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Models and Methods of Representation and Processing of Knowledge in Mathematics

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Abstract

In this era of media convergence with rapid technological development, broadcasting practitioners are faced with the problem of how to use new technologies to enhance news dissemination and turn dilemmas into opportunities. This study uses media convergence theory and Chinese broadcasting theory to conduct a collective case study of positive examples of barrier-breaking, analyzing different presenters and their programs. It analyses the impact of changes in how audiences receive information, the relative lag in the speed of communication, the limitations of the form of communication, and the decline in the influence of communication on the communication of broadcasters and presenters. It puts forward positive suggestions in terms of guiding public opinion, strengthening one's influence, adapting to the form of communication, and transforming the language style. This will inform the career development of radio and television industry practitioners in the era of media convergence.

Keywords: Media Convergence Era; Broadcasters and Presenters, Dilemmas and Opportunities, Radio and Television, Digital Technology.

Introduction

Knowledge is a complex system that includes mathematical objects (numerical, linguistic, etc.), their predicates (properties and relationships between them), rules and statements (axioms, lemmas, theorems). An accurate and structural representation of knowledge reflects all its properties and relationships between them. This is an important aspect not only in education, but also in scientific research. They are objects in the processing of automated decision support systems and intelligent technologies.

This article discusses key aspects of knowledge modeling: ontology and thesaurus for a given subject area. Each of these approaches allows defining, structuring and processing mathematical objects in a special way, which significantly increases the efficiency of working with large volumes of data and contributes to the development of artificial intelligence systems capable of answering questions and evaluating answers to questions. In this work, secondary education mathematics is chosen as the subject area.

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Ontology

A 10-point assessment system has been introduced in schools in Kazakhstan since the 2020-2021 academic year. This system is used in the framework of criterion assessment and is divided into two main types: formative (current) and the cumulative assessment. Formative assessment is designed to assess student achievements in the daily learning process. Here, the level and activity of students completing tasks are estimated in points from 1 to 10. For example, 10 points are awarded to an active and independent student who has completed the tasks completely and without errors. Summary assessment is used to assess students' knowledge by study sections or at the end of the quarter. This form of assessment also uses a point system, and the points obtained are converted into percentages and final grades are given on a traditional 5-point scale. For example, scores from 85 to 100% correspond to a grade of "5". A 10-point system is a system for evaluating student academic achievement on a scale from 1 to 10. This system was introduced in Kazakhstan as part of the criterion assessment system and adopted in order to fairly and accurately assess the quality of education. On a 10-point scale: 10 points-a very high level, the task is complete, without errors, completed independently; 7-9 points-a good level, completed with a small error or help; 4-6 points-an average level, completed with several errors; 1-3 points-the task is not fully completed or not understood; 0 points-the task was not completed at all. This system is widely used in European countries, in particular in countries such as Finland, Estonia, Lithuania, the Netherlands, and Germany. They give priority to assessment, taking into account the dynamics of students' development and activity in the educational process. The concepts of formative assessment and cumulative assessment are also borrowed from the experience of these countries. Kazakhstan has been implementing this system since 2016 based on the experience of Nazarbayev Intellectual Schools. After 2020, it gradually became widely used throughout the country. Reasons for the introduction: Fair assessment is an individual assessment of the actual success of each student; Increasing student motivation is motivation for development; Competence education is not only knowledge, but also an assessment of skills and attitudes; Compliance with the international system is coordination with international studies such as PISA and TIMSS. A 10-point assessment system has been officially introduced in schools in Kazakhstan by Order No. 193 of the Minister of Education and Science of the Republic of Kazakhstan dated May 12, 2022. This order has amended Order No. 125 of March 18, 2008 and approved new approaches to the assessment system in schools in Kazakhstan. New approaches to the assessment system for students have been officially approved by Order No. 193 of the Minister of Education and Science of the Republic of Kazakhstan dated May 12, 2022. It is indicated that changes have been made to subparagraph 2 of paragraph 2.7 of this order on the 10-point assessment system. For example, " " Formative assessment is an assessment of a student's academic achievements when performing educational tasks, evaluated in points from 1 to 10...". The appendix also provides a table for converting the scoring system to a 5-point system, for example:

Points	Percentage	Traditional score
9–10	90–100%	5 (excellent)
7–8	70–89%	4 (good)
5–6	50–69%	3 (satisfactory)

1-4	0-49%	2 (unsatisfied)
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Kundelik.kz formative assessment is a type of assessment conducted during daily classroom work, is a current indicator of student achievement, provides an operational relationship between students and teachers in the learning process, feedback between students and teachers, and allows for the improvement of the educational process. The formative assessment was developed by the Ministry of Education and Science of the Republic of Kazakhstan within the framework of the rules for conducting ongoing academic performance monitoring and is included in the current version of Order No. 125. In formative assessment, the teacher independently determines the number of students and the frequency of providing feedback.

The teacher registers the progress of students' academic achievements in the form of points in accordance with the following differentiation:

- 1 point - completed academic assignments from 0% to 10%, mistakes were made, is passive in the lesson, does not draw conclusions based on feedback from the teacher, does not show independence when completing assignments, does not know the material covered;
- * 2 points - completed study assignments up to 20%, mistakes were made, is passive in the lesson, does not always draw appropriate conclusions based on feedback from the teacher, does not show independence when completing assignments;
- * 3 points – completed up to 30% of study assignments, mistakes were made, tries to correct mistakes, sometimes shows activity in the lesson, needs the support of the teacher / parents / peers when completing study assignments;
- * 4 points - completed up to 40% of the training tasks, made mistakes, needs help correcting mistakes, is not always active, sometimes shows independence when completing tasks;
- * 5 points - completed up to 50% of the study tasks, made up to 5 mistakes, needs the help of a teacher, is not always active in the lesson, sometimes shows independence when completing possible tasks;
- * 6 points - completed up to 60% of the study tasks, made up to 4 mistakes, needs the help of a teacher, is motivated in the lesson, is able to independently complete tasks of medium complexity;
- * 7 points - completed up to 70% of the study tasks, made up to 3 mistakes, corrected mistakes in a timely manner, is active in the lesson, shows independence when completing tasks;
- * 8 points - completed up to 80% of the study assignments, made 1-2 minor mistakes, corrects his mistakes based on teacher feedback, is active, independent;
- * 9 points - completed up to 90% of the training tasks, made minor inaccuracies in completing tasks, works with errors, is active, independent;
- 10 points - completed 100% of the training tasks, made no mistakes, is active, independent, knows how to interpret, justifies his answers.

The color scheme of the signs during the formative assessment is evaluated in accordance with the information contained in the methodological and instructional letter (2020-2021).

Scores	Color-coded	Level
10, 9, 8	green	high
7, 6, 5, 4	orange-red	medium
1, 2, 3	red	low

The formula for calculating the quarterly price within the framework of the amendments made to Order No. 125 (from the Ministry of Education and Science of the Republic of Kazakhstan) from the beginning of the 2020-2021 academic year:

Quarterly Grade =

$$\left(\frac{\text{Sum of Actual FA} + \text{Sum of FO}}{\text{Max. Sum of FA} + (\text{Number of FO} \times 10)} \right) \times 50\% + \left(\frac{\text{Actual SA Score}}{\text{Max. SA Score}} \right) \times 50\%$$

Here:

- * Oh, the fact. amount-the actual score of the final grade given to the student or their sum;
- * The sum of the FB is the sum of the Formative Assessment. The amount of formative points awarded to the student during the reporting period;
- * MB max. The sum is the maximum score of the cumulative grades set by the teacher, or their sum. A feature that is the basis for evaluating students' academic achievements;
- * Number of FBS-the number of Formative assessments. The total number of formative points awarded to the student during the reporting period;
- * PTS fact. score-the actual score of the final assessment for the quarter:
- * HOA max. score-the maximum score of the cumulative assessment for the quarter:

This formula shows that the highest formative assessment score is 10.

The letter with methodological guidelines for each academic year specifies which order to follow when evaluating students. For example, the methodological instruction "on the specifics of the organization of the educational process in secondary schools of the Republic of Kazakhstan in the 2024-2025 academic year" also states: "on approval of the Standard Rules for conducting ongoing monitoring of academic performance, intermediate and final certification of students for organizations of secondary, technical and vocational, post-secondary education" of the Ministry of Education and Science of the Republic of Kazakhstan dated 18.03.2008, Order 125 states that it is based on.

In the intellectual educational edition, the student can evaluate the theoretical knowledge gained using a 10-point rating system. Any questions or ways to issue reports were also included in this 10-point rating system. The 10-point assessment system is a modern method introduced to assess students' academic achievements on a criterion-based basis. Thus, this system takes into account the progress that the student demonstrates in the learning process, and not just the final result. Since the intellectual educational publication bases this assessment system and applies this assessment system in all institutions of general secondary education, the assessment process of

students does not cause difficulties.

As an example, consider evaluating a student's answers to any question based on the figure below. We were told: "what are negative numbers?" let them ask a question. Let's solve this question using a 10-point rating system and a color scheme.

Scored answers												
No	Question	1 point	2 points	3 points	4 points	5 points	6 points	7 points	8 points	9 points	10 points	Grade
1	What are negative numbers?	This answer does not correspond to the problem	This answer only partially corresponds to the problem, the explanation is	This answer is incomplete, the explanation is not convincing	This answer is not accurate, the explanation is weak	This answer contains factual errors, the explanation is weak	This answer is correct, but not fully reasoned	The answer is complete, the reasoning is correct, but there are terminological inaccuracies	The answer is reasoned, correct, contains terminological and factual accuracy	The answer is well-structured, logically complete, terminologically correct	The answer is extended and complete, includes examples, diagrams, logical conclusions	

What are negative numbers?

- * 1 point is a number with a minus sign that exists only in fractional form.;
- * 2 points are only integers, which are indicated by the "minus" symbol.;
- * 3 points-these numbers are preceded by a minus sign, which is placed only after the positive numbers.;
- * 4 points are numbers whose values are less than 0, and they are located on the numeric axis from right to left;
- * 5 points are numbers whose values are less than 0, and they are indicated by a minus sign.;
- * 6 points-these numbers are less than 0, they are located on the left on the numeric axis;
- * 7 points-negative numbers have a broad mathematical meaning and are often associated with physical or financial values, such as low temperature or negative direction of movement.;
- * 8 points-they are located on the numerical axis from right to left. Negative numbers can be used in mathematical operations such as addition, multiplication, and division.;
- * 9 points-these numbers are less than 0 with a minus sign in front of them. They are located on the numeric axis opposite positive numbers, and are also used in geometric problems.;
- * 10 points - they are located to the left of zero on the numeric axis, and positive numbers are on the right, for example, playing an important role in the operations of addition, multiplication and division of negative numbers.

Thus, we can evaluate the answer to any question using a 10-point rating system. This is very beneficial for both the student and the student.

As a result of their reports, the student receives points through a 10-point rating system. It is evaluated depending on the complexity of the tasks presented on the same topic. For example, give us math problems on the topic "Applying operations to numbers with different symbols." Now let's look at the scale of the 10-point rating system.

Points	Tasks	Answers	
1.	$(3-7) \cdot 4$	If the answer is incorrect	$\neq -16$
2.		If the error is in the sign	16
3.		If it is correct	-16
4.	$\frac{(4-8)(3-1)}{(8-9)^2}$	If the answer is incorrect	$\neq -8$
5.		If the answer is incorrect	-4
6.		Error in the sign	8
7.		Right answer	-8
8.	$\frac{(6-8)^2(4-5)}{(8-9)^3}$	If the answer is incorrect	$\neq -4$
9.		Error in the sign	-4
10.		Right answer	4

The student is presented with 3 tasks on this topic. 1 task consists of only two techniques, respectively, if the student's answer is incorrect, 1 point is awarded for errors, 2 points for errors, 3 points for correct conclusions. 2. receives 4 points in the answer if two errors are made, 5 points if one error is made, 6 points if an error is made from a sign, 7 points if it is made correctly. 3 more difficult tasks, 8 points if it gives an error, 9 points if it gives an error, 10 points if it gives everything correctly.

Give tasks for calculating the area of a triangle on the subject of Geometry. Consider as an example the 3 tasks in the figure below.

Points	Tasks	Answers	
1.	$\frac{4}{3} \sin^2 x = 1$	If the answer is incorrect	$x \neq \frac{\pi}{3} + 2\pi k$
2.		If the error is in the sign	$x = \frac{\pi}{3}$
3.		If it is correct	$x = \frac{\pi}{3} + 2\pi k$ $x = \frac{2\pi}{3} + 2\pi k$
4.	$\sin 3x + \sin x = 0$	If the answer is incorrect	$x \neq \frac{\pi k}{2}$
5.		If the answer is incorrect	$x = \frac{\pi k}{3}$
6.		Error in the sign	$x = \frac{\pi}{2}$
7.		Right answer	$x = \frac{\pi k}{2}$
8.	$\sin^2 x - \frac{1}{2} \sin 2x = 0$	If the answer is incorrect	$x \neq \frac{\pi}{4} + \pi k, x \neq \pi k$
9.		Error in the sign	$x = \frac{\pi}{4} + \pi k$
10.		Right answer	$x = \pi k$ $x = \frac{\pi}{4} + \pi k$

When finding the area of a triangle in 1 problem, the student made two mistakes of 1 point, with one error of 2 points, with the correct 3 points. 2. in the answer, he gets 4 points if he makes two mistakes, 5 points if he makes one mistake, 6 points if he makes a mistake from a sign, 7 points if he makes a correct statement. 3 tasks are more difficult, 8 points if it gives an error, 9 points if it gives an error, 10 points if it gives everything correctly.

In the same way, we will consider the result of trigonometric problems. For example, if we receive tasks on the topic "trigonometric equations", his scale in the 10-point rating system will look like this.

By using the color scheme in the drawing, you can find out which level the task belongs to. Thus,

the student can get his result in a 10-point rating system.

The 10-point assessment system is a system aimed at an objective and accurate assessment of students' academic achievements. This assessment allows for a comprehensive assessment of the student's level of assimilation of educational material, his activity, independence and creativity, paves the way for alignment with international standards (for example, PISA, TIMSS), adheres to the principle of fairness using clear, understandable criteria and a point scale in formative and cumulative assessment, strengthens feedback between the student and students, contributes to the improvement of the quality of the process.

1. Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 125 (18.03.2008)
2. Amendments: Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 193 (12.05.2022)
3. Methodology-letter of instruction (2020-2021)
4. Methodology-letter of instruct

In this article, we will look at the history of Protege and its role in the development of ontological modeling. The first stages of total ontological modeling began to develop in the mid-20th century, when scientists began to look for ways to formally represent knowledge. In the 1970s and 1980s, the first attempts to create an ontology for representing knowledge in expert systems appeared.

Protege was founded in 1987 as part of a project to create tools to support the development of expert systems at Stanford University. The project initially aimed to develop tools that would allow medical experts to develop decision-making systems. The first version of Protege was developed as a text editor for creating data models. Over time, Protege has evolved into a sophisticated platform that supports graphical interfaces and various data presentation formats. The main goal of the development was to make the process of creating ontologies accessible and intuitive for users without deep knowledge of programming. During the 1990s, Protege became an important tool for researchers and developers. Support for open standards such as OWL (Web Ontology Language) allowed Protege to be integrated with other tools and systems. In the 2000s, Protege became one of the most popular tools for ontology development due to its flexibility and extensibility. Protege plays a key role in ontology modeling, allowing users to create, edit, and manage ontologies. It supports visual interfaces for developing ontologies, which simplifies the modeling process and makes it accessible to a wide range of users. Protege also supports various plugins and extensions that allow you to tailor the platform to specific user needs. The ability to work with OWL-based ontologies makes protege a versatile tool for various applications, from biomedical research to information systems development. Models and methods of presenting and processing knowledge in mathematics application in the learning process, group work educational publications allow students to work in a team, jointly find solutions and interact with each other. Questions and tasks questions and tasks asked in educational publications help students develop their thinking and gain new knowledge. The game format when presenting educational publications in a game format increases the interest of students and actively involves them in the learning process. Models and methods of presenting and processing knowledge in mathematics help to improve student performance, improve the quality of knowledge and make the learning process more interesting and effective. Ontology is a conceptual scheme consisting of a set of concepts and a set of conclusions about these concepts. On its basis, it is possible to

describe classes, relations, properties, functions and individuals (instances). This is a form of formal representation of a certain area of knowledge. Currently, ontology is widely used in programming, training, and various studies. The creation of such an ontology allows achieving a logical result. An ontological model consists of classes (concepts), their properties and individual model variants (individuals). In the process of constructing an ontology, the first classes are created. They are given in the "equations" window (Fig. 1)

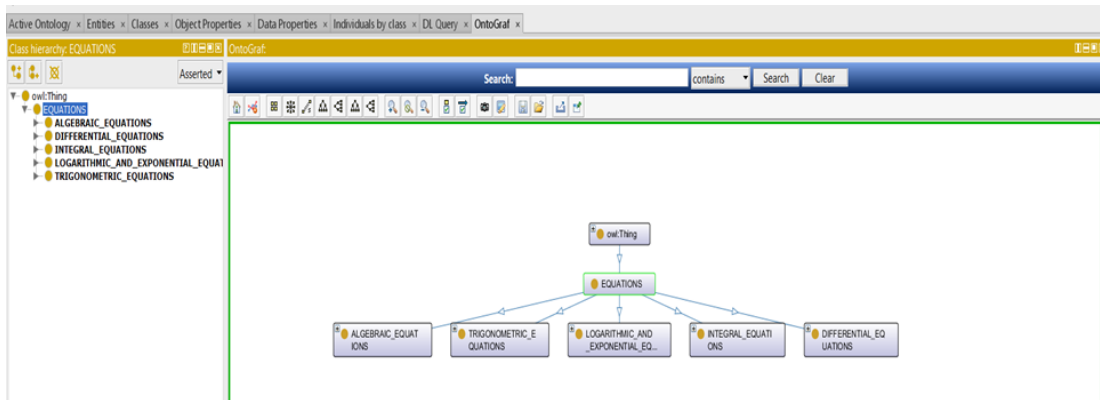
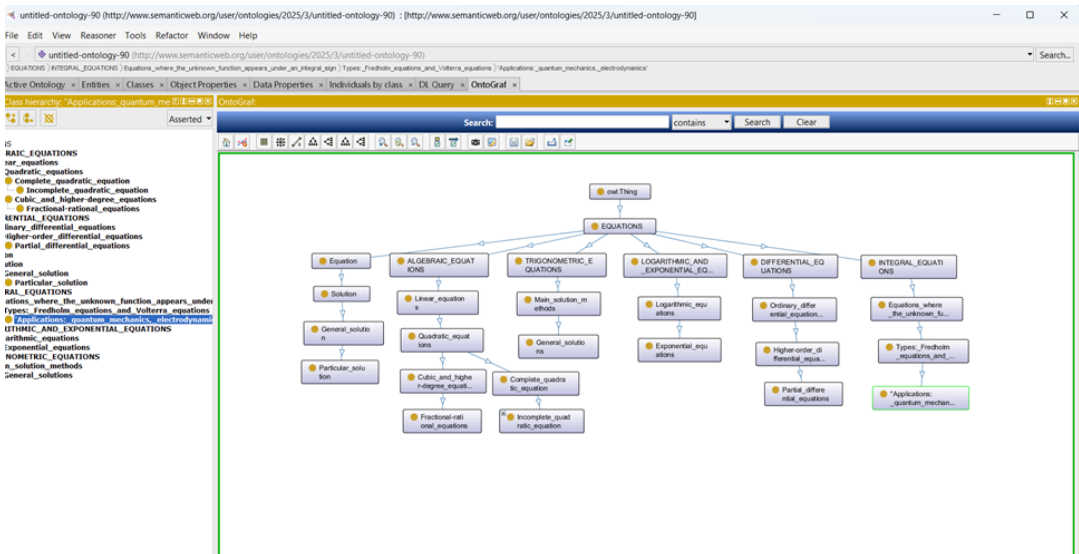


Figure 1.

Classification ontology built on the basis of models and methods for representing and processing knowledge in mathematics



A class is a description of objects that share the same symbols (attributes), operations, relations, and semantics. And any object is a template version of a class. Here, the THING class is a collective class that covers the entire object of the subject area. The classes of the subject area will be a subclass of this class. An ontological model is composed of the name and value of the equations proposed by the models and methods of representing and processing knowledge in mathematics. The history of the creation of Protege as a branch of science is closely related to the development of ontological modeling. Since its inception, Protege has come a long way from

a simple text editor to a powerful platform for developing ontologies. Today, it is an indispensable tool for researchers and developers working with ontological and semantic networks.

3. Thesaurus

The article has developed a thesaurus in mathematics, as shown in the table below. In mathematics, terms are very important. Therefore, for a complete study of mathematics, each term was given a separate definition, an antonym of the term, a synonym of the term, a hyperonym of the term, a hyponym of the term, a meronym of the term, a holonym of the term. Let's briefly focus on the main ones from this thesaurus. Definition of a term: This is a scientific explanation describing the exact meaning of the term. Each mathematical term refers to a specific concept, and its definition must be precise and precise. For example: "addition" is the operation of combining two or more numbers and finding their common value. Antonym of the term: concepts of the term in opposite meanings. For example: the antonym of the term "multiplication" is "division". A synonym for a term is another word or phrase that has a meaning or a similar meaning to the same term. For example: a synonym for the term "subtraction" is "subtraction". Hyperonym of the term: this is a generalized mathematical concept containing this term. In other words, a hyperonym is a broader term. Hyponym of this term: these are types or examples of this term in a more specific, narrower sense. In other words, a hyponym is a specific term referring to a broader concept. For example: the hyponyms of the term "geometric shape" are "triangle", "rectangle", "circle". The meronym of your term is: it is a concept that is part of this term. In other words, a meronym is a component of the whole. For example: the meronyms of the term "triangle" are "wall", "corner", "ceiling". Holonym of a term: it is a broader concept that includes a specific term as a part of itself. In other words, if one concept includes another, then it is a holonym. For example: the holonym of the term "wall" is "triangle". Depending on the specifics of each term, all these definitions may be missing. For example: although the term stereometry is a definition, antonym, synonym, and hyperonym of a term, there is no hyponym of a term, meronym of a term, or holonym of a term. And the term parallel lines completely covers the thesaurus. The term "Parallel" is similar to the term "stereometry". There will also be no hyponym of the term, meronym of the term, holonym of the term. The following term diagonal has a definition, an antonym, a synonym, a holonym. But the hyperonym of the term, the hyponym of the term, is not a meronym of the term. And the term vertical parallelepiped does not only have a hyperonym of the term.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
Stereometry	The field of geometry that studies the properties of	Flat geometry	Spatial geometry	geometry	-	-	-

	spatial bodies is called stereometry.						
Parallel lines	Lines that lie on the same plane and do not intersect are called parallel lines.	Intersecting lines	Parallel lines	Straight lines	Horizontal straight, Vertical straight	Segments of parallel lines, parallel	The plane on which parallel lines are located
Parallel	A straight line and a plane that do not have a common point in space are called mutually parallel.	Intersecting perpendicular	One-sided, equilateral	Geometric shape, line	-	-	-
The diagonal	The segment connecting the improper vertices of a parallelepiped on one side is called its diagonal.	Horizontal	Oblique, intersection	-	-	-	Rectangle, square, triangle
Vertical parallelepiped	If the sides of the parallelepiped are rectangles, such a body is called a	Horizontal parallelepiped	Rectangular parallelepiped	-	Cube	Base, surface, edge, angle	parallelepiped

	vertical parallelepiped.						
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1. The thesaurus was compiled individually for each mathematics class. Let's take a look at the first-class thesaurus shown in the table below. Each term was given a separate definition, an antonym of the term, a synonym of the term, a hyperonym of the term, a hyponym of the term, a meronym of the term, a holonym of the term. Due to the specifics of the terms, all these definitions may be missing. Let's briefly focus on the main ones from this thesaurus. Term number: there is a definition of the term, a synonym of the term, a hyperonym of the term, a hyponym of the term, a meronym of the term, a holonym of the term. But this term has no antonyms. Countable term: will be the definition of the term, the antonym of the term, the synonym of the term, the hyponym of the term, the meronym of the term, the holonym of the term. But the term does not have a hyperonym. The term "Figure": is similar to the term "number". Only the antonym of the term will not be. Reporting term: becomes a synonym of the term, hyperonym of the term, hyponym of the term, meronym of the term. But the term will not have antonyms and holonyms. Price topic: will only be a synonym of the term and a hyperonym of the term.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
Number	The result of counting or measuring	-	pointer, parameter	mathematical understanding	natural number, fractional number	the integer part of the number, the decimal part of the number. zero, one, two, three, four, five, six, seven, eight, nine	mathematics, the number system
Count	Determining the quantity or order of a	Don't count	- Measurement	-	Evaluation	Figures are Indicators	Mathematics - Arithmetic

	substance		- Assessment				
Figure	External shape, type of object	-	Form	geometric shape	circle, triangle, rectangle and other specific geometric shapes	straight, flat (a shape can consist of lines or be part of a plane)	an image (an image can be part of an image).
The problem (mathematical text)	A life situation (condition) that requires inference using calculations using certain knowledge, skills, and thinking (I'm a question)	-	task	exercise	situation	academic discipline	-
Price		-	cost, payment	rate	-	-	-

2. Let's get acquainted with the thesaurus of the second grade in mathematics. Each term was given a separate definition, an antonym of the term, a synonym of the term, a hyperonym of the term, a hyponym of the term, a meronym of the term, a holonym of the term. A complete and comprehensive definition of the terms has been given here. There are a lot of terms, and we have listed the main terms in the table. Letter term, equation term, digit term, square term, even numbers. The terms were given a complete thesaurus.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
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Literal expression	A mathematical letter consisting of numbers and letters followed by an operation symbol	numeric expression, mathematical expression, symbolic expression, numeric expression	vocabulary expression, written expression, literary expression, written sentence, textual expression	text, communication, literature, language, writing	word, sentence, phrase, paragraph, abbreviation	letter, punctuation mark, capital letter, small letter, punctuation	book, article, essay, novel, composition
The equation	Equality with the sign indicated by the letter	Separation, deprivation	Balancing, alignment, alignment	Action, gesture, communication, interaction, expression, pronunciation, expression, recording	equality, equilibrium, harmony, algebraic equation, differential equation, integral equation, functional equation	Coefficients of the equation, unknown variables, roots of the equation	Algebraic equation, system of equations, trigonometric equation
Number	The character you use to write the number	Letter	Indicator, parameter, number	Sign, quantity, number, format	Zero, one, two, three, four, five, six, seven, eight, nine	Numeric digit, numeric sign	Numbers, number system, mathematics, arithmetic, numerical expressions

Square	A rectangle with all equal sides	The square root	Regular rectangle, degree, square meter	Rectangle, rhombus, parallelogram, trapezoid, deltoid, quadrilateral, polygon, geometric shape, degree, structure	Cube, agate, borges, diamond	Sides of a square, angle of a square, diagonal of a square, area of a square, perimeter of a square	Geometric shape, flat shape, rectangle, geometry, mathematics
Even numbers	Numbers divisible by 2	Odd numbers	Double numbers divided by 2, position even numbers, multiples of 2	Integers, rational numbers, real numbers, complex numbers	4-fold, 6-fold, 8-fold, 10-fold, etc.	Numerical digits, decimal numbers	Set of numbers, numeric field, numeric field

3. Let's get acquainted with the thesaurus of the third grade in mathematics. Each term was given a separate definition, an antonym of the term, a synonym of the term, a hyperonym of the term, a hyponym of the term, a meronym of the term, a holonym of the term. Centimeter square term: there is a definition of a term, an antonym of a term, a synonym of a term, a hyperonym of a term, a hyponym of a term. But the term does not have a meronym and holonym of the term. The term empty set: the definition of the term, the antonym of the term, the synonym of the term, is only a hyperonym of the term. And there will be no hyponym of the term, meronym of the term, holonym of the term. The term Radius: will be the definition, the antonym of the term, the synonym of the term, the hyperonym of the term, the meronym of the term, the holonym of the term. The term cannot be just a hyponym. The term point O is similar to the term empty set. There is also a definition of the term, an antonym of the term, a synonym of the term, just a hyperonym of the term. But there is no hyponym of a term, a meronym of a term, a holonym of a term. The term "century" is similar to the term "radius". There is also more than just the hyperonym of the term.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
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Centimeter square	Unit of area measurement	cubic centimeters	square centimeter	square units of area (for example, square meter, square decimeter)	square millimeter	-	-
An empty set	A set without elements	Universal set	the zero set	set	-	-	-
Radius	The segment connecting the center of the circle to any point along it	diameter	cut	a circle	-	the arc	geometric shape
Point O	The center of the wheel	Point 1, point 2, Point 3, etc. in the positive direction on the numeric axis	origin of coordinates	point the coordinate	-	-	-
Century	A large unit of time measurement	moment	One hundred years	period, interval, time	-	year, phase	the millennium, the epoch

4. Mathematics fourth grade thesaurus. Each term was given a separate definition, an antonym of the term, a synonym of the term, a hyperonym of the term, a hyponym of the term, a meronym of the term, a holonym of the term. The term is the value of a variable: here there is only a definition of the term, a synonym of the term. And there will be no antonym of the term, hyperonym of the term, hieronym of the term, holonym of the term. Term expression: the definition of the term is given, the synonym of the term, the hyperonym of the term, the hyponym of the term, the Meronym of the term. But the term will not have antonyms and holonyms. Formula term: similar to expression term. The definition of the term, the synonym of the term, the hyperonym of the term, the Meronym of the term are given here. And there will be no antonym of the term, hyponym of the term, holonym of the term. The term Graph: the definition

of the term, the synonym of the term, the hyperonym of the term, the Meronym of the term, the holonym of the term is given. And there will be no antonym of the term, no holonym of the term. The term circle: definitions are fully covered.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
The value of the variable	The numeric value that a variable can take	-	unknown value, numeric value	-	-	-	-
Expression	The initial mathematical concept. writing letters and numbers in combination with arithmetic symbols. braces can also be used.	-	formula	mathematics, algebra	function, logarithm	variable	-
Formulas	Letter equalities that establish the relationship between values	-	conclusion	expression	-	Maxima	-
Chart	A diagram used to visually	chart	-	picture	work schedule	-	-

	represent the dependence of one or another quantity on another.						
Circle	A closed line, all points of which lie at the same distance from a point called the center of the circle	rectangle	round	figure	the unit circle	diameter, radius	shape, geometry

5. The table below shows a thesaurus of several basic fifth grade math terms. The definition of each term was shown, the antonym of the term, the synonym of the term, the hyperonym of the term, the hyponym of the term, the Meronym of the term, the holonym of the term. The term Coefficient: the definition of the term, the synonym of the term, the hyperonym of the term, the hyponym of the term, the Meronym of the term, the holonym of the term is given. This will not be the antonym of the term. The term Perimeter will be similar to the term coefficient. There will also be no antonyms for this term here. The term "percentage", a thesaurus of diagonal triangle terms, is fully included.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
Ratio	A number expressed as a product with multipliers of one or more letters is a	-	indicator, multiplier, parameter, multiplication factor, multiplier	mathematical value	linear coefficient	part	Mathematics, algebra

	multiplier.						
Perimeter	The sum of the lengths of all sides of geometric shapes on a plane	-	contour length	border	side	segment	geometric shape
Percent	The hundredth part is called	absolute value	fraction	equity relations	tithe, twentieth, third	numerator, denominator	sum, number, value
Triangle	A polygon with three sides	polyhedron, polygon	The trigon	polygon, geometric shape	right triangle, isosceles triangle, isosceles triangle	walls	geometric shapes
The diagonal	For example, a segment connecting two non-adjacent vertices of a polygon	side	intersection or line of intersection	segment, line	rectangle diagonal, rhombus diagonal, main diagonal	peak	geometric shapes

6. The table below shows the thesaurus for the sixth grade in mathematics. The table contains only the basic terms. The term variable: the definition of the term, the antonym of the term, the hyperonym of the term, the hyponym of the term is given. A synonym of a term, a meronym of a term, is not a holonym of a term. The term Module completely covers the thesaurus. The term "integers" doesn't just have a hieronymus. The term rational numbers does not only have a synonym for the term. Other terms are fully covered. The term Proportion completely covers the thesaurus.

Term	Definition	The antonym of the term	Synonym of the term	Hyperonym of the term	Hyponym of the term	The measure of the term	Holonym of the term
Variable	Instead, the letter containing the number koyuga is called a variable	constant	-	apparently	unknown	-	-
Module	A number whose coordinate from the origin indicates the distance from α -ha to the nucleus is called the modulus or absolute value of α	General	Module, absolute value	Mathematical function	Shown	The coordinate	Coordinates

Integer s	Natural numbers, their opposite numbers, and the number 0 are called integers	Large numbers	Finite numbers		Integer functions	-	Mathematical fields
Rational numbers	Integers, negative and positive fractional numbers are called rational numbers.	An irrational number	-	Mathematical numbers	Positive fractional numbers	Fractional numbers	Mathematical conceptual features
The proportion	The direct equality of two or more katynasts (divisions) is called a proportion	Disproportionate	-	Ratio	The same type	Proportional value	Comparison of rational numbers

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