjects;
- Uses doubling operation and connects one quarter and half of the whole with each other;
- Compares the whole part of the half of the model (is more than half, less, equal).

Math. IV.5. The pupil can use different units of the size and connect them with each other.

The result is obvious if the pupil:

- Demonstrates a large unit of length / weight (also half of the larger unit) with a small unit (e.g. 2 m = 200 cm; 4 kg = 4000 g);
- Uses the known ratio between the time units (hours and minutes) and using the arithmetic effects finds an interval of time (up to an hour);
- Depicts half an hour/quarter /fourths in minutes;
- Uses the operation of subtraction by the remainder in the given units of size using the other unit of data (e.g. how many meters and centimeters is 320 cm? How many hours are in 100 minutes?).

Direction: Regularities and Algebra

Math. IV.6. The pupil can construct, depict and examine the compliance.

The result is obvious if the pupil:

- Names the same compliance with his / her own depicting way independently;
- By means of any method (e.g. orally, by using a table or scheme) finds the image of the pointed element for correspondence;
- Constructs the adequate compliance with the real situation between two groups of objects (for example, pupils and desks in the classroom) and through the table or scheme.

Math. IV.7. The pupil can create and use algebraic image while solving a simple task.

The result is obvious if the pupil:

- Explains the tasks connected with the simple proportional attitude (in which according to the relevant number it is required to calculate the number of some relevant units, for example, calculating of the value of some units by the value of per unit);
- For finding the image of the digit, uses the commutation, associativity of the operations of multiplication-addition and towards the operation of addition the distribution of multiplication;
- Finds the importance of the unknown component containing the equation of multiplication-division, addition-subtraction;
- When solving the task distinguishes the required and unnecessary data.

Direction: Geometry and Spatial Perception

Math. IV.8. The pupil can describe the geometric figures and classify them.

The result is obvious if the pupil:

- Compares and corrects spatial figures according to geometric attributes;
- Indicates the common points of intersecting images of the figure, as well as the common points, and the points, which belong only to one figure;
- In the spatial figure indicates the adjacent/non-adjacent facets, intersecting/non-intersecting edge.

Math. IV.9. The pupil can create graphic images and models of flat and spatial figures.

The result is obvious if the pupil:

- Designs the model of the spatial figure according to the sample or the carcass using different material;
- Creates a flat figure or the graphic image of the figures group based on its verbal description (e.g. draws square and rectangle of the same perimeter);
- Creates a specified configuration/figure by the spatial geometric figure models; draws a graphic image of a flat geometric figure or a pattern to get a figure / figures.

Math. IV.10. The pupil can find the distance and dimensions between the objects and figures.

The result is obvious if the pupil:

- Evaluates the distance between two objects in the proper standard unit, measures it and checks his assumption;
- Measures and calculates the length of the broken line, the perimeter of the polygon and fixes the result in the appropriate standard unit;
- Finds the shortest distance between two objects according to the proper schematic image of the real situation (on which the distances are indicated), (for example, length of the route from home to school).

Math. IV.11. The pupil can focus on the scheme and create a simple scheme to describe the route on it.

The result is obvious if the pupil:

- Distinguishes the indicated route on the scheme by using the symbols;
- Uses symbols (for example, indicated by letters) to describe the route between the two points indicated on the scheme;
- Schematically shows the exact route of the real situation (for example, the route from home to school).

Direction: Data analysis, probability and statistics

Math. IV.12. The pupil can gather qualitative and quantitative data concerning the given topic or the object, which should be examined.

The result is obvious if the pupil:

- Picks the required data from the categories of the correct data;
- In connection with this topic, asks questions containing some alternative choices and gets the necessary information (such as "What kind of ice cream would you prefer - chocolate, strawberry or cream?");
- Selects the proper means for gathering the data (observation, measurement) and uses it, explains his choice.

Math. IV.13. The pupil can improve quantitative and qualitative data.

The result is obvious if the pupil:

- Arranges more than 10 data combined in the group (for example: the numerical data by number increasing/decreasing; the names by lexicographic method, among them there some have the common names, but not more than two first letters);
- Classifies the data with at least two signs and explains the rule of grouping;
- Correctly fills the table, scheme, questionnaire / form (for example, writes the data in the appropriate cells of the prepared table).

Math. IV.14. The pupil can interpret qualitative and quantitative data and make elementary analysis.

The result is obvious if the pupil:

- Asks the search / summary questions about the data presented in the table;
- Describes / explains the data presented as a column diagram in words and written form;
- Compares the data combination of two combinations and finds a qualitative difference between them (the property is related to the data type / group, data periodicity, position and sequence).

The Program Content

1. Natural numbers within a million;
2. Operations on natural numbers;
3. Dividing by the remainder;
4. Half the whole, a third and a quarter parts only by the introducing rule (recording the part as the fraction and the knowledge about the fractions is not mean);
5. Length units;
6. Time units: hours and minutes, initial knowledge about 12 hours format;
7. Weight units: kilograms, grams;
8. Compliance between subjects, subjects and their attributes; scheme; the element image for the given compliance;
9. The whole digital images and their equivalents containing multiplication-division; addition-subtraction;
10. Commutation of addition-multiplication (transferability), associativity (clarification) and distribution towards addition;
11. Textual tasks, which are explained by algebraic images containing subtraction -multiplication.
12. Spatial figures: prism, cone, cylinder;
13. Interconnection of the elements of the spatial figure: adjusting/non-adjusting facets, intersecting/non- intersecting edges.
14. The perimeter of the polygon;
15. Regulating schemes of inter disposal of objects in real situation;
16. Facilities to gather qualitative and quantitative data: measurement, observation, survey; picking the data from the simplest sources of data (e.g. the reference book);
17. Organization of qualitative and quantitative data: data grouping; sorting of quantitative data on growth and depth; sorting qualitative data with lexicographic methods;
18. The means of data presentation for quantitative and qualitative data: table, pictogram; column diagram.

V class

The results to be achieved at the end of the year and their indicators

Direction: Numbers and Operations

Math.V.1. The pupil can use new numerical names and positioning systems and classify the natural numbers.

The result is obvious if the pupil:

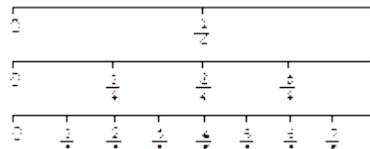
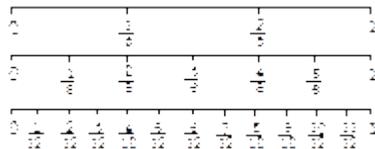
- Reads a large number of millions using new numerical names (e.g. trillion, etc.); explains these numerical names;
- Finds a large number row given by the new numerical name (on million) (for example, how many digits does such a number, recorded in a dozen positive system, consist of?);
- Uses indexes of the 10 when recording numbers; discusses the advantages of decimal positions in comparison with other numerical systems (e.g. Egyptian or Roman systems);
- Finds multiples and divisors of a single digit and double digit numbers;
- Distinguishes odd, even, simple and compounded numbers, substantiates the devising signs by 2 and 5 digits;
- Uses the concept of the number square, recognizes the natural number square among the double digit natural numbers.

Math. V.2. The pupil can read, display, evaluate, compare, and sort the fraction.

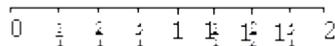
The result is obvious if the pupil:

- Reads and displays normal and mixed fractions; indicates the fraction numerator and denominator, whole, and parts of fraction;
- Shows the parts of the unit on the numerical beam and marks the equal parts; calculates the parts by the relevant step (including the unit);

Sample 1



Sample 2



- Compares the two fractions, including the utilization of the main property of the fraction;
- Writes a mixed fraction in the form of an irregular fraction and on the contrary; makes different interpretations of the fractional definitions and discusses about the connection between them (the fraction as the record of the division result of two natural numbers, part of the unit, the subgroup of the whole group and the distinct place on "the numerical beam").

Math V.3. The pupil can perform operations on natural numbers and fractions with common denominators.

The result is obvious if the pupil:

- Takes into consideration the context of the task and uses the appropriate method for performing operation on natural numbers; in case of division of the remainder, interprets the remainder taking into account the context of the task;
- Displays the arithmetic operations on the simplest fractions with the same denominator and interprets the results of the operations using the model (e.g. pieces of cake);
- Discusses how the fraction is changed by increasing/decreasing of its only denominator or only nominator; substantiates he answer (for example, using the model);
- Uses the properties of the operations, and the connections between them in simultaneous calculation / simplification (mixed numbers addition/ subtraction, multiplication of fraction by natural numbers).

Math V.4. A pupil can connect different units of measurement with each other and use them.

The result is obvious if the pupil:

- Connects units of length of space with each other using a number square record in this context;
- Connects units of width of space with each other; displays a large unit of space using a small unit;
- Using time 12 and 24-hour formats and determines time and time interval using arithmetic operations;
- Uses division with remainder in the given units of measurement when depicting the data by other unit (for example, how many hours are in 50000 seconds).

Direction: Regularities and Algebra

Math. V.5. The pupil can depict and describe the relationship between the values.

The result is obvious if the pupil:

- Describes (including the actual situation) any amount of change that is obtained by adding /subtracting of the constant value;
- Makes qualitative analyzes concerning the given dependence, particularly, how influences the changing of one value the second value depended on the former and other attributes, as well (for example, "the first's growth will cause the second's growth", "the height above sea level is comparatively much more dark on the map");
- In the given using letter display containing one variable with different numbers he fills in the table depicting the dependence between the variable and display values, in which appropriately to the variable value the column/line is filled in advance;

Math. V.6. The pupil can create algorithmic images and simplify the task.

The result is obvious if the pupil:

- Establishes the real situation or its verbal description, inequality or equation (in which there is only one side of the equals);
- Uses the arithmetic operations when solving the text task, asks questions to fill in incomplete data (for example, the condition of the task: "The pupil paid 60 tetri in three pencils, what is the price of one pencil?" The question is: "Is the price of all three pencils equal?");
- Uses commutation of addition/multiplication, associativity and multiplication distribution qualities (containing one variable) to simplify lettering expressions.

Direction: geometry and spatial perception

Math. V.7. The pupil can recognize, describe and display geometric shapes.

The result is obvious if the pupil:

- Indicates elements of circle / circumference; correctly uses the terms related to the circle / circumference (center, diameter, radius, and chord);
- Divides the circumference / circle (half and quarter) into arcs / sectors; Uses the comparison of their corners and the sorting (obtuse, right, acute and straight);
- Prepares rectangular parallelepiped and cube shapes; according to the shape, prepares the model prepares the model and names the obtained figure.

Math. V.8. The pupil can establish connections between the figures and elements of the figure.

The result is obvious if the pupil:

- Classifies the triangles according to its angles (obtuse-angled, right-angled, acute-angled);
- Refers to the parallel and intersecting sides of the flat figure, discusses whether the sides are intersected in the result of extension;
- Refers to the parallel and intersecting facets on the model of the spatial figure, discusses whether these points are intersected by their spread.

Math. V.9 The pupil can find and compare the areas of the flat figures.

The result is obvious if the pupil:

- Covers the figure with the same non-covering figures and names the total number of required figures to be covered;
- Using combination of figures compares or assesses the spaces of figures (e.g. when one figure is placed in the other, its space is smaller);
- Uses space admission to look for the spaces for the figure obtained by a combination of non-covering figures.

Math V.10. The pupil can focus on the space covered with the set.

The result is obvious if the pupil:

- Uses coordinates (pair of symbols) and describes the location and uses this method in real situation (for example, movie, theatre, sinking of ships, chess board, finding an object on the map);
- Transfers to the ceiling sheet of paper by instructions and describes how to reach from given cell to the other one (for example, two cells to the left, then one cell above, on the top);
- Describes two or more parallel points on the map using four directions (e.g. north and west).

Direction: Data analysis, probability and statistics

Math. V.11. The pupil can obtain the qualitative and quantitative data for solving the given problem.

The result is obvious if the pupil:

- Selects from the given list of questions and uses the appropriate question / questions for gathering the necessary data;
- Puts the questions about a given topic in the appropriate form (open, closed, containing some alternative choices) and through these questions will obtain the necessary data;
- Chooses the appropriate means for gathering the data (observation, measurement, data picking from the given combination) and uses it to evaluate his choice.

Math.V.12.The pupil can present qualitative and quantitative data in a favorable way to find out the task.

The result is obvious if the pupil:

- For the classified data, by the pointed rule of unequivocal correspondence creates the pictogram one symbol of which coordinates with several data;
- Creates a simple table for not more than twenty classified and sorted data (for example: determines the number of notches, headlines, columns and makes the data table);
- For the classified data, by the rule of inter-unequivocal correspondence creates the bar graph (diagram) on the celled sheet of paper (e.g. determines the number of notches, headlines, columns and paints the proper stripes of length of the celled sheet of paper);

Math V.13. The pupil can interpret qualitative and quantitative data and make elementary analysis.

The result is obvious if the pupil:

- Puts the searching/summing questions about the data, which are represented in the form of the bar graph (diagram), (e.g. how many different kinds of ice-cream should we buy for the class celebration? how many ice-creams of each kind should we buy? what kind of ice cream do the most of our classmates like- of chocolate or of strawberry? Which kind of ice cream is the most popular for our classmates? -For girls? For boys? Why?);
- Compares the two combinations of data and presents qualitative and quantitative similarities and differences between them (the quality is related to the group's data / group, data repeatability, position and sequence, distinctive data);
- Expresses the assumption on the basis of data (for example, the survey - "What kind of means of movement does each pupil use to go to school" - based on the results supposes about the fact, that approximately how many children live near the school).

The Program Content

1. Natural numbers and operations on them;
2. More than a million natural numbers (billion, trillion, etc.);
3. Introduction of other numerical systems;
4. Non-negative fractions with equal denomination and operations on them;
5. Comparison of different fractions, sorting and displaying;
6. The number square in the context of space;
7. Connections between the units of length and space;
8. Time units (hours, minutes, seconds), 12 and 24 hour format;
9. Weight units (kilograms, grams, milligrams);
10. Dependence between the two values, which are given by the display containing addition / subtraction operations; displaying the dependence between the values by on the table;
11. Numeric and lettering images containing the addition / subtraction and multiplication operations and their simplifying;
12. Numerical inequalities containing the addition / subtraction operations and their properties;
13. Textual tasks, which are solved by algebraic images containing numerical or one letter indication and addition / subtraction operations;
14. Circle / circumference (center, diameter, radius, and chord, sector);
15. Angle (informally, as an element of the polygon);
16. Types of triangle: obtuse-angled, right-angled, acute-angled and straight-angled;
17. Dependence between the sides of the polygon: parallel and intersecting sides; connection between polygonal facets: parallel and intersecting facets;
18. Space (informally, as the number of the covering figures in the figure covered with the similar uncovering figures);
19. Coordinates (informally, as indication of the location by the symbols pair);
20. Facilities for combining of qualitative and quantitative data: measurement, observation, survey; data picking from the simplest sources of data (such as directory, reference book);
21. Organization of qualitative and quantitative data: classification of data (excluding quantitative data group into intervals);

22. The indications of quantitative and qualitative indications of the regulated combinations of the data: distinctive (e.g. extreme, rare) data;

23. The means of data representation for quantitative and qualitative data: frequency table, pictogram, column diagram (bar graph).

VI class

The results to be achieved at the end of the year and their indicators

Direction: Numbers and Operations

Math VI.1. The pupil can display, compare the non-negative rational numbers and sort them by using the positional system.

The result is obvious if the pupil:

- By the numbers (for example, five, six or seven) creates the largest / smallest (five-digit, six-digit or seven-digit) numbers;
- Displays decimals in a different way (including the numerical beam); writes the finite decimal in the form of fraction;
- Reads the record of the finite decimal; indicates the categories and names the digits according to the categories; uses this knowledge when comparing and sorting the decimals (including the numerical beam);
- In the image of the fraction indicates all the whole and fraction parts the numerator and denominator; uses this knowledge when comparing, evaluating and sorting the fractions;
- Depicts the fraction in the non-reduced form; displays the fraction in the form of the finite decimal in appropriate case.

Math VI.2. The pupil can perform arithmetic operations on nonnegative rational numbers and evaluate the outcome of the operations.

The result is obvious if the pupil:

- Uses the main advantage of the fractions for performing the operations of the addition/subtraction; finds the part of the given number and solves the inverted tasks;
- Uses the equivalent forms of recording the rational number and the properties of arithmetic operations to simplify calculation (e.g. when performing them orally);

- Rounds decimals off in the accuracy (tenth and a hundredth); finds the approximation of the arithmetic imaging (without precision);
- Finds an unknown divisor by the given dividend and quotient; similarly, finds one of the unknown co-multiplier by the given other co-multiplier and the product; examines the answer.

Math VI.3. A pupil can connect the different units of the measurement with each other.

The result is obvious if the pupil:

- Uses the multiplication for displaying the correspondence of the little unit with the large unit of the measurement (length, space, weight, volume, capacity);
- Connects the proper units of length, space and volume with one another;
- Uses proportionality and evaluation for solving the tasks derived from the field of natural science (tasks on scale, solutions, alloys);
- Uses the knowledge of the time zones, the correlation between time units and the addition/subtraction operations for finding the time unit, (for example, finds the time of arriving in Boston by the plane flown at 6:00 from Tbilisi, if the difference between Tbilisi and Boston is 9 hours and for travelling by the plane it takes 13 hours).

Math VI.4. The pupil can solve the problems by using calculation, variants counting and relations.

The result is obvious if the pupil:

- Uses the knowledge of a positional system, setting and excluding methods and division operation with the remainder when solving the tasks; (e.g. tasks on counting the variants; arranges the using of the written algorithm; inserting of the missing digits in the sample of the fulfilled multiplication operation and substantiating of the answer, for example, how many years are leap in the case of 1200 days);
- Correctly uses the terms "all", "each", "every", "some", "one", "none", "only" - when determining the connection between the properties or number combinations;
- Uses general-private types and discusses about the correctness of the given suppositions concerning the numerical properties / numerical regulations;
- When evaluating the task on the calculation, discusses about the fact what is more relevant - the evaluation of the effect of arithmetic operations or the finding of its precise significance.

Direction: Regularities and Algebra

Math.VI.5.The pupil can display, extend and describe the relationship between the values.

The result is obvious if the pupil:

- For the given dependence (including real circumstances), qualitatively and quantitatively describes the dependence of one size changing on the dependent second size and other attributes;
- By using a rule given orally or in the obtained letter image, with the lettering digits fills the table, which displays dependence between the values;
- Extends the table displaying the dependence between the values; for the pointed value of the variable, finds the missing dependent values;

Math VI.6. When solving the problem, the pupil can draw and simplify the algebraic image.

The result is obvious if the pupil:

- Draws the appropriate equality, inequality, or equation to the real situation or verbal description (given by the straight line displaying);
- According to the drawn equation for solving the task, determines the fact, that how one value influences the solution of the task;
- Uses the properties of commutation, association, and distribution to simplify lettering images and determine the equivalence of algebraic images.

Direction: Geometry and Spatial Perception

Math.VI.7.The pupil can identify, describe spatial figures and display them by using different methods.

The result is obvious if the pupil:

- Names the possible type of spatial figure according to its given geometric attributes (for example, forms and quantity of facets);
- Describes the graphical representations of the spatial geometric figures or the interconnection of the figure using the appropriate terminology (for example, to which facets of the right- angled parallelepiped belongs the indicated rib);
- Prepares a spatial figure shape; distinguishes spatial figures by their shapes.

Math VI.8. The pupil can demonstrate geometrical transformations.

The result is obvious if the pupil:

- Transfers the given flat figure parallel (point, section, notch, polygon), onto the indicated point of the plane;
- Constructs a symmetrical figure of a flat figure towards an indicated symmetric axis on the celled sheet of paper;
- Finds the symmetric axis / axes of the symmetric configuration of the figures and substantiates the answer (for example, by folding or using a mirror).

Math. VI.9. A pupil can identify the relationships between the figures and the elements of the figure.

The result is obvious if the pupil:

- Counts for different figures (flat, spatial) and compares the values of Euler's characteristics; Uses Euler's formula to determine the number of elements of spatial figures;
- Uses geometrical transformations to determine the conjugation and symmetry of the figures;
- Makes the conclusion about the circumferences' disposal on the flatness, using distance and radius between their centers.

Math. VI.10. When solving the problem, the pupil can calculate the space of the flat figure.

The result is obvious if the pupil:

- Covers a flat figure with square homogeneous cell and evaluates its space (for example, counts the minimum number of squares required to cover the entire figure, and the number of squares placed within the figure and evaluates the space as the value accommodated between the two numbers);
- In real situation finds a space of the rectangular object (for example, the classroom floor) and present the result in the suitable units (including fractional);
- Uses a space additive for calculating it with the purpose of solving practical tasks.

Direction: Data analysis, probability and statistics

Math VI.11. The pupil can obtain the qualitative and quantitative data for solving the required task.

The result is obvious if the pupil:

- Makes inquiries of indicated respondent by the questionnaire / form and gathers the data;
- Conducts a simple statistical experiment and gathers the data (for example, asks the classmates to evaluate the length of any section in the drawing figure on the bar graph and the length of the same section separately);
- Chooses the proper means of gathering the data (observation, measurement, data picking from this combination) and uses it to evaluate his choice.

Math. VI.12. The pupil can improve qualitative and quantitative data and presents the task in a favorable manner.

The result is obvious if the pupil:

- Conducts qualitative and quantitative data classification (except for, discrete quantitative data grouping into intervals) and sorting;
- Draws data tables, including grouped quantitative data;
- Constructs the circular and column diagrams (when the data allows the selection of the scalp easily).

Math.VI.13.The pupil can interpret qualitative and quantitative data and make elementary analysis.

The result is obvious if the pupil:

- Counts summarized numerical characteristics (data average, large and small values) for discrete quantitative data and uses them for describing the combination;
- Compares the number of data according to their preliminary statistical characteristics;
- Finds the existing conventions in the data and discusses about them.

The Program Content

1. Operations on non-negative fractions with different values;
2. Non-negative decimals; connections: decimal-fraction and fraction-decimal (a case of finite decimal);
3. Operations on the non-negative decimals;
4. Dividing the natural numbers in simple multipliers;
5. Minimum common multiplier and the largest common divisors of several natural numbers;

6. Simple and compound natural numbers; divisor and multiplier;
7. Division with the remainder; some of the signs of division and the remainder;
8. Connections between the units of length, space and volume;
9. Time units (hours, minutes, seconds, years, leap year);
10. Length and volume of the units and connections between them;
11. Dependence between the two values of the numbers given by displaying of addition /subtraction division /multiplication operations;
12. Numeric and lettering images containing the subtraction/multiplication operations; simplifying and using them when solving the textual tasks;
13. Numerical inequalities and features of the numbers, including addition /subtraction /multiplication operations;
14. Geometric transformations on flatness: axial symmetry, parallel relocation;
15. Space of the flat figure;
16. Quantitative connection between elements of spatial figures (for example, Euler's formula);
17. Models of spatial figures, shapes of cube and rectangular parallelepiped;
18. Measurement, observation, surveying; picking the data from sources (for example: a reference book, directory, internet); statistical experiment;
19. Organization of qualitative and quantitative data: quantitative data grouped in intervals;
20. Qualitative signs of the regulated data combinations: recurrence type of regularities;
21. The means of data representation for quantitative and qualitative data: columns and circular diagrams;
22. Data Summary numerical characteristics for qualitative and quantitative data: measurement of central trend - data average; the greatest and the least importance.

