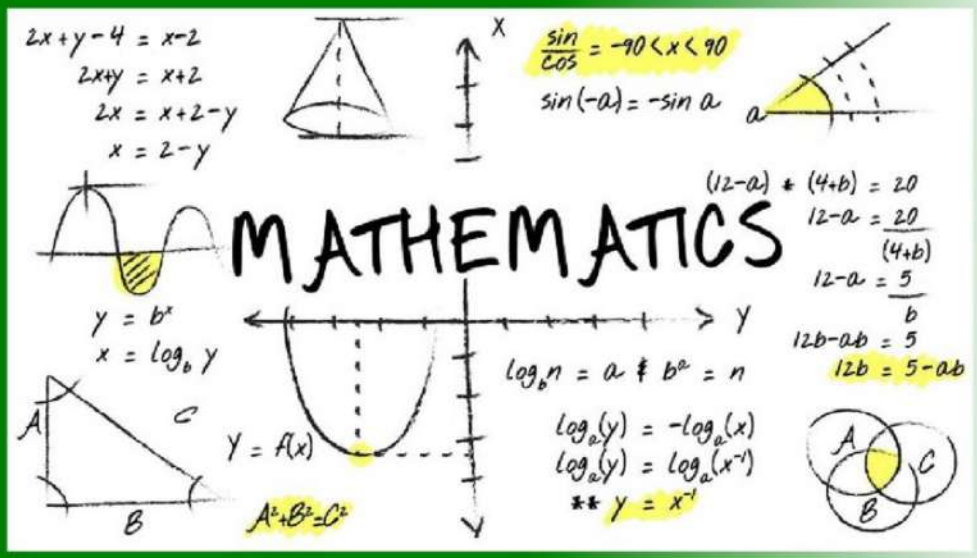
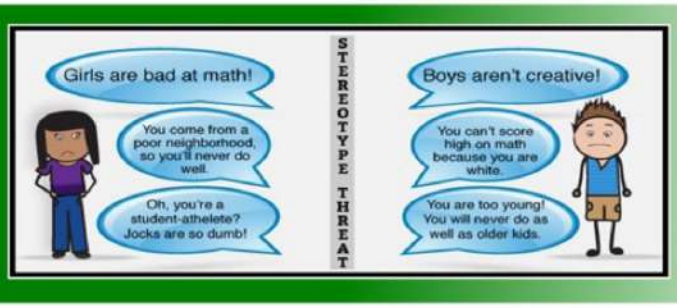
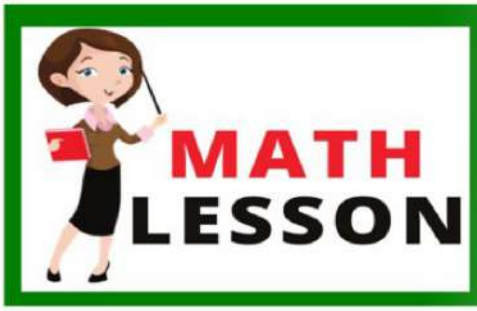


JustMaths

Maths education in our countries



Prejudices about maths



Student's opinions about math lessons

THE FELLOWSHIP OF MATHS

FELLOWSHIPS OF MATH

Volume 3

April- 2022

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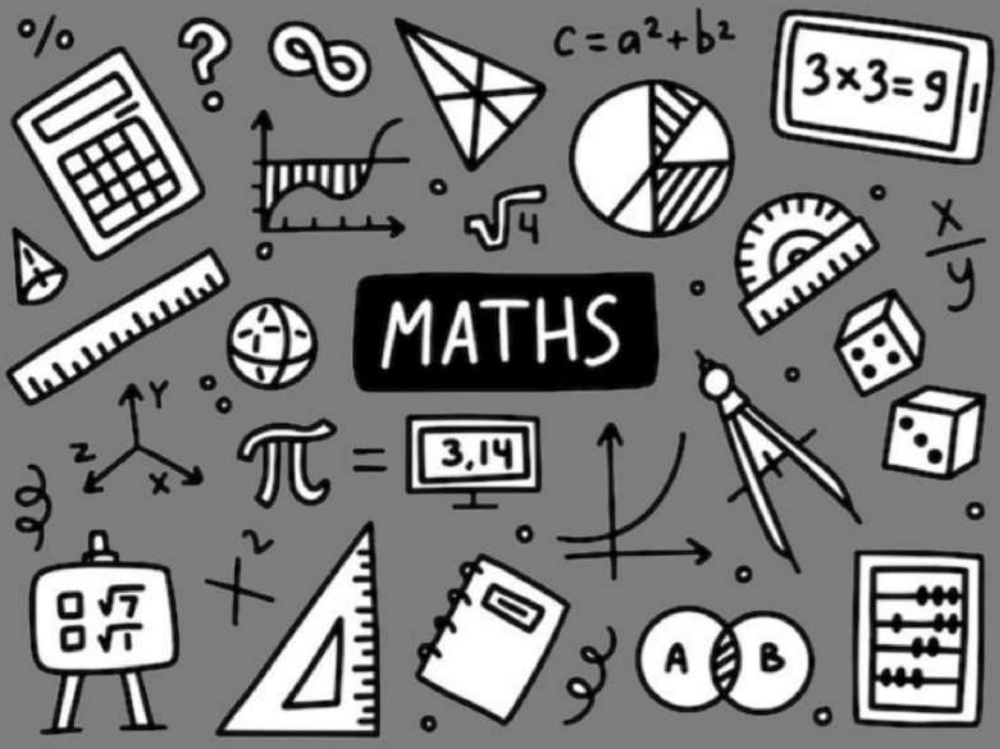
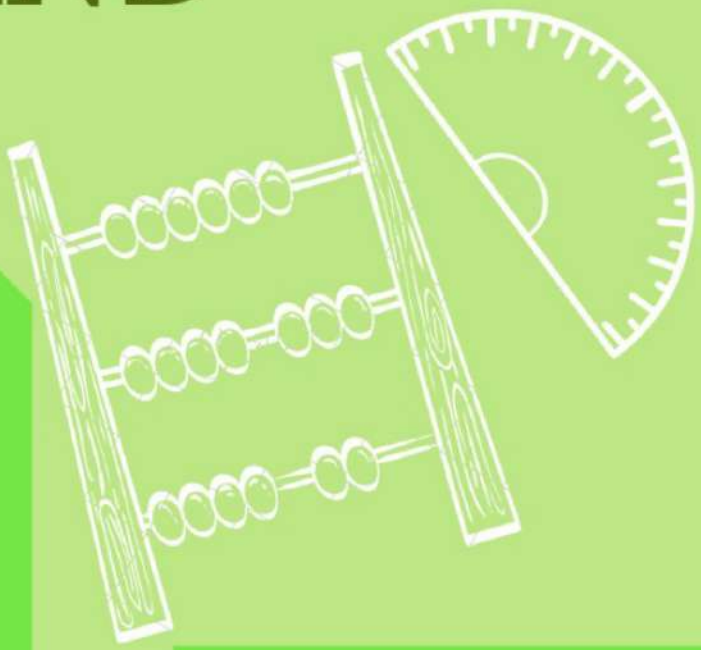


MATH LEARNING IN POLAND

Mathematics is introduced into our everyday life from an early age, both by parents, grandparents and teachers. In the early stages of teaching, children learn numbers, start adding and subtracting from the age of 6. By the end of primary school, students have mastered basic math operations.



$$M = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$

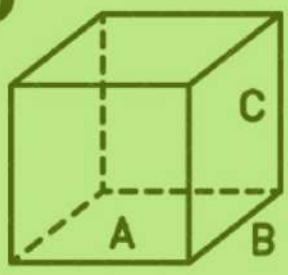
Then, according to their predispositions, students choose a high school.

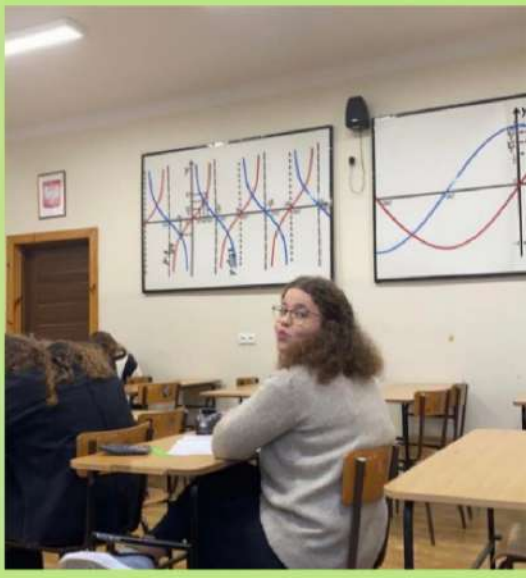
The number of hours of maths per week depends on the class profile we choose, which also determines the material we study during classes.

At the beginning of each year, together with the teacher, we choose the textbook that we will use at a given stage of learning. The book is divided into sections, each of them representing a different field of mathematics. After the section is finished, we have an exam showing to what extent we have mastered the material.

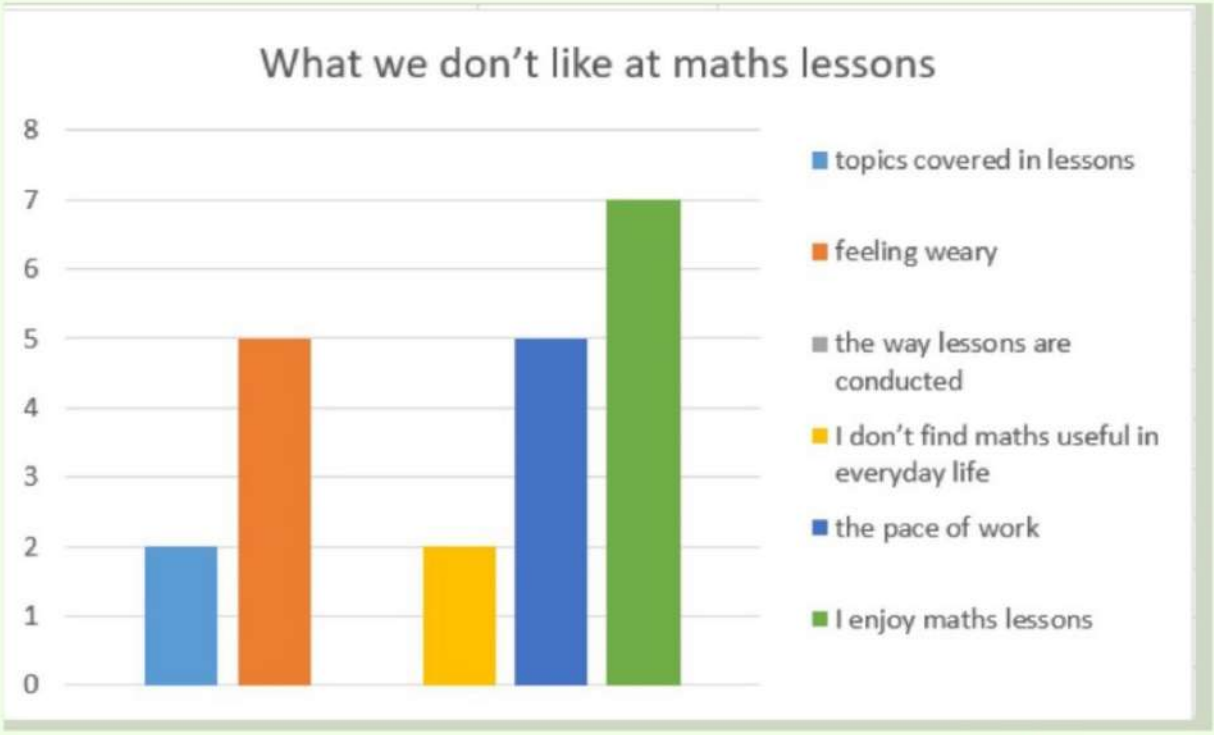
$$\sin(\theta) = \frac{opp}{hyp}$$

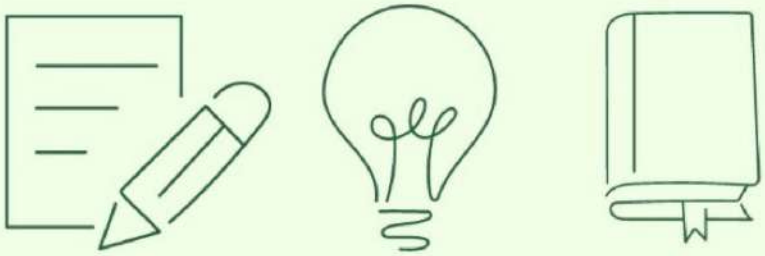
OUR MATHS LESSONS





$$V = \frac{4}{3}\pi r^3$$





What we don't like at maths lessons?

As previously mentioned, some students don't like maths lessons due to weariness during classes.

Mostly, students like learning topics covered in lessons and they also enjoy math overall.

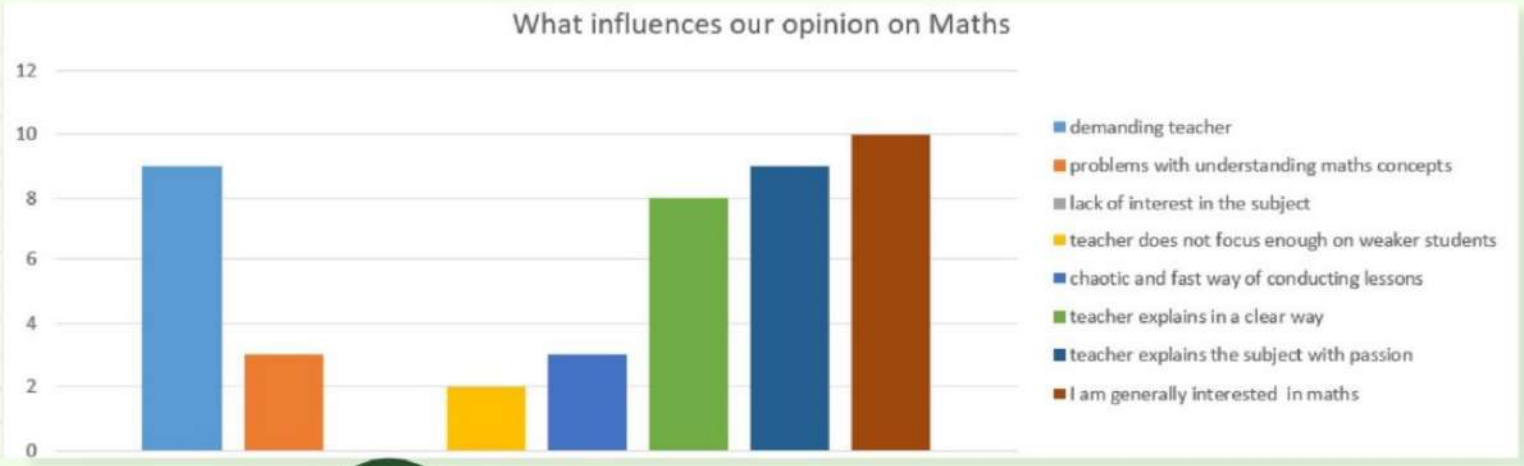
Some students don't find maths useful in their everyday life.

As for the schoolwork, we spend weekly more than 1 hour studying maths at home. More than half of the students often do their maths homework, more than 60 % remember a lot from lessons.

The factors that influence our stress connected with maths are tests, school-leaving exam and the chance of getting a bad grade.

Math survey

From the results of a survey conducted among students participating in the project we can see that plenty of factors strongly influence students' opinion on maths lessons.

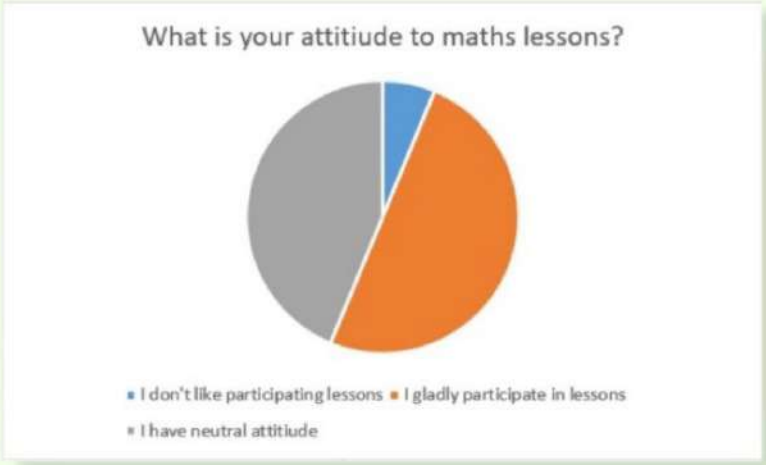


What influences our opinion on Maths?

Mostly, we think that the number of hours of maths lessons per week is enough, that the teacher explains the subject in a clear way and with passion.

Students also want to develop creative thinking and reduce the amount of information to be absorbed.
We like maths lessons both for the way lessons are conducted by the teacher and the subject area.

Some students don't like maths lessons due to weariness during classes.



What is your attitiude to maths lessons?

Students also gladly participate in maths lessons and they find the teacher demanding. Nearly everyone is interested in maths and we are motivated to work due to the school-leaving exam and our desire to discover more things.

...students' thoughts...

:

In my opinion, math is the best subject in school. Thanks to it, we educate ourselves in various areas of life.

$$A = \frac{\sqrt{3}}{4}a^2$$

If we can't describe something in mathematics, it's only because we haven't figured it out yet.

Mathematics is the most interesting subject and it will be very useful to me in the future.

Math is the most stressful lesson but at the same time if you write your test well, you feel a lot of satisfaction. Mathematics is and will always be the queen of sciences.

Some of the mathematics problems are hard to solve but when you have solved them , your endorphins level increases extremely.

$$V = \frac{4}{3}\pi r^3$$

I think that maths is such an interesting subject! The feeling when you get the right answer to equation is the best.

There are plenty of things that make me like Math. The first and primary thing is a curiosity about how exactly math is connected with surrounding World. There is also a theory that everything can be calculated with mathematical formulas.

For me math is really interesting. I think math is the future. Also math is a really easy school subject if you learn systematically!

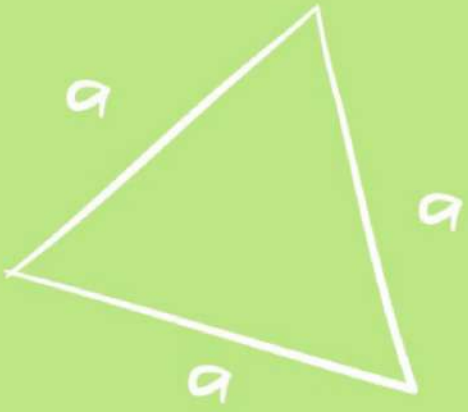
$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The thing I fear the most in math classes are pop quizes.

In my opinion, mathematics is the best school subject. It is very useful and we all use it every day.

Math can be interesting and is essential in everyday life.

Grades in Poland are on a scale of 1-6, however, in order to pass a subject, you must receive at least grade 2. Moreover, in addition to tests, we also have quizzes. They can be announced by the teacher in advance or not.

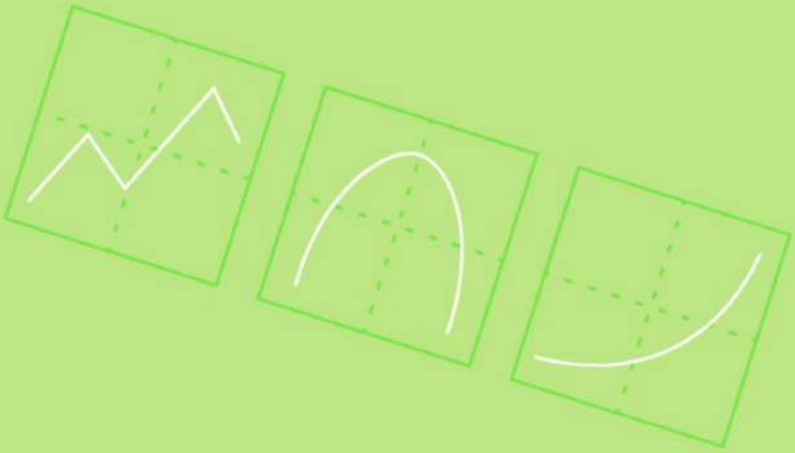


$$A = \frac{\sqrt{3}}{4} a^2$$

$$V = \pi r^2 h$$

There are also trips to universities where we participate in classes during which mathematics is presented in a creative way. It allows us to see the practical application of mathematics and facilitate the acquisition of knowledge.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



The school introduces activities that develop creativity, where we use interactive whiteboards and solve math problems in the form of electronic quizzes.

Preconceptions Against Of Maths

1)Some people have math genes and some don't.

There are no studies showing the existence of any gene predisposition for math ability. In fact, many cultures don't even have the idea that there is a "math gene". How can we explain that some students have an innate mathematical ability at school? If he has that gene, why can't he consistently show this success in math class? Or how can a child who doesn't have one succeed in mathematics later on? It is possible to see that a student learns a new concept easily. What we fail to see are the experiences a child has before school that can shape their interest and skills related to mathematics. Outside of school, most children also experience math readiness with their surroundings while playing with Legos, toys, blocks, and the like. These experiences seem natural to some children. Conversely, children who don't have these experiences in the first place seem to lack the "math gene". This means that playing games that encourage thinking and understanding in preschool age also contributes to children's math skills in their school life.

Conclusion: Students who realize that they make more effort in mathematics than others think that they do not have a "math gene" and give up from the beginning. On top of that, the sentences "People at home say that math is difficult, even when my father was in high school," increases the prejudice even more. For children on the other side of the spectrum who are convinced that they have the math gene, this is ironic and bad, as it causes them to stop learning as soon as possible due to the "I have the gene anyway, I'll do it sooner or later" mentality when the effort to learn new concepts begins.

Solution: Remind your child that effort is necessary, learning is necessary, and that no one can be successful without effort. Just as you wouldn't expect a child to play Beethoven's 5th Symphony without taking any piano lessons, you shouldn't expect math to be learned without effort.

2)Men are better at math than women.

It is a bias close to point one, as there is no research finding, at least so far, to support the idea that boys are much better at math than girls. We even know that girls are more interested in mathematics than boys. However, girls can be negatively affected by implicit cues from female role models (mothers and teachers). In addition, girls are more successful in learning by doing-seeing rather than memorizing. Studies have shown that girls lack persuasiveness in female role models, which leads to lower performance in math. ("How many women are there among scientists anyway!"... etc.)

Conclusion: For the reasons above, girls probably say "I may not be able to do math" or "I don't like math" and give up. This closes to girls the fields of science and engineering where mathematics teaching is required from a very early age.

YASEMİN ERMAN BALSU ACADEMİC SCHOOL

MATH EDUCATION IN OUR COUNTRY

OBJECTIVES OF TEACHING PROGRAMS

Educational programs are defined in the article 2 of the National Education Basic Law No. 1739, "Turkish National Education".

Ithas been prepared on the basis of "General Purposes of Education" and "Fundamentals of Turkish National Education."

All studies carried out with education and training programs are aimed at pre-school, primary and secondary education levels.

It aims to achieve the following objectives in a complementary way

1. To support the healthy development of students who have completed

pre-school education in physical, mental and emotional areas, taking into account their individual development processes 2.

within the framework of self-awareness, having self-confidence and self-discipline, at the basic level that they will need in daily life.

verbal numerical and scientific reasoning, social skills and aesthetic sensitivity,

To enable them to become healthy life-oriented individuals by using

3. Students who have completed secondary school, by improving the competencies gained in primary school, national and spiritual

adopting the values, exercising their rights and fulfilling their responsibilities,

and also to be individuals who have acquired basic level skills and competencies that are expressed in discipline-specific areas.

4. By developing

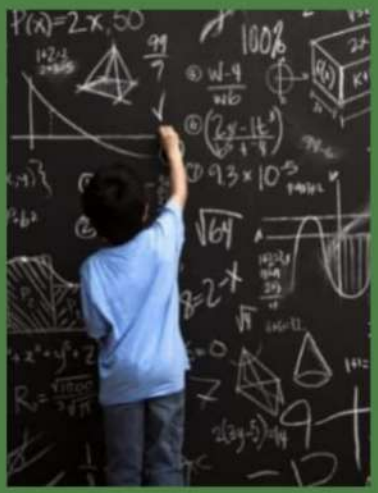
the competencies that students who have completed high school acquire in primary and secondary school, adopting national and

spiritual values and transforming them into a lifestyle, contributing to the economic, social and cultural development

of our country as productive and active citizens, in the "Turkey Qualifications Framework and also in discipline-specific

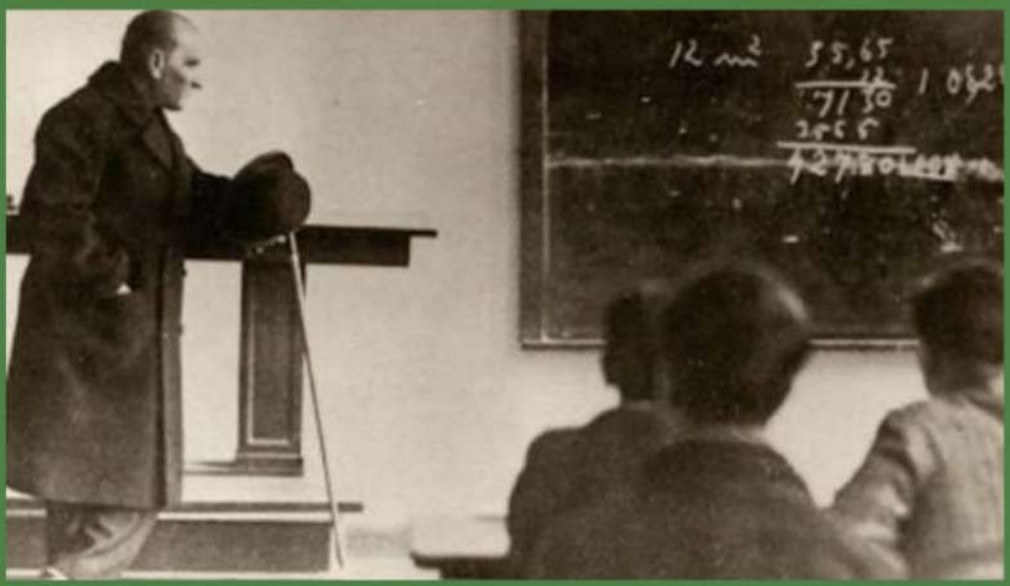
areas" To ensure that they are individuals who have gained basic level skills and competencies, and are ready for a

profession, higher education and life in line with their interests and abilities.



Mathematic's Topics and Outcomes

Rational numbers, Decimal Numbers,Simple Inequalities,Absolute value,Exponential numbers,Radical numbers,Factoring,Equations, Problems, Logic, Clusters,Linear Equations,Inequalities, triangles,Parity and Similarity,Transformation Geometry,Geometric Bodies,vector,radius,triangle,derivative,constant (function),real number,polynomial,proposition,average/mean,common factor,probability,proportion,ratio,negative number,irrational number,least common multiple,greatest common divisor,geometric sequence,equation,circumference,quadrant number,sort,maths,circle,plus,double,multiply,times,corner...



COMPETENCIES

Our education system aims to raise individuals of character with integrated knowledge, skills and behaviors.Students at both national and international level; competencies, which are the skill ranges that they willneed in their personal, social, academic and business life, are determined in the Turkish Qualifications Framework(TYC) TYC identifies eight key competencies and defines them as follows:

1)Communication

2) Communication in foregin languages

3) Mathematical competence and core competences in science/technology

4) Digital competence

5) Learning to learn

6)Social and civic competences

7) Initiative andentrepreneurship

8)Cultural awareness and expression

Students thoughts about math

Student 1: I love maths. Solving your questions sounds like solving puzzles. And it sounds so fun. I wish we could just see maths.

Student 2: The thing which compelling us in this year is mathematics.that's why I love mathematics and I use in daily life desen.

Student 3: Maths sometimes feels like torture to me. Everything seems to complement each other, but there's always something missing. I have a hard time figuring it out, but there's something fun about it, so I like it anyway.

Student 4: Mathematics is the lesson that pushes me the most through education. Even though it pains me to deal with maths, I can't deny that our lives are always in it.

Student 5: I wish we had a chance not to have any maths lessons. I'm having a hard time at maths, and I don't want to. But I have to accept it because mathematics is essential in our education system.

Student 6: Maths class generally sounds fun to me. Because I like to deal with formulas. That's why I like maths.

Student 7: I'm not actually hate mathematics but I really enjoy while I'm trying to solve math problems. Few students find mathematics really hard. but I know that if they really want to solve the problems, they will enjoy too.

Student 8: I actualy like math. It helps me to understand the world much more than anybody else . I also see the world from only maths because it is everywhere. You can use math while buying something , you can use math while building something , you can even use math to communicate in some point.

Solution: If you're a parent who doesn't like math, keep this to yourself! Always try to have a positive attitude about math. At least, until he believes he can succeed and sees that he breaks his prejudices.

3)Mathematicians solve problems quickly and never make mistakes.

Solving new problems or learning new material takes time. Problems that mathematicians can solve immediately are problems that have already been solved. The problem is encountered for the first time, if that problem is encountered again, it enters the practice process. What sets a mathematician apart is the ability to identify patterns, a willingness to try new ideas, and a willingness to be patient with the "failures" that will come along the way.

Conclusion: If students think that mathematicians never make mistakes and hope to find the right answer right away on the first try, they will not be disappointed and learn to be patient as quickly.
Solution: We need to teach students that they can make mistakes when they have to deal with new ideas and concepts. We also need to give them more experience in problem-based learning where they need to find ways to correct their own logic. Unfortunately, in traditional classrooms, students do not have enough creative experiences with mathematics. It is necessary to spend more time solving different questions in different ways, instead of finding answers to questions that have already been solved in class or at home.

4)Speed is an indicator of math ability

Most students have the misconception that being fast and first is proving to be smart at math. This is due to how we reward students in the classroom and the emphasis placed on exam times. Giving time to students to solve tests is a bad fate brought by the system, which helps them to become automatic. Unfortunately, this will only increase anxiety while solving questions, which will increase the margin of error. Solving fast may not mean reaching the right result. Finding fast and accurate answers is about experience.

Conclusion: Students rush through homework and tests as they try to prove it because they think that they are smart when they are fast. This leads to careless mistakes.
Solution: Never tell right or wrong when the child is rushing for answers. When he looks at you for confirmation, he says, "I don't know, what do you think?" When you say so, it will force him to think more about the reasonableness of his answers and to develop a habit of checking his work. Also remind your child that active math is like playing a game. We don't always win and sometimes we lose because we make mistakes. After losing, we should not give up, we should try to improve ourselves by analyzing. What did they say? “Sometimes we win, sometimes we learn...”

Mathematics is a science that helps us in every moment of our lives. Because math provides universal communication regardless of religion, language and race. It includes the basis of developments and innovations in every field. In addition, we need to look at the endless field of activity of mathematics in order to make sense of and comprehend the universe we live in.

If mathematics is such a useful science, why haven't we been able to understand why it is such an important field? The money we all use works thanks to the science of mathematics. Maybe this is because we can't see the benefits of mathematics. The simplest example of this is money, which is what people use most right now. If we need to multiply examples, mathematics plays a leading role in heating our food, producing the clothes we wear, calculating distance-speed, date-time or land area, architecture, construction of transportation vehicles, electrical-electronic works and most importantly technological developments. Therefore, awareness should be raised for the science of mathematics, education and studies in this field should be given importance.

To understand mathematics, we must first love it. Students today are afraid of math because it only creates exam stress for them. However, mathematics is of great importance for humanity. Misrepresenting and ruining something so important is the biggest mistake we make.

If we can save mathematics from the lesson patterns, we can completely change the perspective of the students. In this way, students will love mathematics and really want to learn it. Doing so will be a huge step forward for our days to come. Then we can bring out the intelligences that we lost with fear through love.

Is mathematics really a necessity or do we see it that way? Our answer to this question depends on our point of view. Math is everywhere in life. From the food we eat to the clothes we wear. Yes, it is a must to make life better sense. So why do we students have such a hard time in math?

Because mathematics is being put on like a burden for my friends shoulders who study in science high school and whose field is numeric. Because the system requires it. We think that mathematics is just athe curriculum in school. That's why we're dealing with the most annoying and boring part of math. But if we are taught that mathematics is a branch of science that makes it easy to make sense of life and that it is everywhere in life, maybe mathematics will cease to be a necessity and become a hobby that we are interested in our spare time. This way everyone can love and enjoy math.

There are many reasons why math is disliked. Some of these are not liked very much due to the fact that mathematics is difficult, it is not understood at once, and it requires constant study. Fear of mathematics makes it disliked. Actually, mathematics is not diffucult, it is just a demanding course.

Be patient and spend time with it. If the necessary effort is made, it will be rewarded, but at the beginning of all of these, it is necessary to really understand and love mathematics because if we really want to learn, we can be successful. In short, mathematics is not a lesson to be taken lightly and it is not a subject to search for a shortcut. More time needs to be given. Apart from this, one of the most important factors affecting our attitude towards mathematics is the teachers. The person who will get us to like the lesson is the teacher of the said lesson. Because if the student likes the teacher, they will also make an effort for the said lesson. This is the same for all the subjects, but for mathematics it is slightly different. Because mathematics is a lesson that is over exaggerated nowadays and is very important for society. In other words, this perception of mathematics in the society creates a prejudice and fear in the student. In this case mathematics teachers should break this prejudice, explain what the lesson is instead of just giving the formulas to the students and make them realize that mathematics is not just numbers. In short, mathematics teachers play a big role in this. If the teacher can achieve this, students will start to love mathematics and the prejudices will be broken.

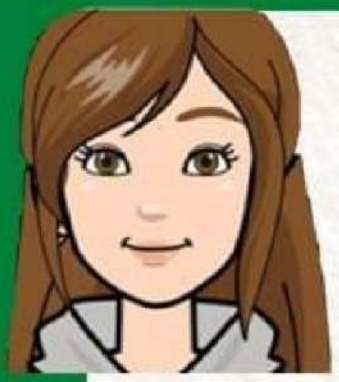
Mathematics has been one of the nightmares of people of all ages. One of the exams that worries students, the most is the math exam. Even those who are good at math worry about math exams. So, is this concern a valid concern?

Generally, the results obtained by the students who think that they will fail in mathematics exams and who are worried are lower than the students who do not care about mathematics even if they are not good at it. This anxiety is a situation experienced by people of all ages, not only during their student years, but every year. And this anxiety can create a serious obstacle in front of people's life-long, computational works or projects in every field, and even affects their career choices.

People generally think of math anxiety as a problem frequently encountered in middle and high school students. However, by the age of 12, children have already had many bad experiences in math. The panic about working with numbers starts at a much earlier age. So, is the real problem math ignorance or math anxiety?

It would be easier to solve the problem if the problem was a lack of knowledge. But the problem is both. So why specifically math? The reason for this is the approach, in other words, the mentality. For the most part, it is believed that mathematical skills are present or absent. The sentence "This kid has a mathematician head and will be an engineer" has been heard by everyone. This approach recognizes that a student must be extremely gifted in order to be successful in mathematics and is unrelated to science. Students who think this way also have difficulties in mathematics. This attitude reinforces the idea that when a person has a little difficulty in any math problem, he does not have a math head.

The real problem that causes math anxiety is not whether or not to have a head for math, but the system and mentality that suggests that he cannot be successful unless he can do math, and that he is not smart if he can't do math.



This project added a lot to me about mathematics, I can even say that it made me love it. It was very good to be intertwined with mathematics. First of all, we published our first magazine. For this, we researched the relationship between mathematics and nature and added it to our journal.

In the research we have done, I have seen that mathematics is related to many branches. Afterwards, with in the scope of this project, we organized a pi day at our school and exhibited the projects. We made sure that what we learned while doing these projects could be learned by other friends as well. We read the contents of the published magazines. 2. We had the opportunity to read mathematicians from other countries in the magazine. Seeing the subject we were researching in the magazine made both me and my other friends feel happy and successful. The meetings we held with our peers in other countries within the scope of the project were also beneficial. Having the opportunity to meet new people and speaking a foreign language made us feel in another dimension. I realized that we shouldn't be afraid of math. In fact, I saw that mathematics is at the very center of life. Everything that can be proven is beautiful, uncertainty scares people, and there is no uncertainty in mathematics.

What Is Math For You?

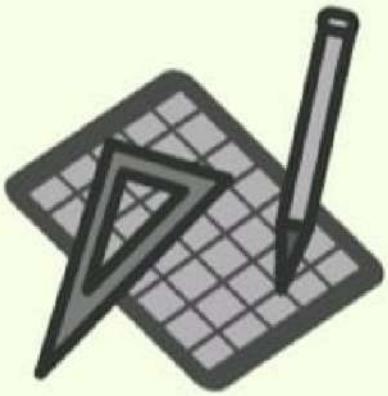
Math is all around of our lifes. From beginning of our lifes till we die, we solve thousands of math problems. While some people are better at this, some of them are not. Actually math is all about liking it or not. If you love math you have more possibility to fail less than someone who doesn't love math. My thoughts about math is really changeable. Because sometimes I enjoy math but sometimes I really hate it. I think the most important thing about math is the person who teaches us.

If you love the teacher you will listen to the lesson carefully and do the assignments on time. I usually loved my math teachers and that helped me a lot. I thank all of them. And finally math is everything. Someone who doesn't love math will always remain incomplete.

What Do You Think About Math?

I have been taking math lessons for years. I took all of these lessons to pass my exams. I always questioned the things that my teachers teached me. But the answers never pleased me. So I started to research. I investigated in different subjects. Then I decided that I want to study math. I started to learn so many things and it was really fun. I was learning more than basic mathematics.

When I started high school everything started getting hard. But I was into math and I was really looking forward to get better in math. I had limited time for my researches because I had so many homework to do. But i didn't give up. I continued to ask all of my questions to my teacher. Although he answered my questions, it wasn't enough. It was a bit dissapointing for me. I am hoping in the future students can do the things they want to do.



Do you find math difficult

Most students answer were yes
Of course there were students who think that math is not that difficult.

Do math teachers affect their students success ?

The answer wasn't surprising. All of the students think teacher is really important. They said if the teacher can explain the subject well they won't have any problems while solving a math question.

*We even asked this question to a teacher from our school. She said 'Every teacher have their own technique but this is confusing for students. We should find the right one and go with it.'

Pure mathematics is, in this way, the poetry of logical ideas.
~Albert Einstein

Which one is better? Solving more questions or studying the subject?

Answer was mostly solving more question. They thought practising is much better for success.

But one of the student said 'First we should study the subject then we should solve a lot of question about that subject.'

The advancement and perfection of Mathematics are intimately connected with the prosperity of the state.
~Napoleon

Your Turn...

Do you find math difficult?

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Do math teachers affect their students success?

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Which one is better? Solving more questions or studying the subject?

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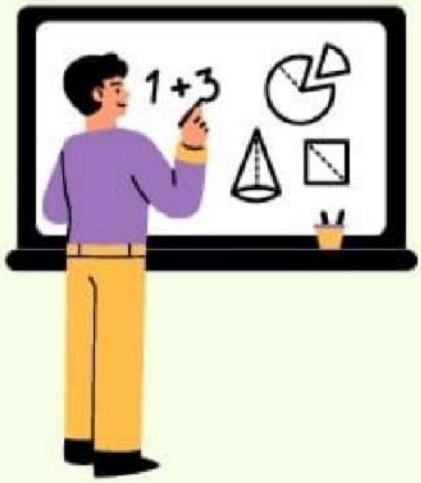

What do you think about your math teacher?

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Romanian Education System

The Romanian education system is administered by the Ministry of Education, Research, Youth and Sports (In Romanian: Ministerul Educatiei, Cercetarii, Tineretului si Sportului). The general legal framework for the management, operation and regulation of education is determined by the Constitution through the Education Law. Each level of education has its own form of structuring and is subject to different laws and regulations. Education in Romania is based on a tuition-free system.

Pre-School Education (Kindergarten)

The pre-school education- kindergarten prepares children for later school years. Kindergarten education is public as well private in Romania. Public kindergarten do not charge any tuition fee, while private kindergartens charge tuition fees, depending on the services provided and location of the institution.

Age: 3 -6 years (or 7 years old)

Duration: 3 years

This educational level is optional and is split up into four groups.

Children are organised as per the age group:

Small Group (Grupa Mică) for children aged 3 to 4

Middle Group (Grupa Mijlocie) for children aged 4 to 5

Big Group (Grupa Mare) for children aged 5 to 6

School Preparation Class for children aged 6 to 7

Each group consists of 1 to 2 teachers and the class strength is generally 10-15 children. There are different class schedules for children:

Short schedule/normal programme: This schedule starts from 8am and ends at 1 pm. It runs for 4 hours a day

Medium schedule: This schedule starts at 8am to 3pm. It runs for 7-8hours a day.

Long schedule: It begins at 8 am and concludes at 5-6 pm. It runs for 11 hours a day.

Primary Education

Primary education as per the latest amendment to the education law, the 'School Preparation Group' or 'Preparatory Group for children aged 6–7 was put as the first phase of the primary education.

Students can take admission to the first grade of primary school when they turn 6 or 7.

Age: 7-11

Grades: 1-4

Duration: 4 years

Students during their primary school study compulsory and optional subjects.

Compulsory subjects: Mathematics, Romanian language and literature, science, practical skills, geography, modern languages, art, music, religion, sports, civics, and history.

Optional subjects: These are certain subjects that the school put forward to pupils in a particular area.

During the primary education, grading is given as:

Insufficient refers to failed

Sufficient (S) or satisfactory refers to barely passing

Excellent and Good refers to passing

Secondary Education

Lower-Secondary Education

The lower-secondary education is mandatory in Romania and takes place in 2 phases :

Gymnasium or middle-school (lower-secondary): This gymnasium continues the primary education built in the first 4 grades.

Grades: 5-8

Ages: 10-14

Duration: 4 years

Students are required to pass a "***national test examination***" in order to pass the gymnasium. The examination assesses students' knowledge in the fields of *Mathematics and Romanian language and literature*. This examination is considered for admittance to high school.

Professional education: Students who undertake professional education receive a level 1 professional qualification.

Grades: 9-11

Age: 14-16 years

Pupils who are not interested to go for high school after gymnasium can opt for professional school, thereby receiving professional qualification that prepares them for the job marketplace.

Professional schools in Romania provide professional qualification in the following fields: Forestry, mechanics, theology, textile and leather industry, food industry, commerce, electro-mechanics, agriculture, electronics and automation, aesthetics and human body health, manufacture of wood products, Industrial chemistry, Construction materials, printing techniques, Public Constructions and Installations, and Tourism and Food.

Upper-Secondary Education

The upper-secondary education in Romania is provided by high schools.

Grades: 9-11

Age group: 14-18/19

Grades 9 and 10 are mandatory to attend, while grade 11 and 12 are optional.

Types of High Schools

Theoretical

The theoretical branch provides 2 profiles: real and humanistic.

Science (Profil Real): This profile provides focuses on mathematics, earth studies and computer programming. This is the most demanding of all the academic programmes, and offers subjects that are required for higher education admissions. There are 15 different subjects per year, and required 30–35 hours in a week.

Humanities (Profil Uman): This profile focuses on social studies and modern languages. This profile consists of 3 or 4 modern languages, 4 years of Latin or Ancient Greek, Romanian and foreign literature, 2 years of social sciences, history and geography. This profile requires more than 30–35 hours in a week.

Technological

The technological branch provides 3 profiles: technical, services, natural resources and environmental protection.

Technical programs -This profile provide education in technical field such as industrial, train driver and mechanic, industrial machine operator, etc. The subjects included are technical, with some physics, math and chemistry.

Services and Economics programs (Profil economic): This profile provides qualification in the areas of services, such tourism operator, waiter, or chef.

Vocational

The vocational branch (Profil vocațional) consists of 5 profiles: theological, military, arts and educational, public order and public security, and sports. This profile provides qualification in a non-technical field, such as assistant architect, kindergarten educator, etc. The subjects are based on humanities. Art, music, design high schools, and religious high schools are also a part of the vocational branch. Admittance is done on the basis of special exam organized individually by the institutions, except the National Tests in music or art.

Specializations in each branch:

Branch	Profile	Specialisation
Theoretical	Humanistic	Philology, Social Sciences
	Real	Mathematics-Informatics, Natural Sciences
Technological	Technical	Automation and Electronics, Media Production Printing Techniques, Electro-mechanics, Electric, Mechanical, Building Materials, Chemical Industries, Construction, Public construction and installations, Manufacturing of wood products, Textiles leather
	Services	Tourism and public food, Trade, Economic, Food industry
	Natural resources and Environmental protection	Environmental protection, Agriculture, Forestry
Vocational	Military	Military-music, Mathematics-Informatics ; Social sciences
	Theological	Orthodox, Catholic, Evangelical-Lutheran, Baptist, Pentecostal, Adventist, Unitarian, Reformed, Muslim
	Sports	54 de discipline sportive de specializare
	Arts and education	Architecture, Environmental art and design, Decorative Arts, Choreography, Music, Acting, Teacher, Librarian, Instructor

Examination

The high school studies in Romania end up with a baccalaureate examination. Students who pass the baccalaureate exam receive the baccalaureate diploma. Only pupils in the technological and vocational branches are required to take additional examination- a qualification examination along with a baccalaureate examination. Students who pass the qualification examination receive a qualification certificate.

Post High-School (Non-University)

Post high-school education is provided through post-high schools. These schools offer professional training.

Duration: 1- 3 years

This form of education is conducted by the technological high-schools. High-school graduates whether they hold a baccalaureate diploma or not ca attend post high school education. Admission to such schools is free.

Specialization Areas: Theology, mechanics, aesthetics and human body health; informatics, agriculture, printing techniques, automation and electronics, food industry, commerce, electro-mechanics, Industrial chemistry, textile and leather industry, forestry, construction materials, manufacture of wood products, public constructions and installations, and tourism and food.

Grading System

Different levels of education in Romania have different grading scales.

Primary Education

Romanian primary schools use a 4-point grading scale.

Grade	Description (In English)	Description (In Romanian)
9-10	Very Good	Foarte Bine (FB)
7-8	Good	Bine (B)
5-6	Sufficient-Pass	Satisfăcător (S)
4 and less	Insufficient-Fail	Nesatisfăcător (I)

Secondary and Higher Education

In lower-secondary, high schools and higher education institutions, a 10-point grading scale is used. The minimum passing grade is 5.

There is no 0.

Grade	Description	Equivalent ECTS
10	Excellent	A
9	Very good	A-minus-
8	Good	B
6-7	Satisfactory	C
5	Sufficient	E
1-4	Unsatisfactory	F

Academic Year

The school year in Romania is split up into 2 semesters:

The first semester commences in mid September and goes on until end of January, from kindergarten to high school.

The second semester starts from mid-February and continues until mid June, including 1-2 weeks break in April.

Summer vacations start from mid-June and ends in September.

Each semester is followed by 3 to 4 weeks of examinations.

THE ROMANIAN EDUCATIONAL S YSTEM

Age	Grade	ISCED	Educational levels				Qualification level
> 20		6 5	University education				5 4
		4	Pre-university/post-secondary school education Non-university Tertiary Education				3
19	XIII	3					
18	XII		Theoretical High school	Vocational High school	Technological High school	Technological High school	3
17	XI					Year of Completion	2
16	X	2	Theoretical Education	Vocational Education	Technological Education	Professional School	1
15	IX						
14	VIII		Comprehensive Education				
13	VII						
12	VI						
11	V						
10	IV	1					
9	III						
8	II						
7	I						
6	Preparatory Kindergarten	0	Preschool Education				
5	Full-kindergarten						
4	Mid-kindergarten						
3	Beginners-Kindergarten						

Baccalaureate Exam in Romania

High school pupils graduating from a College, Liceu or Grup Şcolar must sit for a National Baccalaureate Exam (In Romanian: Examenul Național de Bacalaureat, or bac). The national baccalaureate exam is a highly centralized national examination, and consists of two or three oral exams and four or five written exams, generally extending on the course of one and a half weeks in late June and September.

The examination is supervised by the high school teachers or university professors. Students who wish to enroll in a university are required to take the Baccalaureate exam.

Exam Structure . The National Baccalaureate Exam consists of six exams as follows:

Exam A/1 (Proba A/1)-Romanian Language and Literature (Oral Examination): This exam is an oral exam where the candidate selects a literature subject and a text comprehension subject randomly. Candidates are given 15 minutes to think. This exam is held in front of 3 people and is public.

Duration: 10 minutes

Exam C/1 (Proba C/1): This exam is taken by the candidates whose education is done in a language other than the Romanian, generally in the language of the ethnic group.

Duration: 10 minutes

Exam B (Proba B) - A foreign language (Oral Examination): This exam is an oral exam wherein the candidate is required to select a foreign language from the following options: Russian, English, German, Spanish, French, Portuguese and Italian. The selection of the foreign language is done upon registration for the examination. The candidate is required to select randomly 1 subject with 2 questions- reading comprehension and speaking. A 15 minutes thinking time is given to the candidate to build their answers.

Duration (answering time): 10 minutes

Exam A/2 (Proba A/2) - Romanian Language and Literature (Written Examination): The Exam A/2 is a written exam that comprises of an essay on a literature topic and a text consisting of 10-20 questions. The text-based questions are like to find a metaphor and an oxymoron in the text or comment the following passage in 10 or less lines.

Exam C/2 (Proba C/2): This exam is for those whose teaching is done in a language other than Romanian.

Exam D (Proba D): This is a written examination and consists of a compulsory subject depending on the study programme followed in high school. Candidates who have completed technical or services programme, or real studies can take up math. Candidates who have completed humane studies or vocational studies can select between Romanian History and Geography. However, the difficulty level of the exam varies depending on the academic programme undertaken in the high school.

The exam consists of multiple-choice questions (15%), fill in the gaps (15%) and detailed answers type questions.

Duration: 3 hours

Exam D (Proba D): This is a written exam wherein the candidates can select the subject of their choice from the fields considered as the central part of the academic programme followed in high school. A real studies student can select from chemistry, physics, biology and computer programming; a technical student/railway mechanic can select from mechanical Instruments and machines, physics, technical instruments and measures or railway maintenance; a human studies/languages student can select from Latin or a different language than the one in Exam B.

Students who select basic accounting- services program are required to use an account sheet illustrating the function of each account.

Exam E (Proba E): This exam can be written or practical. Candidates select from the subjects that were taught in high school. A real studies student can select up to 20 subjects, from philosophy to physical education; a student in humane studies/social sciences can select from math to biology as well as physical education.

Candidates can sit for the exams in any language, except for the language exam.

Scoring

A scale of 1 to 10 is being used and each examination is marked from 1 to 10 with 10 indicating the best. Two decimal marking is used for written exams and an integer for an oral exam. Each exam is checked and marked by two separate correctors agreeing on the mark based on a nationwide guideline.

The total mark for the baccalaureate exam is the arithmetic mean average of the 6 or 8 marks acquired. In order to pass, a pupil must get an average score of a minimum 6.00 and at least 5.00 at each of the individual examinations. A pupil who scores 10 is awarded special honors (Absolvent cu Merite Deosebite).

If the student fails in an exam, he/she can retake the exam in which failed. One can retake the exam 5 times.

Subjects

A: Romanian language - oral examination

B: Maternal Language (different from Romanian and studies) - oral examination

C: foreign language - oral and written examination. This exam is graded on the CEFR scale, from A1 to B2

D: Computers-This exam tests the computer skills

Written Exams

Profile	Compulsory Subject	Subject to be Chosen
Theoretical: Sciences	Mathematics	Computer Science, Physics, Biology or Chemistry
Theoretical: Humanities	History	Geography,Logic, Psychology, Economics, Sociology, Philosophy
Technological: Technical	Mathematics	Computer Science, Physics, Biology or Chemistry
Technological: Services	Mathematics	Geography,Logic, Psychology, Economics, Sociology, Philosophy
Vocational: Pedagogy	History	Geography,Logic, Psychology, Economics, Sociology, Philosophy
Vocational: Military	Mathematics	Computer Science, Physics, Biology or Chemistry
Vocational: Other	History	Geography,Logic, Psychology, Economics, Sociology, Philosophy

ABOUT

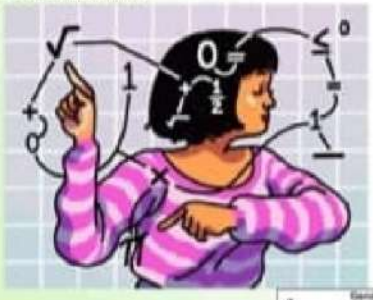
Even before they learn to speak, children organize their information about numbers, space, and time in much more complex ways than we think. Recent research shows that most 9-month-olds are receptive to concepts such as "bigger as" or "smaller than", but also to the relationships between the number and size of objects. We use quantity information daily to organize our experience of the world from the first months of life. Quantity seems to be a powerful tool for making predictions about how objects should behave, to work. But although numbers and computational operations are essential to our daily lives, we have difficulty understanding mathematics, which we avoid or even refuse since primary school.

Mathematics for girls and boys

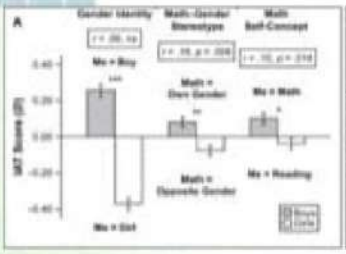
Children often express the stereotype that mathematics is for boys, and Romanian or foreign languages for girls, starting as early as the second grade, applying this stereotype to themselves: boys identify with mathematics, while girls do not. Numerous psychological studies suggest that, as far as girls are concerned, the lack of interest in mathematics would come from a cultural context, leading to the emergence of a cultural stereotype.

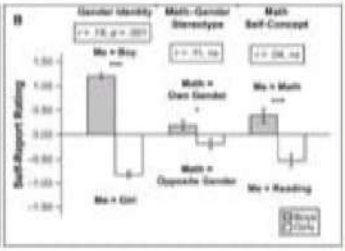
Some studies in psychology conducted at Villanova University show that girls are no less inclined towards mathematical skills than boys. But girls' lack of confidence in their own mathematical computing skills explains that they are less oriented than boys towards choosing a career in science, technology or engineering. To demonstrate this result, the researchers evaluated 493,495 students aged 14 to 16 in 69 countries.

Also, another experiment of the University of Chicago reveals that middle school teachers, who have a reluctance to the mathematical sciences, pass on the stereotype that boys, and not girls, do better in mathematics, and girls who subliminally take on these prejudices will no longer excel in this discipline.



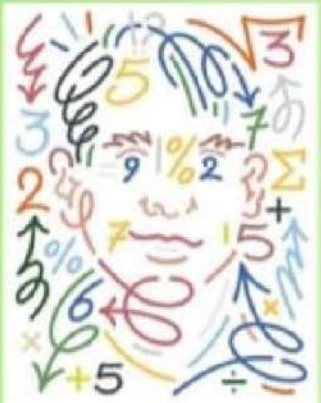
This aspect can also be reinforced by the fact that most of the teachers of human sciences are female, and in the real field (mathematics, physics) male.





Math Prejudice

In kindergarten, girls and boys are equals when it comes to working with numbers. But by the second grade, girls have fallen behind.



Mathematicians are old and boring.

Math is not for girls.

Mathematicians are unworldly.

Mathematicians are all nerds.

Creativity in Problem Solving

Individual Characteristics In Problem Solving	Thinking in Problem Solving	Barriers to Creativity in Problem Solving	Improving Creativity in Problem Solving
♦Attitude (Positive Attitudes & *Negative Attitudes)* ♦Prejudice ♦Resulting from Prejudices ♦Self-Confidence ♦Belief ♦Anticipation-Goal ♦Change in thinking	♦ Divergent Thinking ♦Reflective Thinking ♦Creative Thinking	♦Fixation-Inflexibility ♦Habits ♦Difficulties& Incompetence ♦Absence ♦Educational System	♦Method of Instruction ♦Relating to Daily Life ♦Permanence in Creativity Education ♦Application

Romanian Team

LEARNING MATHS

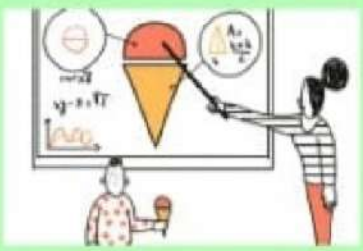
Mathematics is taught almost everywhere in the world. However, there are some countries that stand out from. This information is based on the Programme for International Student Assessment (PISA). This report measures students´ academic performance in mathematics, science and reading on a global scale. Its aim is to provide useful information so that the countries can compare each other and improve their educational system. This are some of the countries which have higher results: Switzerland, Singapore, South Korea, Japan, Netherlands, Finland…

Math is the same all over the world, because it is a universal and exact science. Nevertheless, it is true that how it is learned can change depending on the country as well as the demand of this science. For example, let's talk about some countries:

- **South Korea**: There, math has a leading role compared to other subjects, using it even as a base for the others, so the level is one of the strictest and best ones. Shanghai Mastery is a very popular method there. There are about 35 students per class in South Korea, so the number is not as important as how mathematics is taught.

Shanghai Mastery:

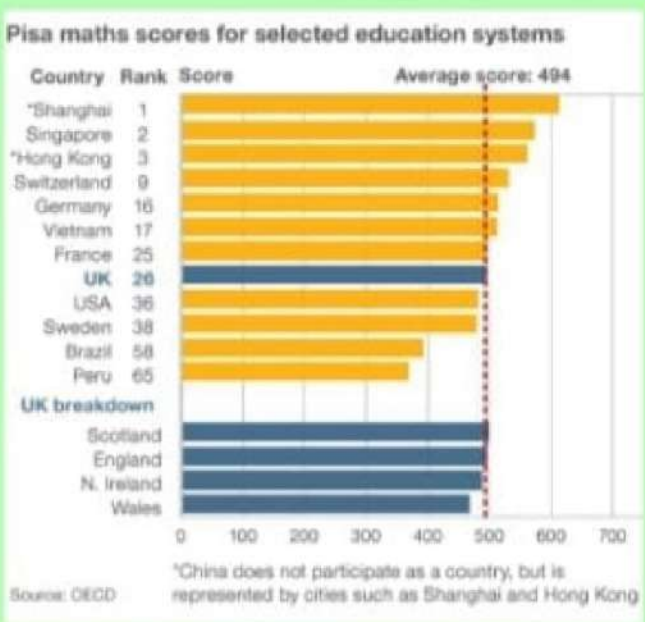
They focus on just one math concept and do not move on to the next one until ALL children have learned it.



- **Netherlands:** They are another great country for the learning of math, as the Netherlands´s educational system is very practical; it provides knowledge from informal to formal. Moreover, they use the vision of its applications to different problems. The key is that the classes are by levels, not only by age and that in education it is invested more than 41 billion euros!

- **Switzerland**: In order to PISA, Switzerland is on top of learning math in Europe, having a similar level to the Asiatic countries. They are known for their method of explaining math of ordinary life and in a really interesting way. School failure in this country is very low: 5.5%, compared to Spanish one: 28%. Education is completely free, including all school supplies (pens and erasers). Besides, there are approximately 20 students per class.

- **Finland**: A secondary school student in Spain receives 1,054 teaching hours each year, 246 hours more than a Finnish, but the difference does not later translate into better academic results. Finland invests 14,636 million of euros in education, while Spain only five million. Another difference is that in Finland there is a maximum of 24 students per class while in Spain there are approximately 30.



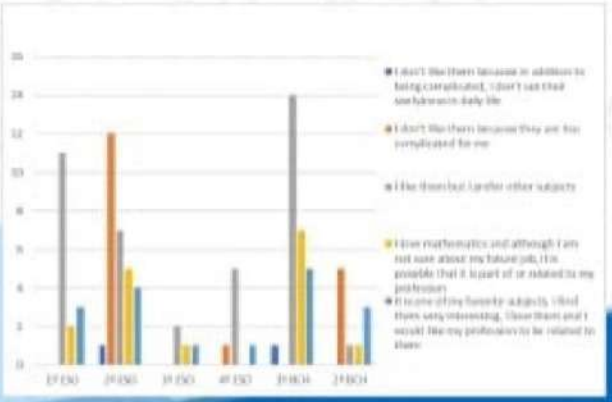
Another very effective method used to learn mathematics is the "**card method**" which consists of writing a summary of the class on them, including formulas, definitions, properties, etc. With this method, you unconsciously learn the content of the cards more easily.

Mathematics survey

Students from high school has been asked about what they think and like more about maths. Around 100 students answered the survey, 57% of these students were females and the other 43% were males.

It could be observed that most of the answers where from 2nd ESO and 1st BCH with about 30% each, followed by 1st ESO (16%) and 2 Baccalaureate (10%). These results are interesting as most of the answers where from 2nd ESO and 1st BCH and comparing with other courses is really high, which means that these two have more interest on math's that the other courses.

1.What do you think about mathematics?



This graph shows the students' opinion about mathematics. It can be seen that most of students like the subject but prefer others. On the other part, this graph also shows that most of students don't like mathematics.

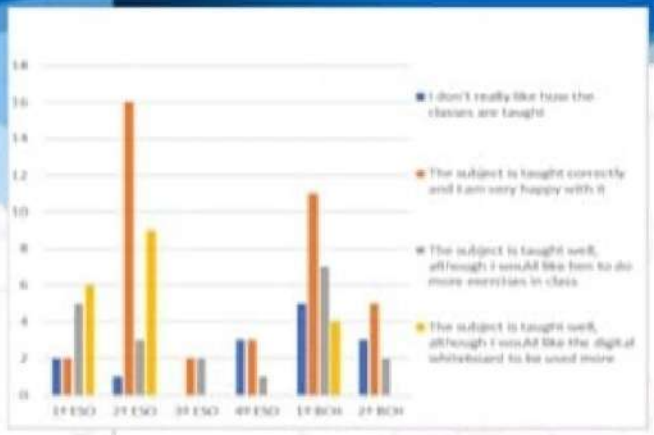
This agrees with the general opinion that students and social media has about mathematics, considering the subject quite difficult, as it is not easy to understand.

2. About the teaching of mathematics in high school...

This second graph shows the answers about the subject in school, and the perception that students have about its way of teaching.

As it is shown, great part of students, specially 2ºESO and 1º BCH, consider that the subject is taught correctly.

This is especially relevant in terms of education quality, as students are happy with their teachers and the way the teach mathematics.



3. Are you having difficulties with mathematics in your course?

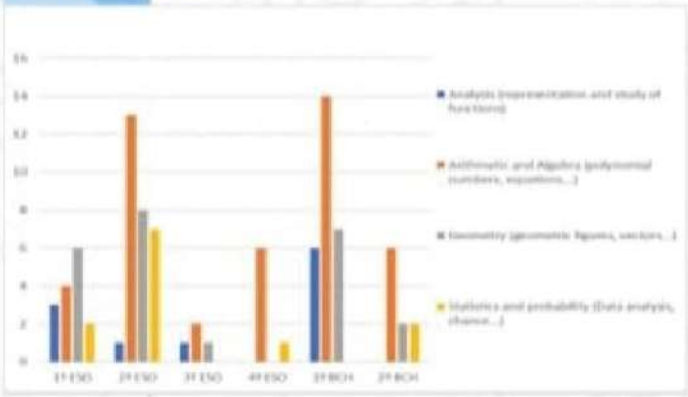
This question was taught to improve students reflexing about mathematics, and avoid they fail in the final subject grade. As students have answered, they consider that they can improve their performance in the subject, as some things can be improved and they can keep up with the material.

Answers in 2ºESO need to open a reflection process, thinking why they think that mathematics is more difficult that year

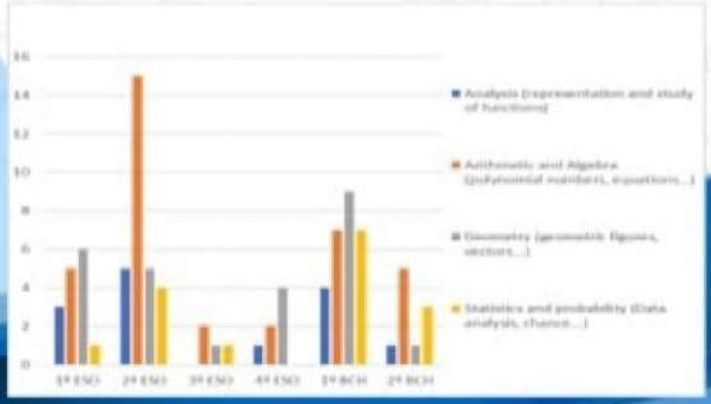
4.What topic of mathematics do you like more?

This graph show a great result from all the years, as most of students, no matter their age, consider that arithmetic and algebra is the mathematics topic that they like more.

This can be understandable as they study it every year, getting more confidence about numbers and equations, among others, as years pass.



5.The topic that result the most difficult to you



Considering the previous graph and this one, students from 2ºESO and 2º BCH like more arithmetic and algebra, but they also consider it as the most difficult part of math's. On the other hand, 1ºESO and 1º BCH like more geometry, not considering it the most difficult one.

6. Algebra

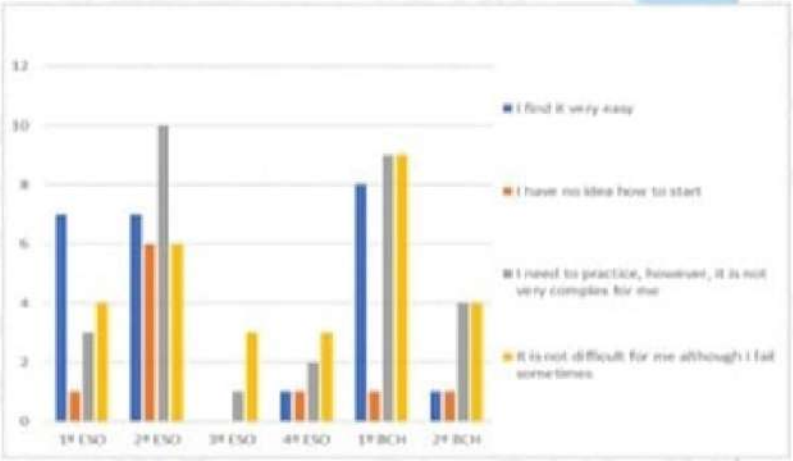
All groups, no matter their age, don't consider algebra as something difficult. Taking into account the previous graph, it can be concluded that the arithmetic part is difficult for students, making the fail the exams sometimes.

7.Geometry

Regarding the geometry part, not many student think about not having any idea about how to start. On the other hand, and in algebra, they consider that it is not difficult, but it can be tricky sometimes, making them fail some exams.

On the other hand, many students from 1ºESO, 2ºESO and 1ºBCH consider that geometry is easy, in comparison with the other parts of mathematics.

8. Study and representation of functions



Students normally love functions, and its representations on the plane. This coincides with the results of this questions, as students from 1ºESO, 2º ESO and 1º BCH consider it really easy.

On the other hand, 3ºESO and 4ºESO consider difficult, understandable answers and in the Spanish educational system, functions get really difficult in that years.

9.Statistics and probability

Finally, this graph shows a quite balanced results with almost the same number of votes in the four possibilities.

With the same percentage (24.7%) the students say that the subject of statistics and probability is not difficult for them but they need to practice more. However, 26.8% of the students find the subject easy and 23.7% do not know how to start in this.

CONCLUSION

As we have been able to observe in the results of the graphs, we can conclude that most people don't really have prejudicies about mathematics, as they think that it is a good subject but at the same time, they prefer other subjects. In addition, our analysis show that students like least the algebra part, while the one they like most is statistics and probability, as it is usually consider the easy part of mathematics.

Prejudices of mathematics

Why do many students hate Mathematics?

According to the mathematician and psychologist Diego Alonso Cánovas, the hatred of mathematics is not something only exclusive to young Spaniards, this is due to a series of factors :

- **·intrinsic difficulty**
- **·the student is not willing to consume mental energy**
- **·biological reasons**
- **·also one thing that we believe is important is that it is a cumulative subject therefore to understand a new concept you need to have assimilated the previous concepts well**

Girls are less good at mathematics

Women are 3.7 times less likely than men to study science, simply because they do not feel capable. This is due to the absence of a discourse that reminds us that men and women are equally capable in terms of intelligence

The data for Spain is also quite revealing. If in 1985 there was practically parity between male and female students enrolled in Mathematics, and even in the year 2000 women represented 60% of the total

Mathematics is useless

FALSE! Obviously, mathematics is useful for many things in life. It helps pupils to be logical, to reason in an orderly way and to have a mind prepared for thought and criticism. For example, did you know that Google uses arrays for its search engine? maths is also used, for example, in medicine, when we use it to reconstruct images of the human body from certain points

Maths lovers are boring people

It is a fact that mathematics is a subject that requires a lot of concentration, hard work and perseverance, but that does not stop anyone from making the most of their free time and enjoying life

You can't be good at mathematics if you're not good at it.

Studies show that being good at math is a matter of hard work as much, if not more, than innate talent.

It is true that some people are good at studying this subject, but to be good at it you have to:

- Attend remedial classes and tutoring
- Take private maths lessons
- Attend revision and remedial courses during the holidays.
- Spend more time revising than watching TV.