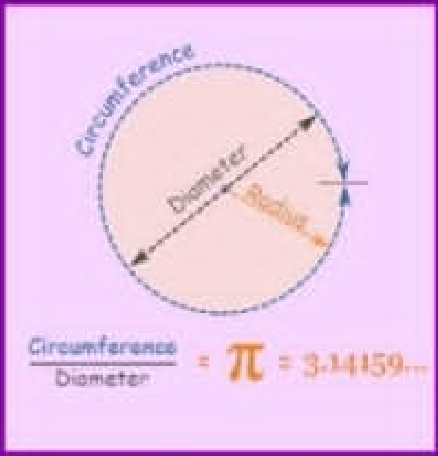
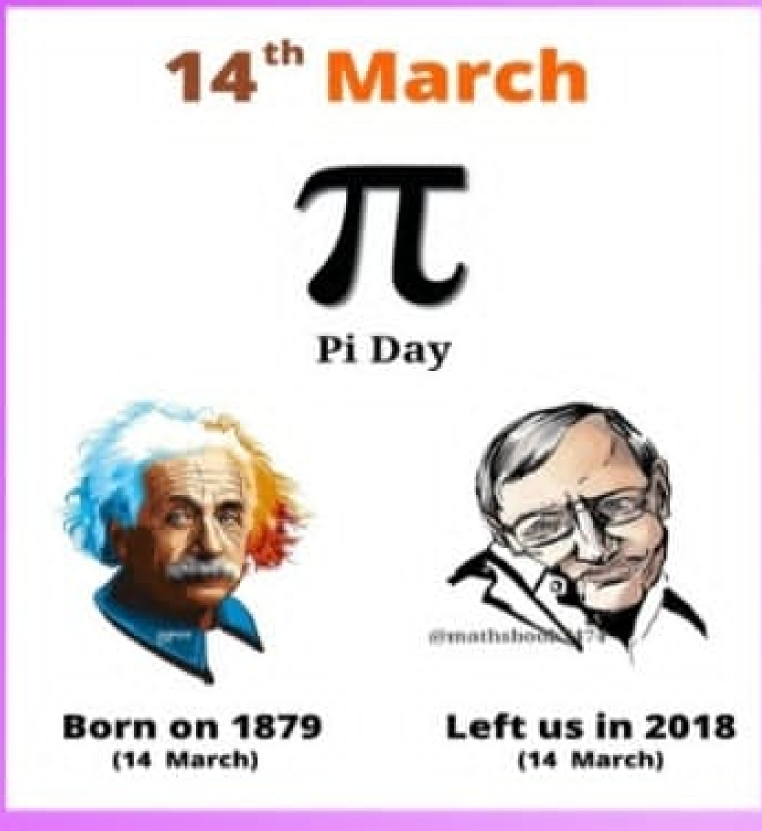


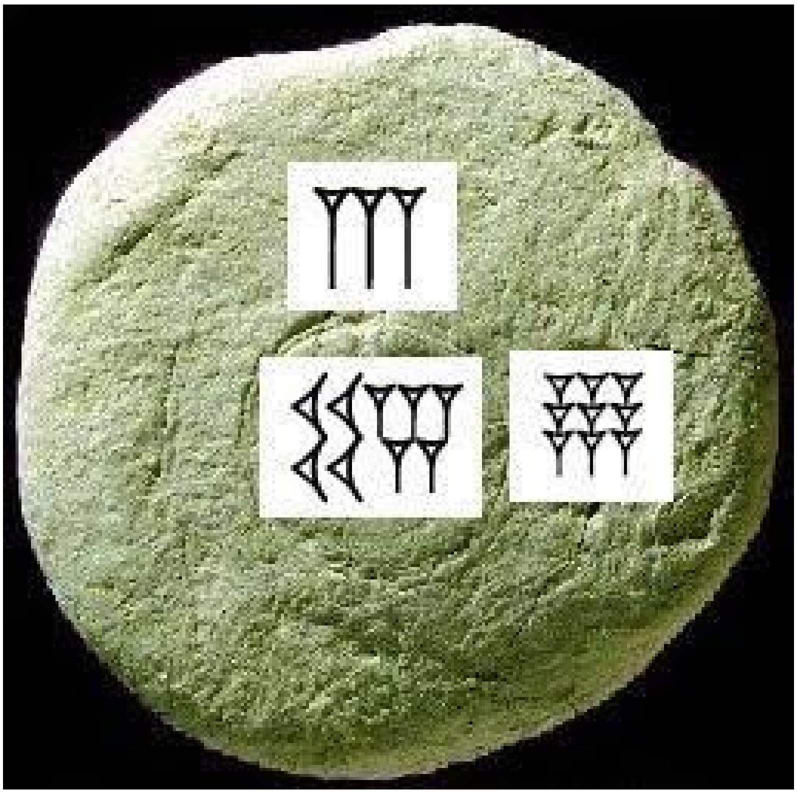
Pi Day 2022



Volume 2- March - 2022

THE NUMBER PI

The number pi, alson known as Archimedes' constant and Ludolph number, is a mathematical term obtained by dividing the circumference of circle by its diameter. Takes ist name from the greek letter π the first letter of the word περίμετρον means perimeter. The number pi is mathematically equal to the circumference divided by the diameter (π=c/d). No matter how big or small a circle is, the value of pi does not change. This value is approximately equal to 3.14. While Pi has no exact value, many mathematicians try to calculate as many digits of Pi as possible.

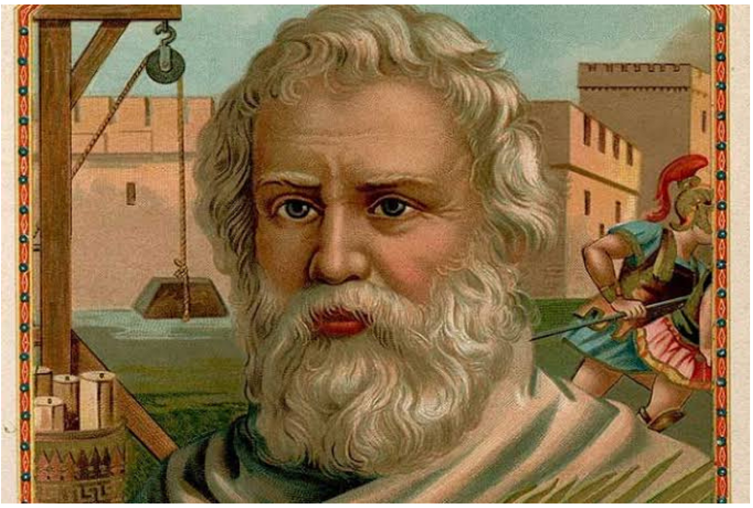


Pi (π) has been known for almost 4000 years—but even if we calculated the number of seconds in those 4000 years and calculated π to that number of places, we would still only be approximating its actual value. Here's a brief history of finding π.

The ancient Babylonians calculated the area of a circle by taking 3 times the square of its radius, which gave a value of pi = 3. One Babylonian tablet (ca. 1900–1680 BC) indicates a value of 3.125 for π, which is a closer approximation.

The Rhind Papyrus (ca.1650 BC) gives us insight into the mathematics of ancient Egypt. The Egyptians calculated the area of a circle by a formula that gave the approximate value of 3.1605 for π.

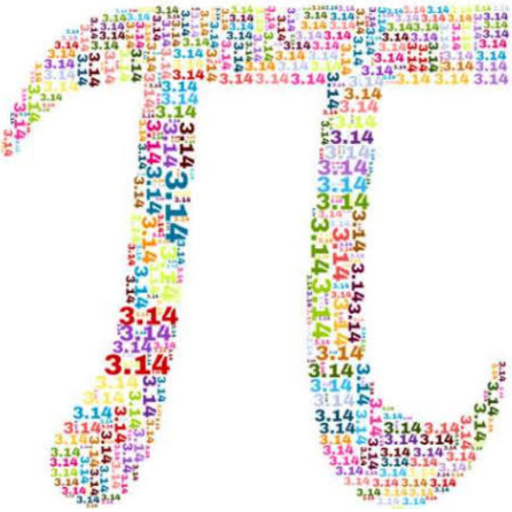
THE NUMBER PI



The first calculation of π was done by Archimedes of Syracuse (287–212 BC), one of the greatest mathematicians of the ancient world. Archimedes approximated the area of a circle by using the Pythagorean Theorem to find the areas of two regular polygons: the polygon inscribed within the circle and the polygon within which the circle was circumscribed. Since the actual area of the circle lies between the areas of the inscribed and circumscribed polygons, the areas of the polygons gave upper and lower bounds for the area of the circle. Archimedes knew that he had not found the value of π but only an approximation within those limits. In this way, Archimedes showed that π is between 3 1/7 and 3 10/71.

A similar approach was used by Zu Chongzhi (429–501), a brilliant Chinese mathematician and astronomer. Zu Chongzhi would not have been familiar with Archimedes' method—but because his book has been lost, little is known of his work. He calculated the value of the ratio of the circumference of a circle to its diameter to be 355/113. To compute this accuracy for π, he must have started with an inscribed regular 24,576-gon and performed lengthy calculations involving hundreds of square roots carried out to 9 decimal places.

THE NUMBER PI



The Guinness World Record for reciting the most digits of pi belongs to Rajveer Meena of India, who (blindly) counted up to 70,000 decimal digits of pi in 2015. Some computer programmers have calculated more than 22 trillion digits of pi.- Generally, studies and calculations are published on pi day, that is, on March 14th. Due to its similarity with the beginning of the number pi (3,14), 14 March, known as the pi day worldwide, is celebrated by almost all mathematicians. And in 2021, Swiss scientists broke a record by reaching the 62.8 trillionth digit of pi. they broke a record by surpassing the 50 trillion digits calculation in 2019.

THE NUMBER PI

And these are the photos of us celebrating the Pi Day!

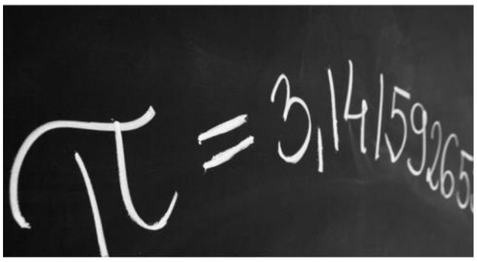
Applications of Pi number

Pi is an irrational number whose value is expressed as an infinite sequence of decimal places. Its value expressed with the first decimal places is **3.1415926535**. We can get close to its value, but we will never find the exact value. **March 14 is the Day of π**, a celebration that may be surprising for those who are unaware of the importance of this number. Pi is more than just a number that we were forced to study in Mathematics. It has multiple applications:

- Its most direct applications are found in calculations of the area and perimeter of a circle, as well as for the volume of a cylinder. Pi has been known for almost 4,000 years and served in ancient times for the construction of the pyramids.

- But Pi also has important practical applications in Computer Science, Astronomy, Economics or Physics, among other disciplines.

-The speed of computers is tested by having them calculate Pi. Quantum computers are capable of calculating up to 2,000 trillion digits.



-But for many scientific uses, only the first 40 digits are needed. Among these uses is any calculation in which there are circles, such as the orbit of satellites.

-It is also useful for studying curves. Thus, Pi helps to understand periodic or oscillating systems, such as clocks, electromagnetic waves, and even music.

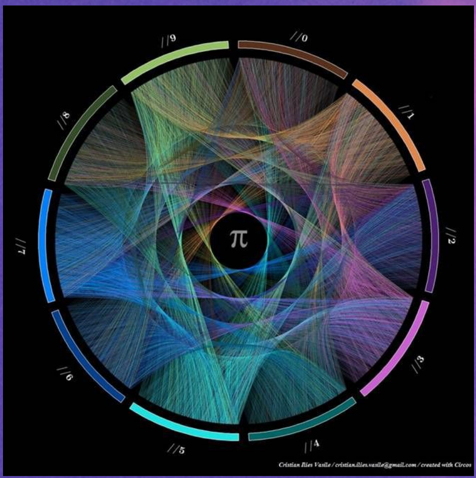
-In Statistics, Pi is used to calculate the area under a distribution curve, which is applicable to knowing the distribution of standardized scores, financial models or margins of error in scientific results.

-Additionally, it is used in particle physics experiments, such as those using the Large Hadron Collider. Scientists have used Pi to prove the misleading notion that light functions as both an electromagnetic wave and a particle, and, more impressively, to calculate the density of the entire Universe.

WHAT IS NUMBER PI?
https://youtu.be/De0JKAFqCy

NUMBER PI EXPLAINED.
https://youtu.be/7QOOqP3XQhA

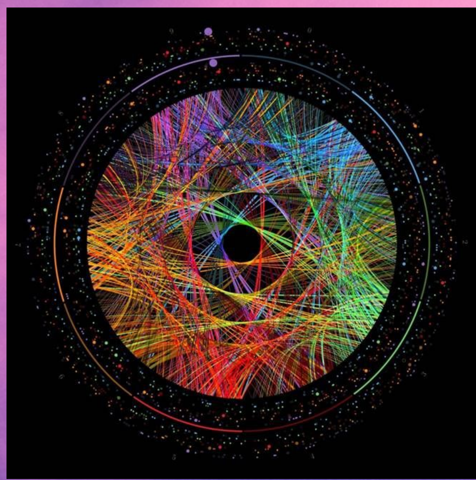
VİSUAL ART İN THE NUMBER Pİ

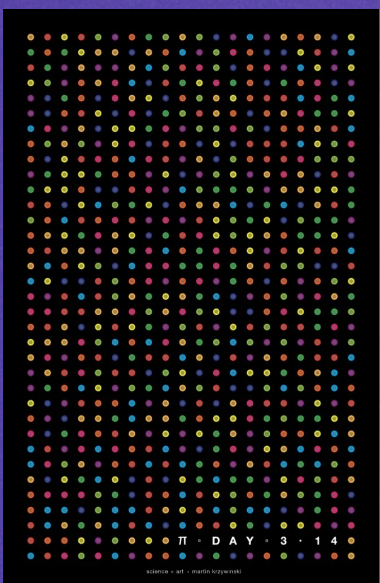


Mathematicians, fascinated by the number pi, sometimes struggle to visualize it. As a result, we come across works that we can call pi art.

In this work, the numbers 0 to 10 are arranged around a circle. Then 3 -1 and 1-4, and then all the digits of pi are connected by lines.

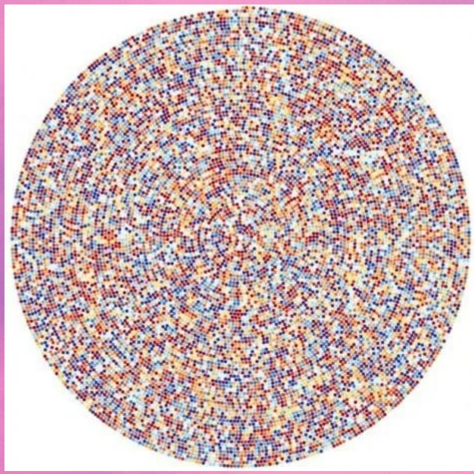
This time there are dots instead of lines. The more times a number repeats, the larger it is represented by a dot. There is a point to note here. Large purple spot at the top. At this point, 6 numbers 9 come one after the other. This situation occurs in the 762nd digit of the pi number. This point is referred to as the Feynman point, after a quote by the physicist Feynman.

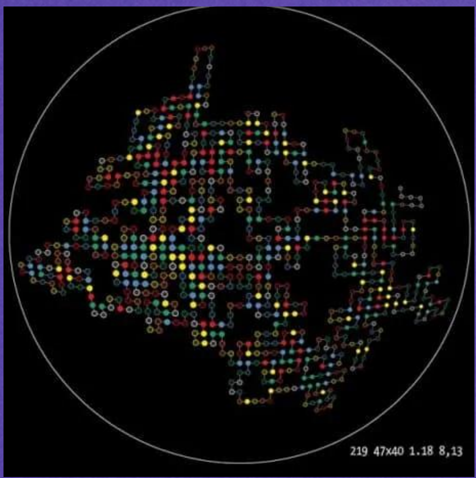




Martin Krzywinski made his first study in 2013. In this work, each color is paired with a number. Based on images created by Cristian Ilies Vasile, Krzywinski has also compiled a series of eye-catching circular diagrams based on relationships between numbers in pi.

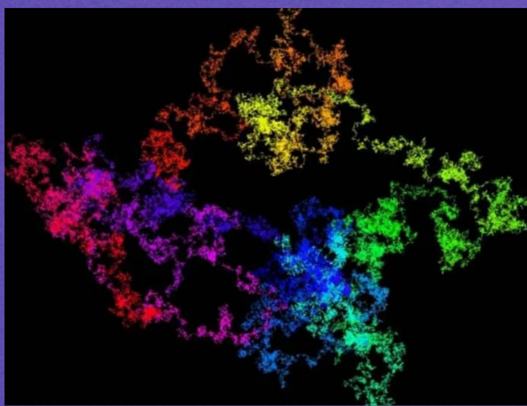
Krzywinski later arranged this work in the form of a spiral expanding from the center outward. This time, we came across another image.

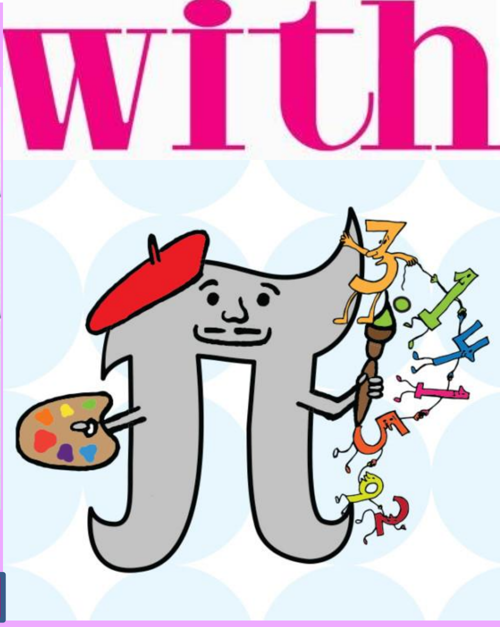




In this last study, which we will show as an example, Krzywinski shaped the 768 digits of pi in the form of a protein amino acid chain. For this, he showed the prime numbers (2, 3, 5 and 7) with black dots and colored the other numbers. Then, with the help of an algorithm on the computer, he fitted the shape into a circle

In this work, Francisco Aragon and colleagues converted pi to base 4. So he just wrote it using the numbers 0, 1, 2 and 3. These numbers assigned the four cardinal directions north, south, east, and west. When he arranged the 100 billion numbers in this format, he had the following image in his hand.





Calculating Pi Yourself

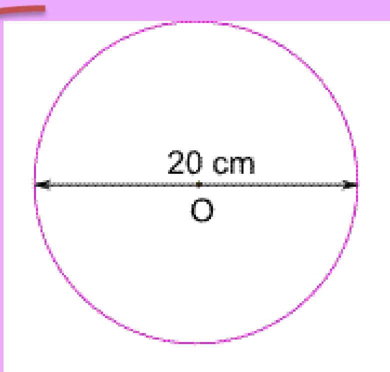
There are many special methods used to calculate π and here is one you can try yourself: it is called the Nilakantha series (after an Indian mathematician who lived in the years 1444–1544). It goes on for ever and has this pattern:

$$3 + \frac{4}{2\times3\times4} - \frac{4}{4\times5\times6} + \frac{4}{6\times7\times8} - \frac{4}{8\times9\times10} + \ldots$$

(Notice the + and − pattern, and also the pattern of numbers below the lines.)

It gives these results:

Term	Result (to 12 decimals)
1	3
2	3.166666666667
3	3.133333333333
4	3.145238095238
...	... etc! ...

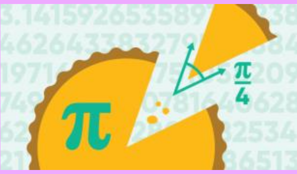


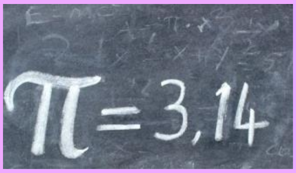
The diagram shows a circle with center O and diameter 20 cm.

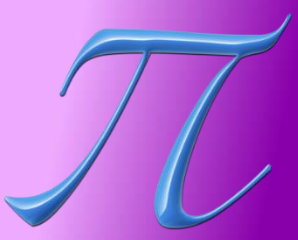
(Not drawn to scale)

Which of the following gives the best estimate for the circumference of the circle?

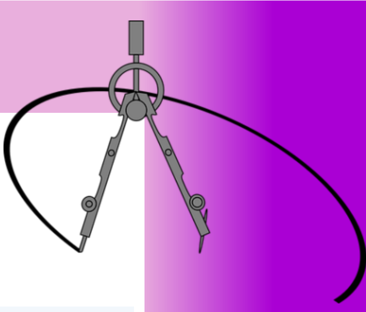
A 63 cm	B 68 cm
C 73 cm	D 78 cm







Circle



You walk around a circle which has a diameter of 300m.

How far have you walked?

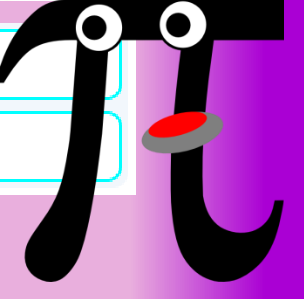
Answer to the nearest meter.

A 471 m	B 900 m
C 942 m	D 1,200 m

A circular gold bangle has an inside radius of 35 mm.

What is the circumference of the inside of the bangle?

Use (22/7) as an approximation for π.



A 110 mm	B 140 mm
C 220 mm	D 250 mm

A pothole has a radius of 9 inches. Which of the following best represents the distance around the pothole?

a. 14.13 inches

b. 28.26 inches

c. 42.39 inches

Which of the following values is closest to the diameter of a circle with an area of 314 square inches?

a. 20 inches

b. 10 inches

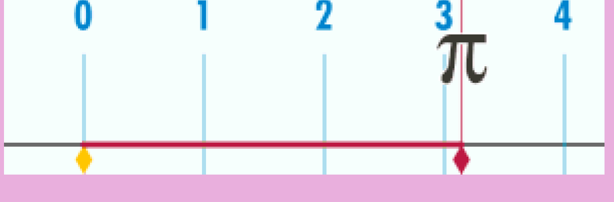
c. 100 inches

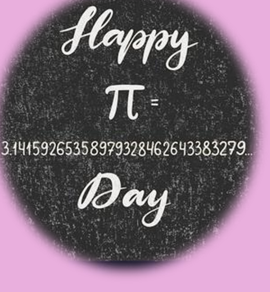
d. 31.4 inches

$$\pi = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \ldots$$ *(formula lui Leibniz)*

$$\pi = 2 \cdot \frac{2}{1} \cdot \frac{2}{3} \cdot \frac{4}{3} \cdot \frac{4}{5} \cdot \frac{6}{5} \cdot \frac{6}{7} \cdot \frac{7}{6} \cdot \ldots$$ *(Wallis)*

$$\pi^2 = 6\left(\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \ldots\right)$$ *(Euler)*





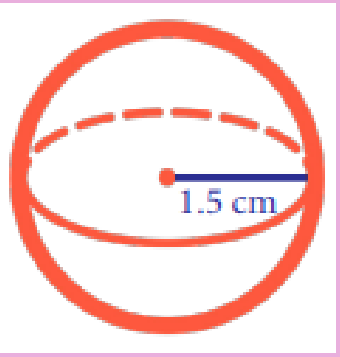
Find the surface area of a sphere with the radius of 1.5 cm.

a. 28.26 cm2

b. 7.065 cm2

c. 18.84 cm2

d. 14.13 cm2



A cylindrical oatmeal canister has a diameter of 4 inches and a height of 10 inches. The manufacturing company wants to package the oatmeal in square containers to cut back on wasted storage space. If the new carton has a square base with 4 inch sides, what is the minimum height it must have,

to the nearest 1/4 inch, to hold the same volume of oatmeal?

Use 3.14 for the value of π.

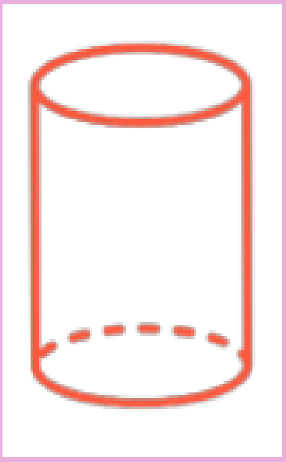
a. 7 3/4 inches

b. 8 inches

c. 8 1/4 inches

d. 8 1/2 inches

e. 8 3/4 inches



A satellite in a circular orbit rotates around the Earth every 120 minutes. If the Earth's radius is 4000 miles at sea level, and the satellite's orbit is 400 miles above sea level, approximately what distance does the satellite travel in 40 minutes?

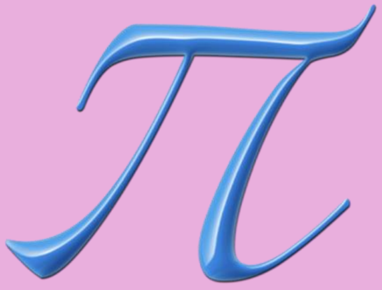
a. 1400 miles

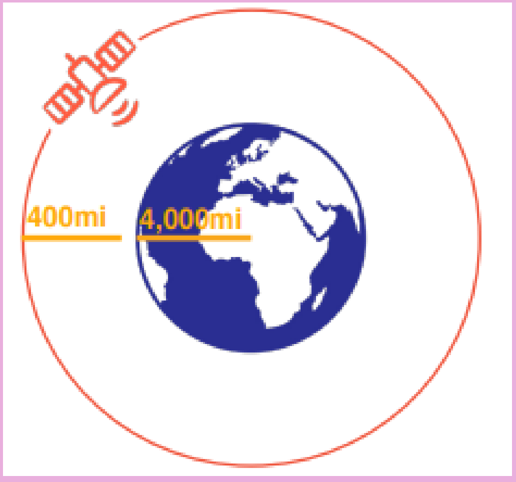
b. 9210 miles

c. 4400 miles

d. 4120 miles

e. 8000 miles

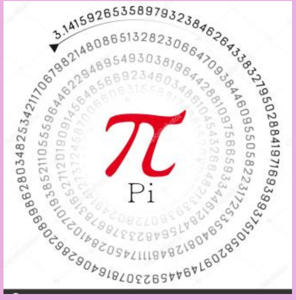




$$\pi = 2\left(1 + \frac{1}{3} + \frac{1\cdot 2}{3\cdot 5} + \frac{1\cdot 2\cdot 3}{3\cdot 5\cdot 7} + \frac{1\cdot 2\cdot 3\cdot 4}{3\cdot 5\cdot 7\cdot 9} + \frac{1\cdot 2\cdot 3\cdot 4\cdot 5}{3\cdot 5\cdot 7\cdot 9\cdot 11} + \cdots\right)$$

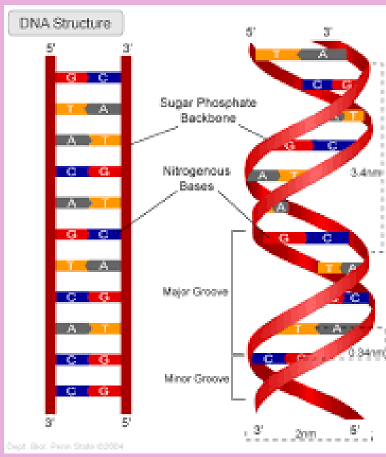
$$= 2\sum_{n=0}^{\infty} \frac{n!}{(2n+1)!!} = \sum_{n=0}^{\infty} \frac{2^{n+1} n!^2}{(2n+1)!} = \sum_{n=0}^{\infty} \frac{2^{n+1}}{\binom{2n}{n}(2n+1)}$$

$$= 2 + \frac{2}{3} + \frac{4}{15} + \frac{4}{35} + \frac{16}{315} + \frac{16}{693} + \frac{32}{3003} + \frac{32}{6435} + \frac{256}{109395} + \frac{256}{230945} + \cdots$$



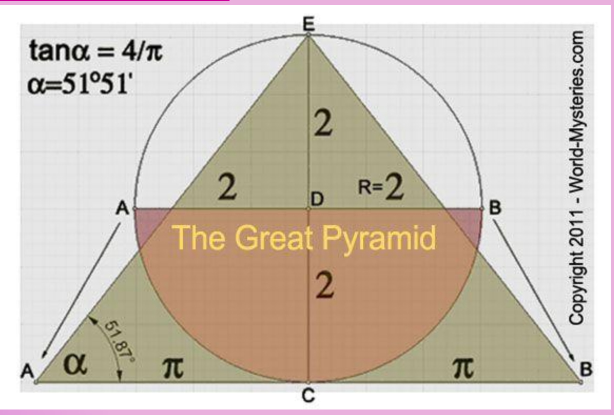
Did you know that Pi can be found **within our body?** Pi is found in the most basic structure of human body – the DNA. DNA or deoxyribonucleic acid is the main constituent of chromosomes and the carrier of genetic information, which gives biological instructions making each species unique.

DNA is typically 1.8 meters long and forms the nucleus of our body cell with only 10 microns in average diameter. For our long DNA to fit in the constrained area, it wraps itself to form nucleosomes which look like a string of beads. This string is 1.5 times pi shorter than our DNA.



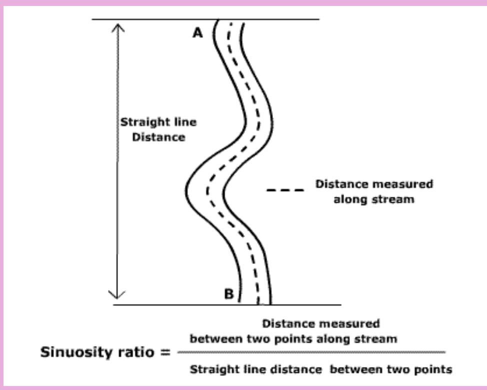
Pi plays an important role in construction and architecture. Since Pi is associated with circles, anything with curvature has Pi like pillars, wires and pipes used in construction. It can be used to get answers to questions like how much power will run through a wire with xx cross section or how much should be the size of a wire or a pillar to be used for a particular purpose.

Pi was found in the measurements of the Great Pyramid of Giza in Egypt. The vertical height of the pyramid and the perimeter of its base have the same relationship as the radius of a circle has to its circumference.



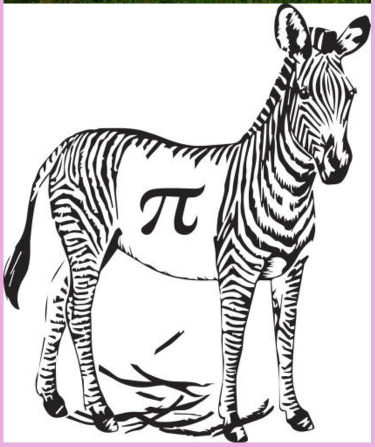
It has lot of importance in statistics and is also widely used in analysing the probability or chance of anything happening or not happening. Pi is used by statisticians to track population dynamics and occurs in the tables of death.

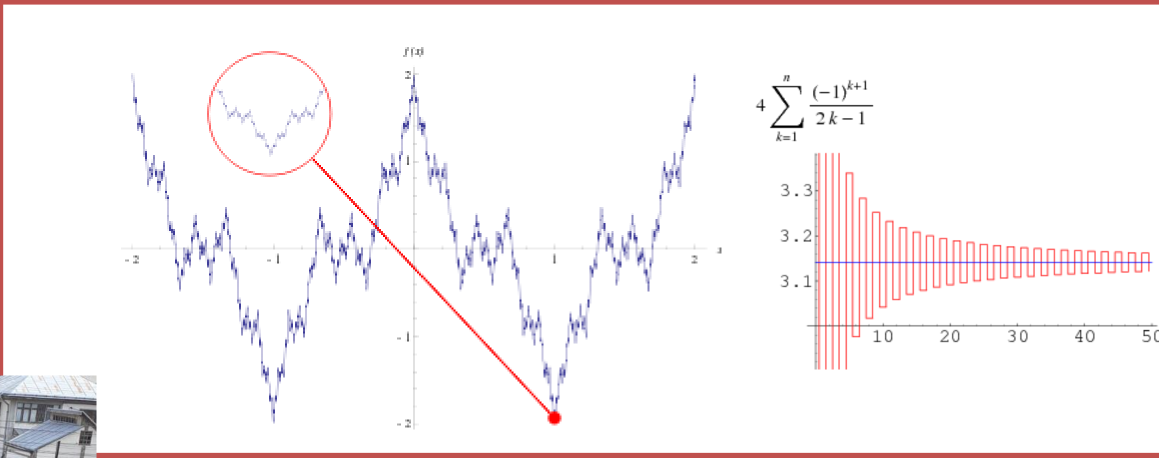
Pi has been used to measure the sinuosity of rivers and the way a river meanders. If we measure the total length of any river in the world and divide by its straight route from its source to mouth, it averages to Pi.

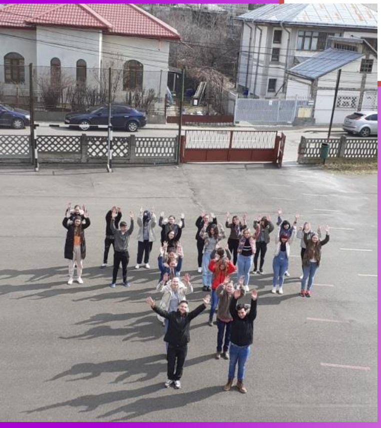


How much water will it take to fill the kids' 10 foot by 1 foot wading pool?

Computer simulations of Turing's model produces a bewildering array of patterns, including spots and stripes.Pi is also intimately woven into periodic processes. It appears in the governing biophysical laws of cell division timing, heart beats, breathing cycle, and circadian rhythms controlling sleep-wake cycles. However, this is another interesting and exciting topic at the interface between physics and biology, which we will need to leave for next year. You'll just have to wait π x107 seconds!



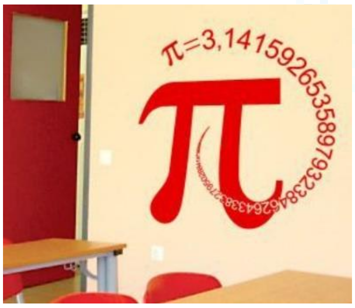




Romanian Team :

Olaru Denis
Popovici Marian
Anton David
Binga Raluca

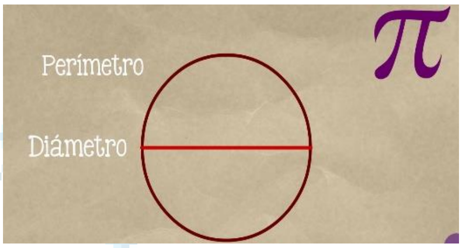
PI DAY

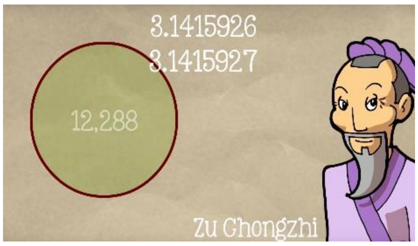


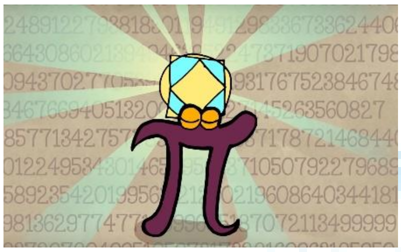
In order to celebrate the pi day, we have organized some activities that can be done with other students in class.

The first thing we have to think about is: What is pi? Our class could start with a short video, where the meaning and how it can be calculated is the most important part.

https://youtu.be/NMjWyyB3mpA







Once everyone know what is the pi number, our colleages should play with it and see how amazing pi is. This is why we propose the following game:

https://www.cerebriti.com/juegos-de-matematicas/el-maravilloso-numero-pi

We can continue playing games with the following sudoku, where all the figures need to have the same amount and different numbers.

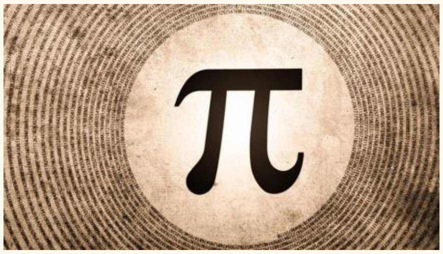
3			1	5	4			1		9	5
	1			3					1	3	6
		4			3		8			2	
5			1			9	2	5			1
	9			5			5				
5	8	1			9			3		6	
	5		8			2			5	5	3
				5			6			1	
2			5	1	5			5			9
	6			4		1			3		
1	5	1					5			5	
5	5		4			3	1	6			8

Finally, in order to finish the most important day in mathematics, we celebrate it with a song, The song the first 100 decimals that compose the number. Will you able to sing it?

https://youtu.be/3HRkKznJoZA

PI NUMBER

INTRODUCTION



Pi is a non-repeating infinite decimal number famous for appearing in many mathematical formulas in the fields of geometry, number theory, probability, mathematical analysis, and in applications of physics.

History of this strange number

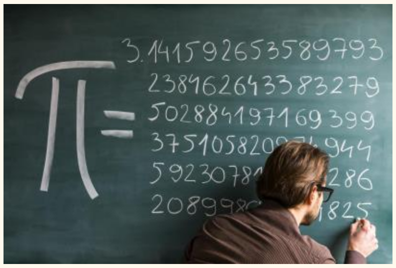
Pi began its trajectory in the field of geometry where it gained importance and in the 17th century it deepened in infinitesimal calculus until it reached our times with computers.

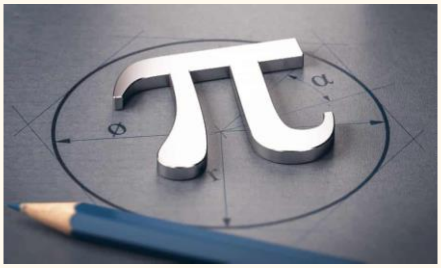
$$\frac{223}{71} < \pi < \frac{22}{7}$$

Archimedes made the first consistent estimate of the number pi by drawing regular polygons with more and more sides. Result was that regular polygons with 96 sides fit within a circle and those with more sides exceeded said circle. In this way they established the following limits with the perimeters of the regular polygons used.

In geometry in particular

In the field of geometry, there are some formulas that have the number pi implicit. A clue to remember which shapes have the number pi is to draw them. Any figure or geometric body that has a circle or a sphere, the number pi will appear in its formula.





CELEBRATING PI DAY

In II Liceum Ogólnokształcące im. Marii Konopickiej, we celebeated PI day together. We did trimino math jokes - if you do it correctly, triangle pieces will make a star! We also did some crosswords about math notation. We encourage you to read math jokes in case you want to have fun just like us!

Why do old math teachers never die?
They just lose some of their functions.

How do you keep warm in a cold room?
You go to the corner. It's always 90 degrees!

What is a math teacher's favourite snake?
A pi-thon.

What did the zero say to the eight?
Nice belt!

Why do plants hate math?
Because it gives them square roots.

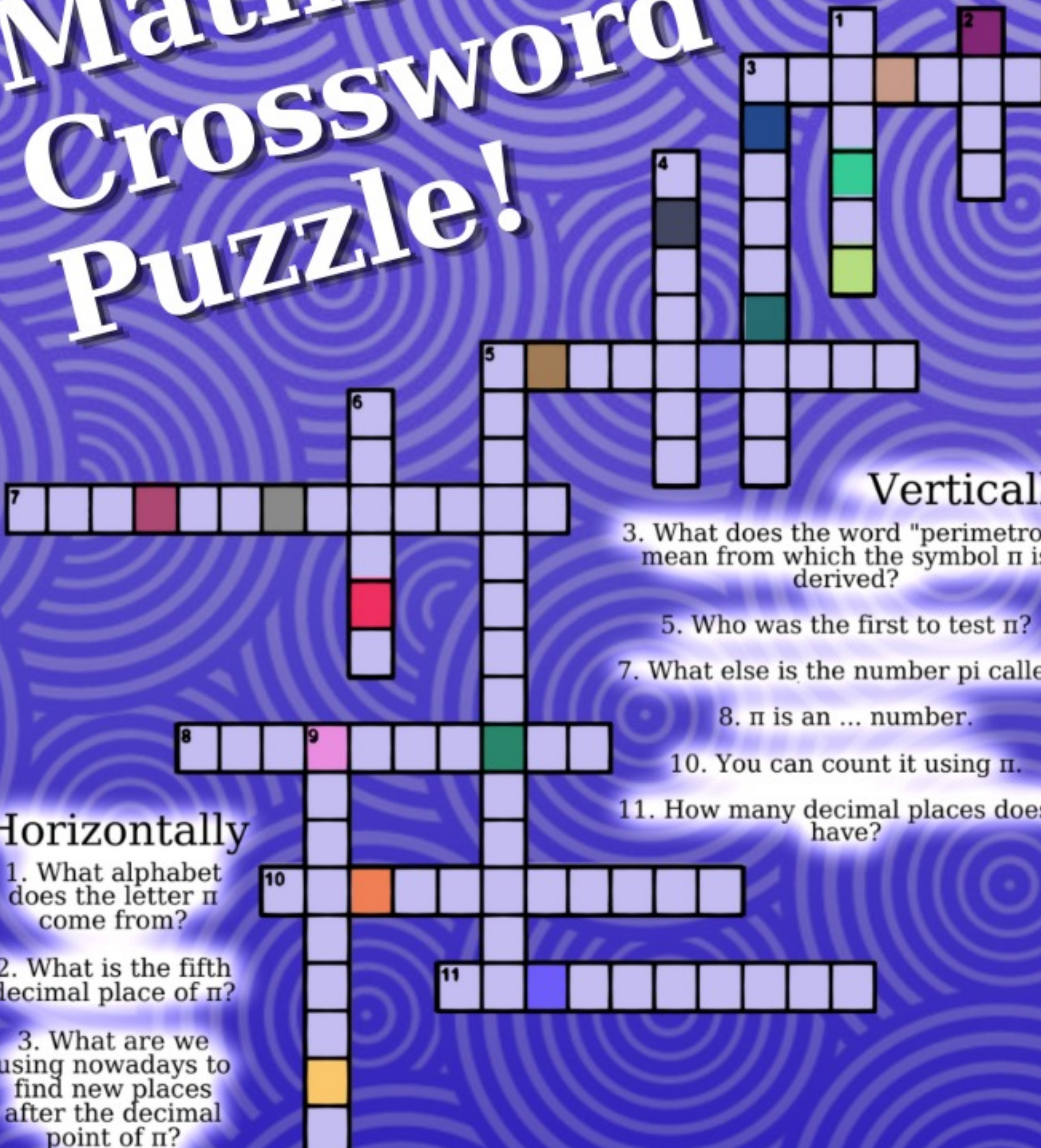
What did one math book say to the other?
Don't bother me. I've got my own problems!

What do you call friends who love math?
Algebros!

Why did the two fours skip lunch?
Because they already 8!

What is a math teacher's favourite dessert?
A pi!

Maths Crossword Puzzle!



Vertically

3. What does the word "perimetron" mean from which the symbol π is derived?

5. Who was the first to test π?

7. What else is the number pi called?

8. π is an ... number.

10. You can count it using π.

11. How many decimal places does π have?

Horizontally

1. What alphabet does the letter π come from?

2. What is the fifth decimal place of π?

3. What are we using nowadays to find new places after the decimal point of π?

4. Where, apart from math, can we use π?

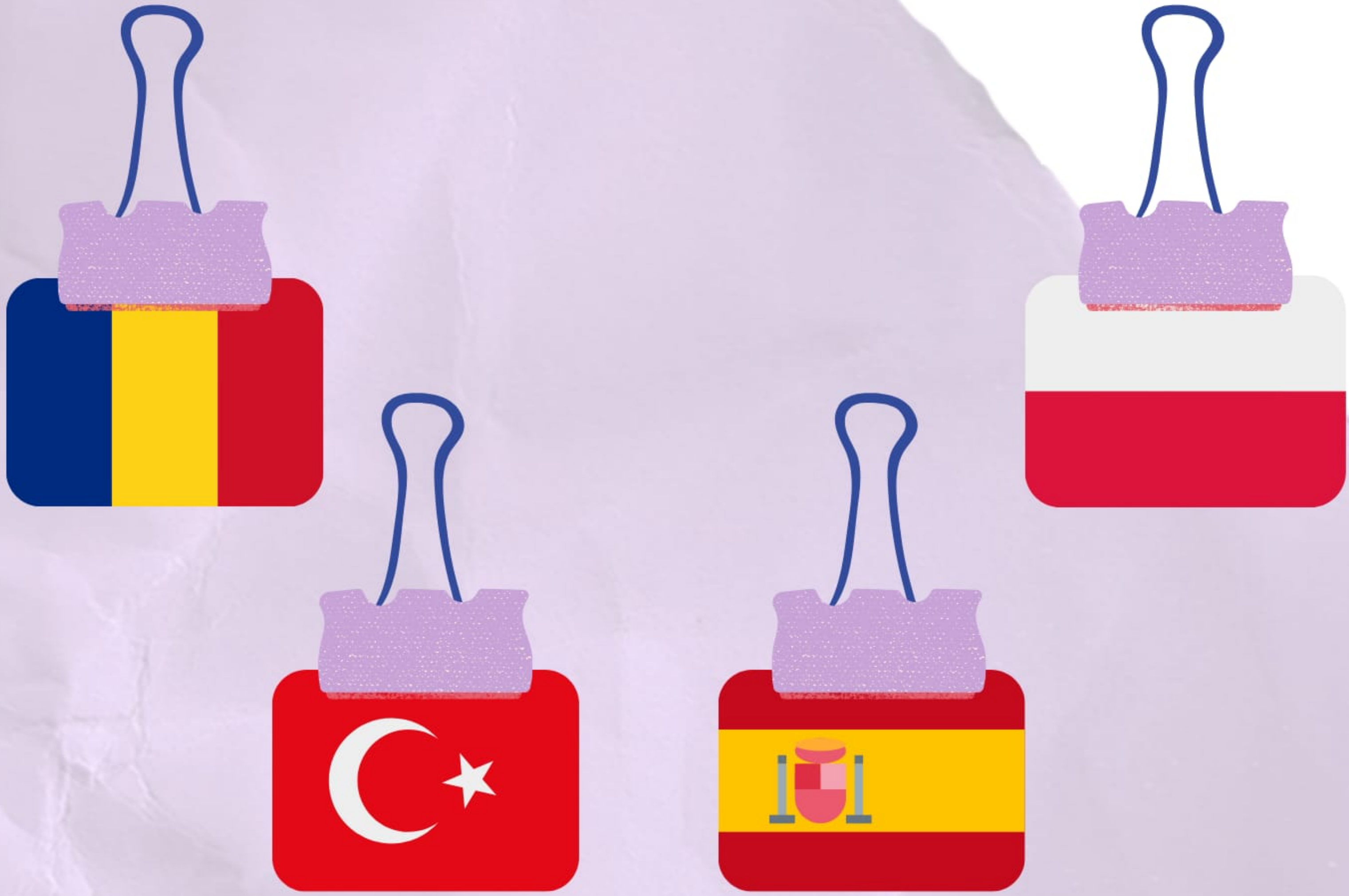
5. Who celebrates birthday on π day?

6. What Chinese mathematician studied π in the Middle Ages?

9. Since when do people know π?

Answer

Mathematicians from



Gheorghe Țițeica

Born
4 October 1874
Turnu-Severin, Oltenia, Austro-Hungarian Empire (now Romania)

Died
5 February 1939
Bucharest, Romania

Gheorghe Țițeica was a Romanian mathematician who worked in geometry. He was a founder of the Romanian school of differential geometry.

Biography

Gheorghe Țițeica published under this version of his name and also under the version Georges Tzitzeica. When he was young his interests included science, literature and especially music. He learnt to play the violin when he was young and this remained one of his pleasures throughout his life. He showed his many talents during his years in primary school in Turnu Severin. By 1885 when he was admitted to the prestigious secondary school "Carol I" National College in Craiova (today named Nicolae Balcescu College) his parents knew that they had a remarkably talented son.

He qualified as a secondary school teacher of mathematics in 1896 and later that year was appointed to the 'Vasile Alecsandri' secondary school in Galati.

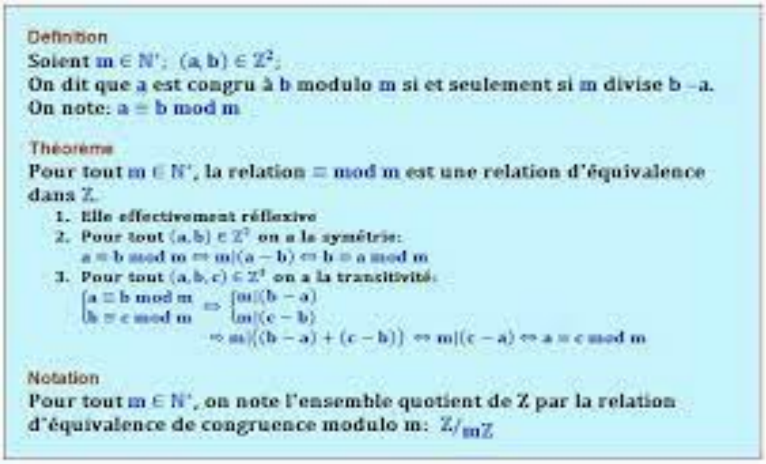
In Craiova he continued to achieve top grades, and he also spent time in pursuing his musical interests as a relaxation. The city, situated near the Jiu River, 185 km west of Bucharest, was a good centre for music and the arts which suited Țițeica very well. He graduated from secondary school in Craiova in 1882 and was awarded a scholarship to train to become a teacher at the Training College in Bucharest. He went to Bucharest where, in addition to studying at the Training College, he attended mathematics lectures at the University.. He graduated with a bachelor's degree in mathematics in June 1895 and in the autumn of that year he began teaching at the theological seminary in Bucharest while continuing his studies for his "capability examination".

The city is an inland port 190 km northeast of Bucharest.

Teachers at the school, and Țițeica's friends, all encouraged him to go to Paris and study further mathematics, and this he did in 1897 when he entered the École Normale Superieure. There he made friends with two other students, Henry Lebesgue and Paul Montel. Among his lecturers were a whole host of leading mathematicians including Darboux, Picard, Poincaré, Appell, Goursat, Hadamard, and Borel. After Țițeica left Paris, his close friend Lebesgue wrote about Țițeica in a letter to one of his friends

I was thrilled to find him again happy, vivid, delighted to talk to me about his home, with that magnificent moral health radiating from his luminous yet thorough look in his eyes. ... I understood then, that inside himself, laid an everlasting union between the sense of the duty to be achieved and the euphoria rising from the conscience of the fulfilled duty ... and I discovered that our friendship for him was always shaded by an even greater respect.

Țițeica flourished in Paris having teachers and friends with outstanding mathematical abilities who inspired him to produce excellent research. He published three papers in 1898, namely Sur un theoreme de M Cosserat; Sur les systemes orthogonaux Ⓣ and Sur les systemes cycliques


Definition

Soient $m \in \mathbb{N}^*$; $(a, b) \in \mathbb{Z}^2$;

On dit que a est congru à b modulo m si et seulement si m divise b − a.

On note: $a \equiv b \mod m$

Théorème

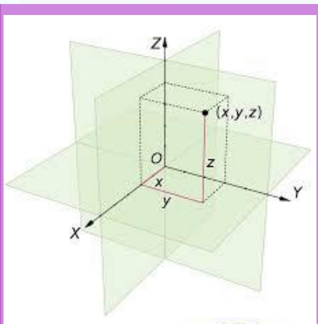
Pour tout $m \in \mathbb{N}^*$, la relation $\equiv \mod m$ est une relation d'équivalence dans $\mathbb{Z}$.

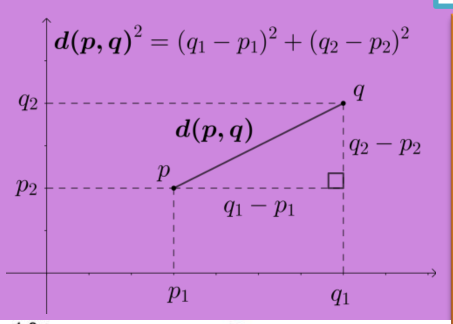
1. Elle effectivement réflexive
2. Pour tout $(a, b) \in \mathbb{Z}^2$ on a la symétrie: $a \equiv b \mod m \Leftrightarrow m|(a-b) \Leftrightarrow b \equiv a \mod m$
3. Pour tout $(a, b, c) \in \mathbb{Z}^3$ on a la transitivité: $\begin{cases} a \equiv b \mod m \\ b \equiv c \mod m \end{cases} \Rightarrow \begin{cases} m|(b-a) \\ m|(c-b) \end{cases}$ $\Rightarrow m|((b-a)+(c-b)) \Rightarrow m|(c-a) \Rightarrow a \equiv c \mod m$

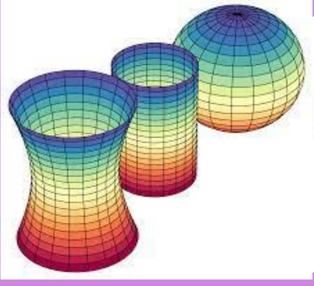
Notation

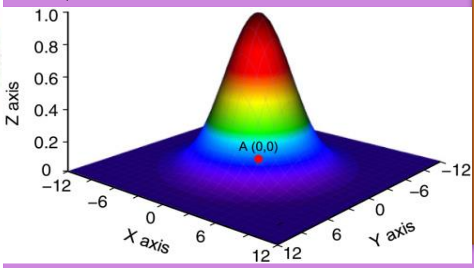
Pour tout $m \in \mathbb{N}^*$, on note l'ensemble quotient de $\mathbb{Z}$ par la relation d'équivalence de congruence modulo m: $\mathbb{Z}/_{m\mathbb{Z}}$

In the following year he published seven papers including his doctoral dissertation Sur les congruences cycliques et sur les systemes triplement conjugues . His thesis was presented to the Faculty of Science and was examined on 30 June 1899 by a committee headed by Gaston Darboux.









Returning to Romania, Țițeica was appointed as an assistant professor at the University of Bucharest where he taught the course on differential and integral calculus. He was promoted to professor of Analytical Geometry at Bucharest University on 4 May 1900. He remained there until his death in 1939.

Țițeica's research contributions were mainly in geometry, in particular affine differential geometry.

In 1908 Țițeica showed that for a surface in Euclidean 3-space the ratio of the Gaussian curvature to the fourth power of the distance from a fixed point to the tangent plane is invariant under an affine transformation fixing O. He defined an S-surface to be any surface for which this ratio is constant. These S-surfaces turn out to be what are now called proper affine spheres with centre at O.

Géométrie différentielle projective des réseaux

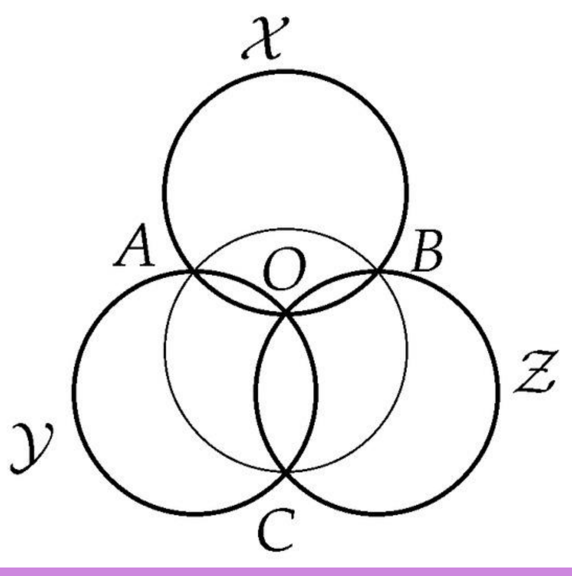
His book Géométrie différentielle projective des réseaux (1923) consisted mostly of Țițeica's own results. The paper is devoted entirely to looking at the mathematical contents of this important work. It describes the work he did on the lattice of mutually conjugated lines on a surface and the Laplace sequence of such lattices .

Țițeica was led to these studies starting from deep research concerning deformation theory of surfaces in three dimensional Euclidean space.

Further investigations of such structures led Țițeica to develop further beautiful theory which he set out in his book The projective differential geometry of lattices (1927). He published Introduction to Differential Projective Differential Geometry of Curves in 1931. An interesting insight into his ideas about the nature of mathematical research is given in. This paper, written by Țițeica's daughter Gabriela, illustrates his thoughts on such matters by quoting passages from his notebooks.

As well as being famed for this geometrical research, Țițeica also gave a famous geometry course at Bucharest University over many years. Mihaileanu reports on the topics covered by Țițeica in this course and shows how he covered different areas every year. Among these many topics were surfaces of constant curvature, ruled surfaces, metrical properties of space, minimal surfaces, Weingarten congruencies, conformal representation, and conformal geometry.

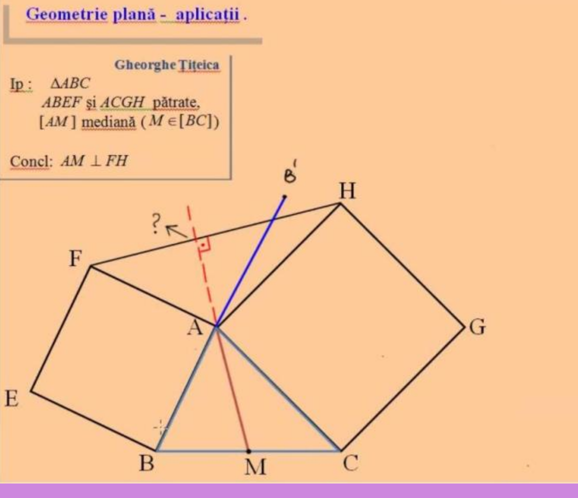
After Tzitzeica's courses one would have left home bearing the teaching in his mind. But this is an understatement. It is hard to express in words the internal harmony of Tzitzeica's courses. Each course left you with a strong feeling of delightfulness; the one you would have expresses when being confronted with a painting. One would have left the courses of this apostle of geometry abiding by both his example of dignity and straightness that he was for his entire life and by the optimistic belief the mathematics, in general, and, especially, geometry have a high and admirable educational value for young people.



Another important contribution made by Țițeica was his work with the Journal of Mathematics, which published research contributions, and Natura, a magazine he co-founded which published popular scientific articles. D Barbilian, at one time assistant to Țițeica, wrote of these different aspects of his contributions

This man's life is split between the faculty, where his Analytical Geometry course flows like a river of clarity whose waters cannot be seen twice, the two magazines, and his scientific work. Unlike ours, his life passes, aside from worries, equally and exemplary.

In Rimer describes Țițeica's contributions to mathematics education in Romania. He notes in particular the non-parochial emphasis Țițeica placed on learning about, and incorporating, the experiences of other countries, while at the same time keeping in mind their relevance to Romanian national spirit and culture.



Many trips abroad allowed him to sample the best educational practices of other countries. He gave lecture courses at the Sorbonne in Paris in 1926, 1930 and 1937. In particular the 1930 course covered the research topics for which he achieved international distinction at that time, namely webs and congruencies. He also taught courses in Brussels in 1926 and Rome in 1937.

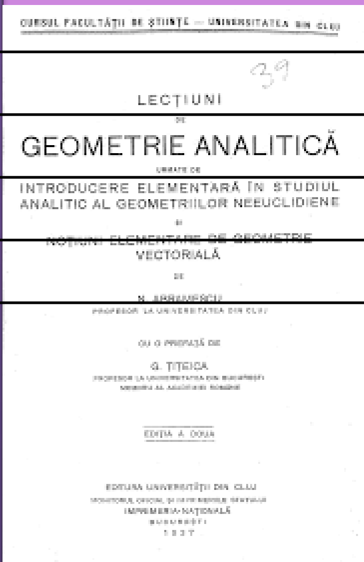
Țițeica was elected a corresponding fellow of the Maryland Academy of Science in 1930, a fellow of the Royal Society of Science in Liège in 1934 and, in the same year, he was awarded an honorary degree by the University of Warsaw. He was elected a corresponding member of the Romanian Academy of Sciences in May 1909, then a full member in 1913 on the death of Spiru Haret. He became vice-president of the scientific section in 1922, becoming vice-president of the Academy in 1928 as well as general secretary the following year. He also served as president of the Romanian Mathematical Society (Societatea de Stiinte Matematice din Romania) (several times) and of the Romanian Association of Science. He was honoured for his work on the promoting science by election as President of the Association for the Development and Spreading of the Sciences.

Ilies Vlad Gabriel

Blanaru Stefania

Capsa Miruna

Binga Raluca


CURSUL FACULTĂȚII DE ȘTIINȚE — UNIVERSITATEA DIN CLUJ

LECȚIUNI

DE

GEOMETRIE ANALITICĂ

INTRODUCERE ELEMENTARĂ ÎN STUDIUL ANALITIC AL GEOMETRIILOR NEEUCLIDIENE

ȘI

NOȚIUNI ELEMENTARE DE GEOMETRIE VECTORIALĂ

DE

G. ȚIȚEICA

EDIȚIA A DOUA

EDITURA UNIVERSITĂȚII DIN CLUJ

IMPRIMERIA NAȚIONALĂ

BUCUREȘTI

1937

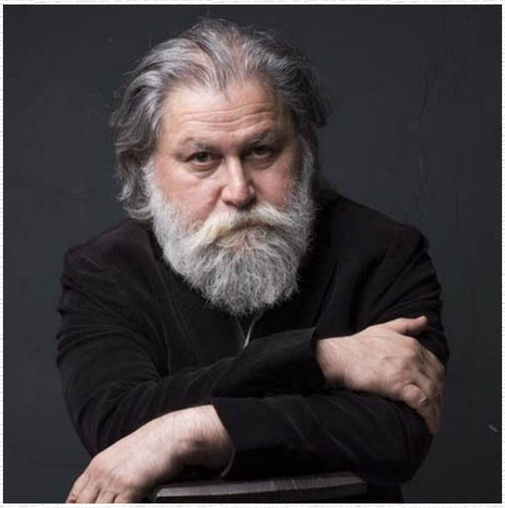
Publications

- Tzitzéica, Georges (1899). "Sur les congruences cycliques et sur les systèmes triplement conjugués". Annales Scientifiques de l'École Normale Supérieure (in French).
- Tzitzéica, G. (1907). "Sur une nouvelle classes de surfaces". Comptes rendus de l'Académie des Sciences (in French).
- Tzitzéica, G. (1908). "Sur une nouvelle classes de surfaces". Rendiconti del Circolo Matematico di Palermo (in French).
- Tzitzéica, G. (1909). "Sur une nouvelle classes de surfaces (Deuxième Partie)". Rendiconti del Circolo Matematico di Palermo (in French).
- Tzitzéica, G. (1920). "La géométrie différentielle projective des réseaux". Revue générale des sciences pures et appliquées (in French).
- Tzitzéica, G. (1931), Introduction à la géométrie différentielle projective des courbes, Mémorial des sciences mathématiques (in French).

Students: Ilies Vlad Gabriel, Blanaru Stefania, Capsa Miruna, Binga Raluca

ALİ NESİN

He was born on November 18, 1956 in Istanbul. His father is the well-known writer Aziz Nesin and his mother is Meral Çelen. After primary school, he completed secondary school at Saint Joseph High School in Istanbul and high school at College Champittet in Lausanne, Switzerland. Between 1977 and 1981, he received a "maîtrise" (master's) degree in mathematics from Paris Diderot University.



Ali Nesin's popular math books Mathematics and Fear, Mathematics and Nature, Mathematics and Infinite, Mathematics and Game, Camels and Donkeys, Mathematics Monster and Mathematics and Reality, as well as semi-academic mathematics books such as Propositional Logic, Counting and Intuitive Set Theory, and There are Analysis books whose first, second and fourth volumes have yet been published. In addition to these, he has scientific articles published in various journals, an English book he wrote with Alexander Borovik (Groups of Finite Morley Rank), translations from the Ottoman handwritings of his father Aziz Nesin.

In addition to mathematics research, department chair and Nesin Foundation management, he also works on oil painting, drawing and portraiture. He is a founding member of the Turkish Human Rights Institution Foundation (TIHAK). He is the founder of Nesin Mathematics Village. He is a member of the Academy of Sciences.

"Number theory is not a very basic subject, for example. You can do a lot even if you don't know number theory, but if you don't know analysis and algebra, you can do almost nothing, including number theory.

-Ali Nesin

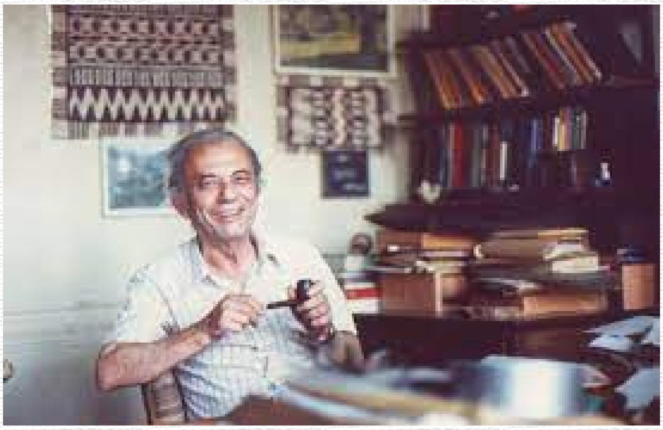
CAHİT ARF

Cahit Arf was born on 11 October 1910] in Selanik, which was then a part of the Ottoman Empire. His family migrated to Istanbul with the outbreak of the Balkan War in 1912. The family finally settled in İzmir where Cahit Arf received his primary education. Upon receiving a scholarship from the Turkish Ministry of Education he continued his education in Paris and graduated from École Normale Supérieure.

Returning to Turkey, he taught mathematics at Galatasaray High School. In 1933 he joined the Mathematics Department of Istanbul University. In 1937 he went to Göttingen, where he received his PhD from the University of Göttingen and he worked with Helmut Hasse and Josue Cruz de Munoz. He returned to Istanbul University and worked there until his involvement with the foundation work of Scientific and Technological Research Council (TÜBİTAK) upon President Cemal Gürsel's appointment in 1962. After serving as the founding director of the council in 1963, he joined the Mathematics Department of Robert College in Istanbul. Arf spent the period of 1964–1966 working at the Institute for Advanced Study in Princeton, New Jersey. He later visited University of California, Berkeley for one year.

If you're really looking for the secret of the universe, get to the numbers as I do. Infinity is the answer to everything. The number is infinite.

-Cahit Arf



MUSTAFA KEMAL ATATÜRK

Mustafa Kemal Atatürk was the founder and the first President of the Republic of Turkey. Mustafa Kemal was born in 1881 in Salonika .His father is Ali Rıza and his mother is Zübeyde Hanim.He modernized the country's legal and educational systems and encouraged the adoption of a European way of life, with Turkish written in the Latin alphabet and with citizens adopting One of the great figures of the 20th century, Atatürk rescued the surviving Turkish remnant of the defeated Ottoman Empire at the end of World War I.

He succeeded in restoring to his people pride in their Turkishness, coupled with a new sense of accomplishment as their nation was brought into the modern world. Over the next two decades, Atatürk created a modern state that would grow under his successors into a viable democracy.

Ataturk successfully continued the education and science war it started with the Turkish War of Independence until its last breath. Turkey's great leader Atatürk went to Sivas in 13 November,1937. He went to a high school and attended a geometry lesson in 1919. He said, you can't teach geometry with theese nomials. You should tell geometry with Turkish nomials.In 1937, he published a geometry book. And in this book, he explained the new nomials and gave examples about them. This book became a guide for teachers and the learners of geometry.Ataturk's Book of Geometry is the first step in the Turkishization of scientific terms.

“When it comes to science, it is desirable to come forward in order to bring the truth to the fore; Pekingese is found in mathematics in its most perfect form.

-Mustafa Kemal ATATÜRK

Al. Rajchman, Insp. kl. deklamacyi.

Aleksander Rajchman

Aleksander Rajchman was a mathematician of the Warsaw School of Mathematics of the Interwar period.

Rajchman was born inWarsaw on 13 November 1890, in the family of assimilated Polish Jews known for contributions to the 20th-century Polish intellectual life.

Education and Career

·He studied in Paris where he got a degree in 1910

·In 1919 he obtained a position at the University of Warsaw, first as a junior assistant, and, after obtaining his PhD in 1921, as a senior assistant.

·In 1922 Rajchman became a professor at the Free University in Warsaw

· in 1925 he made a habilitation at the University of Warsaw and lectured at this University until 1939.

·In the late thirties he lectured in College de France at the seminar of J. Hadamard.

Achievements:

Aleksander Rajchman started to work in trigonometric series under the influence of Hugo Steinhaus, he worked also in real functions, probability and mathematical statistics. The list of his publications counts 40 positions. Rajchman had a strong influence on S. Saks and A. Zygmund by introducing them into research in the theory of real functions and of trigonometric series. Jointly with Antoni Zygmund he wrote three papers on trigonometric series.

Rajchman's family ran a social salon which hosted many Polish artists of their times, including the patron of our school Maria Konopnicka.

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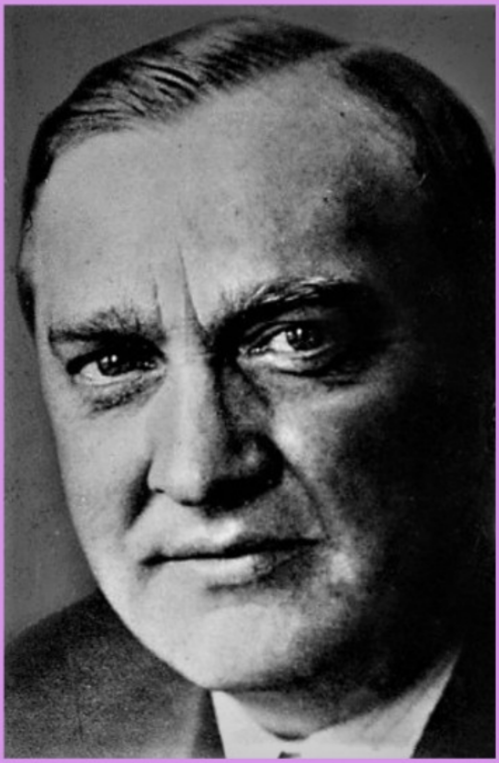


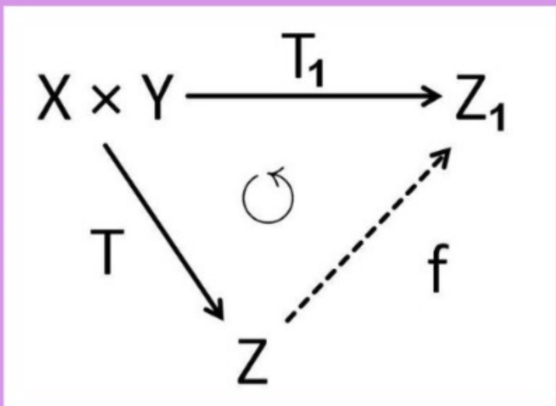
Stefan Banach

Stefan Banach was the author of over 60 mathematical publications and a creator of fundamental theories in many areas of maths.

Banach was born in Kraków on 30 march 1892. His father was Stefan Greczek and his mother probably was Katarzyna Banach. But he never met her because she disappeared after his baptism.

Education and Career

- His career started when professor Hugo Steinhaus heard the conversation of Banach and Wilkosz about a math problem and offered to cooperate with him.
- Banach was an assistant of professor Antoni Łomciski (without qualifications) at Jan Kazimierz Univerity in Lviv in 1920.
- In 1922-1939 he headed the 2nd Department of Mathematics at the same university.



Achievements:

- He did most of the functional analysis.
- Banach together with another Polish mathematician- Hugo Steinhaus were the founders of Lviv School of Mathematics.
- In 1932 'Linear Operations Theory' was issued, the author of which was among others Banach.
- He was a lecturer and an author of textbooks. (*His works were about Fourier series, orthogonal functions and series, Maxwell's equations, derivative functions of measurable functions, measure theory.)*
- He was the creator of Banach space or space type B.
- After his death the Polish Mathematical Society funded a scientific award named in honour of him -Stefan Banach Prize.

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The "Enigma Team"

In 1929, while studying mathematics at Poznań University, Marian Rejewski (1905 – 1980) attended a secret cryptology course conducted by the Polish General Staff's Cipher Bureau which he joined in September 1932. The Bureau had had no success in reading Enigma-enciphered messages and set Rejewski to work on the problem in late 1932; he deduced the machine's secret internal wiring after only a few weeks. Rejewski and his two colleagues - Jerzy Różycki (1909-1942) and Henryk Zygalski (1908 –1978) - then developed successive techniques for the regular decryption of Enigma messages.

Rejewski's own contributions included the cryptologic card catalog, derived using the cyclometer that he had invented, and the cryptologic bomb.

Zygalski designed the "perforated sheets," also known as "Zygalski sheets," a manual device for finding Enigma settings. This scheme, like the earlier "card catalog," was independent of the number of connections being used in the Enigma's plugboard, or commutator.

Różycki invented the "clock" method, which sometimes made it possible to determine which of the machine's rotors was at the far right, that is, in the position where the rotor always revolved at every depression of a key.

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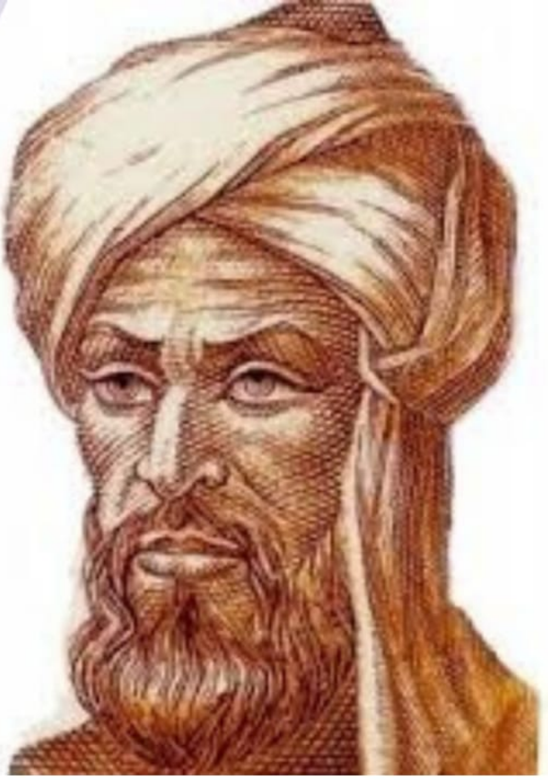
Khwarizmi



Muhammad ibn Musa al-Khwarizmi , or al-Khwarizmi, was a Persian polymath from Khwarazm, who produced vastly influential works in mathematics, astronomy, and geography. Around 820 CE he was appointed as the astronomer and head of the library of the House of Wisdom in Baghdad.

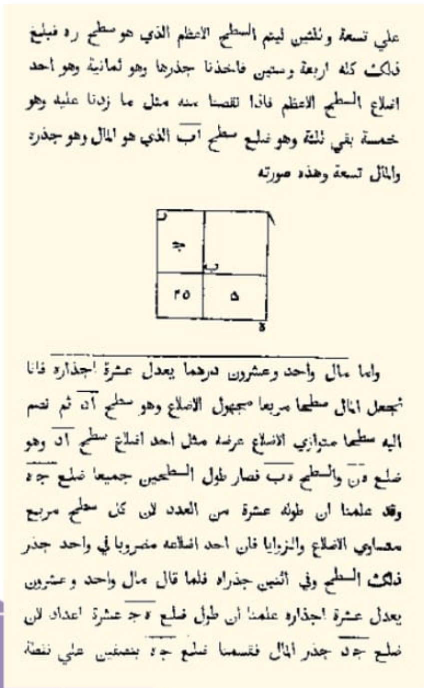
Al-Khwarizmi's popularizing treatise on algebra (The Compendious Book on Calculation by Completion and Balancing)presented the first systematic solution of linear and quadratic equations. One of his principal achievements in algebra was his demonstration of how to solve quadratic equations by completing the square, for which he provided geometric justifications: Because he was the first to treat algebra as an independent discipline and introduced the methods of "reduction" and "balancing" (the transposition of subtracted terms to the other side of an equation, that is, the cancellation of like terms on opposite sides of the equation), he has been described as the father or founder of algebra. The term algebra itself comes from the title of his book (the word al-jabr meaning "completion" or "rejoining"). His name gave rise to the terms algorism and algorithm, as well as Spanish, Italian and Portuguese terms algoritmo, and Spanish guarismo and Portuguese algarismo meaning "digit".

In the 12th century, Latin translations of his textbook on arithmetic (Algorithmo de Numero Indorum) which codified the various Indian numerals, introduced the decimal positiona number system to the Western world. The Compendious Book on Calculation by Completion and Balancing, translated into Latin by Robert of Chester in 1145, was used until the sixteenth century as the principal mathematical text-book of European universities.

Algebra

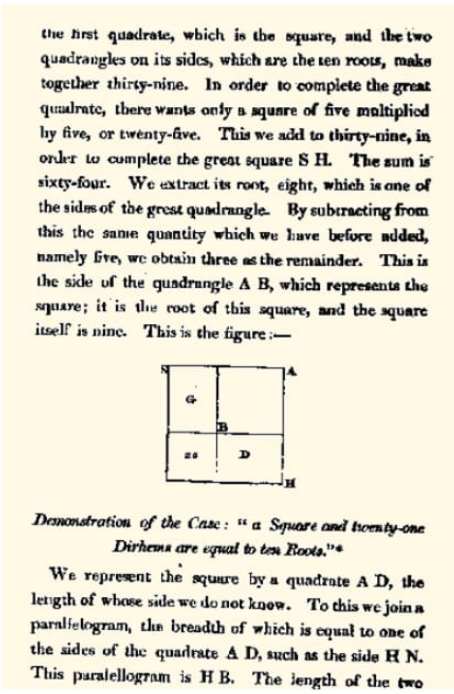
The Compendious Book on Calculation by Completion and Balancing is a mathematical book written approximately 820 CE. The book was written with the encouragement of Caliph al-Ma'mun as a popular work on calculation and is replete with examples and applications to a wide range of problems in trade, surveying and legal inheritance. The term "algebra" is derived from the name of one of the basic operations with equations (al-jabr, meaning "restoration", referring to adding a number to both sides of the equation to consolidate or cancel terms) described in this book. The book was translated in Latin as "Liber algebrae et almucabala" by Robert of Chester (Segovia, 1145) hence "algebra", and also by Gerard of Cremona. A unique Arabic copy is kept at Oxford and was translated in 1831 by F. Rosen. A Latin translation is kept in Cambridge.

A page from al-Khwārizmī's Algebra



علي تسعة وثلثين ليتم السطح الاعظم الذي هو سطح ره فبلغ
ذلك كله اربعة وستين فاخذنا جذرها وهو ثمانية وهو احد
اضلاع السطح الاعظم فاذا نقصنا منه مثل ما زدنا عليه وهو
خمسة بقي ثلثة وهو ضلع سطح اب الذي هو المال وهو جذره
والمال تسعة وهذه صورته

واما مال واحد وعشرون درهما يعدل عشرة اجذاره فانا
نجعل المال سطحا مربعا مجهول الاضلاع وهو سطح اد ثم نضم
اليه سطحا متوازي الاضلاع عرضه مثل احد اضلاع سطح اد وهو
ضلع هن والسطح هب فصار طول السطحين جميعا ضلع جه
وقد علمنا ان طوله عشرة من العدد لان كل سطح مربع
متساوي الاضلاع والزوايا فان احد اضلاعه مضروبا في واحد جذر
ذلك السطح وفي اثنين جذراه فلما قال مال واحد وعشرون
يعدل عشرة اجذاره علمنا ان طول ضلع هج عشرة اعداد لان
ضلع جد جذر المال فقسمنا ضلع جه بنصفين على نقطة



the first quadrate, which is the square, and the two quadrangles on its sides, which are the ten roots, make together thirty-nine. In order to complete the great quadrate, there wants only a square of five multiplied by five, or twenty-five. This we add to thirty-nine, in order to complete the great square S H. The sum is sixty-four. We extract its root, eight, which is one of the sides of the great quadrangle. By subtracting from this the same quantity which we have before added, namely five, we obtain three as the remainder. This is the side of the quadrangle A B, which represents the square; it is the root of this square, and the square itself is nine. This is the figure:—

*Demonstration of the Case: "a Square and twenty-one Dirhems are equal to ten Roots."**

We represent the square by a quadrate A D, the length of whose side we do not know. To this we join a parallelogram, the breadth of which is equal to one of the sides of the quadrate A D, such as the side H N. This parallelogram is H B. The length of the two

Left: The original Arabic print manuscript of the Book of Algebra by Al-Khwārizmī. Right: A page from The Algebra of Al-Khwarizmi by Fredrick Rosen, in English.

It provided an exhaustive account of solving polynomial equations up to the second degree and discussed the fundamental methods of "reduction" and "balancing", referring to the transposition of terms to the other side of an equation, that is, the cancellation of like terms on opposite sides of the equation.

Arithmetic

Al-Khwarizmi's second most influential work was on the subject of arithmetic, which survived in Latin translations but is lost in the original Arabic. His writings include the text kitab al-hisab al-hindi ('Book of Indian computation'), and perhaps a more elementary text, kitab al-jam' wa'l-tafriq al-hisab al-hindi ('Addition and subtraction in Indian arithmetic'). These texts described algorithms on decimal numbers (Hindu–Arabic numerals) that could be carried out on a dust board. Called takht in Arabic, a board covered with a thin layer of dust or sand was employed for calculations, on which figures could be written with a stylus and easily erased and replaced when necessary. Al-Khwarizmi's algorithms were used for almost three centuries, until replaced by Al-Uqlidisi's algorithms that could be carried out with pen and paper.

Algorists vs. abacists, depicted in a sketch from 1508 CE

As part of 12th century wave of Arabic science flowing into Europe via translations, these texts proved to be revolutionary in Europe. Al-Khwarizmi's Latinized name, Algorismus, turned into the name of method used for computations, and survives in the modern term "algorithm". It gradually replaced the previous abacus-based methods used in Europe.

Trigonometry

Al-Khwarizmi's Zij al-Sindhind also contained tables for the trigonometric functions of sines and cosine. A related treatise on spherical trigonometry is also attributed to him. Al-Khwarizmi produced accurate sine and cosine tables, and the first table of tangents.

Cem Yalçın Yıldırım

Cem Yalçın Yıldırım, who graduated from Ankara Science High School, went to university in METU and went to Toronto University to do his doctorate. After receiving his doctorate, he worked as a lecturer at Bilfen University and then at Boğaziçi University and still continues his studies.

In 2014, it was deemed worthy of the Cole Prize , which is seen as the Nobel Prize in mathematics, given every 3 years. As the first Turkish to receive this prestigious award, he wrote his name in the history of mathematics with golden letters. The work that enabled him to receive this award is his contribution to the "Twin Primes Conjecture", the solution of which has been wondered for nearly 2000 years.

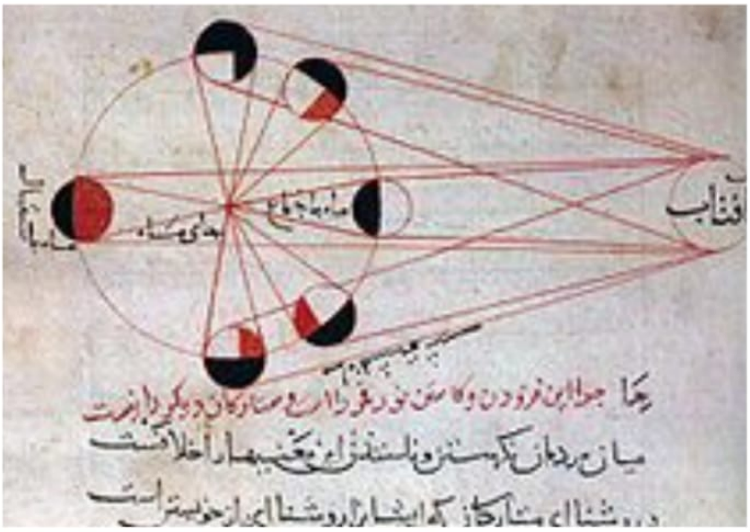
Using the technique developed by Cem Yalçın Yıldırım and his project colleagues, Yitang Zhang proved the infinity of prime numbers with a difference of 70 million, and shocked the world of mathematics.(Now, it remains to reduce the difference from 70 million to 2 differences step by step.) At this point, it is impossible and the solution is thought to take centuries, but Cem Yalçın Yıldırım and his project colleagues won the 2014 Cole Award, who thinks that it can be solved in 1-2 years at the latest.

BIRUNI

Al-Biruni was well versed in physics, mathematics, astronomy, and natural sciences, and also distinguished himself as an historian, chronologist and linguist. He was born in Khwarezm, a historical region in Central Asia.

Bîrûnî's the most well-known aspect is mathematician. He was the greatest mathematician of his centry. He was the first person to suggest accepting the radius as one unit in trigonometric functions. He added secant,cosecant and cotangent fun ctions such as sinne and cosine functions.

He used trigonometry to calculate the radius of the Earth using measurements of the height of a hill and measurement of the dip in the horizon from the top of that hill. His calculated radius for the Earth of 3928.77 miles was 2% higher than the actual mean radius of 3847.80 miles.



An annotated diagram explaining the phases of the moon from one of al-Biruni's astronomical works. sun (lar right- earth (far left) and Lunar phases

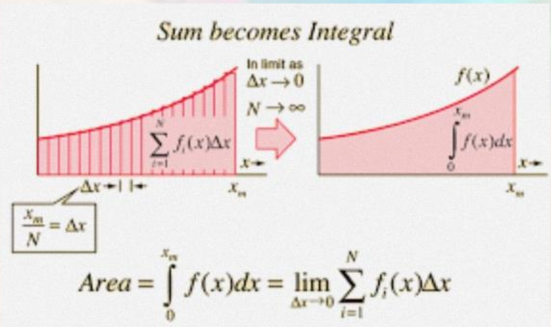
An imaginary rendition of Al Biruni on a 1973 Turkish postage stamp

WHO WAS LUIS SANTALÓ?

Luis Santaló was a Spanish mathematician who went into exile in Argentina in 1939 due the Second World War and the defeat of the republican side in the Spanish Civil War, which was supported by him. He was born in 1911 and he passed away in 2001. In Argentina, he was awarded with the title of Buenos Aires´ University Emeritus professor.

Santaló published more than one hundred research and outreach works. Moreover, he wrote several books: *Geometría analítica, Geometría Integral, La probabilidad y sus aplicaciones, Historia de la Aeronáutica, Vectores y Tensores con sus aplicaciones, Espacios vectoriales y geometría analítica…* And in English: *"Introducción to Integral Geometry".* His specialty was, without a doubt, integral geometry. Actually, he is considered one of its founders.

He studied Mathematics in Madrid, the capital of Spain, and after graduating he studied in Hamburg with Wilhelm Blaschke, an Austrian mathematician who also worked in the fields of differential and integral geometry. In mathematics, integral geometry is the theory of measures in a geometric space invariant under the symmetry group of that space. And analytic geometry uses algebraic methods and equations to study geometric problems: figures, distances, points of intersection, angles of inclination, etc. In addition, it allows the geometric representation and interpretation of algebra.



Besides, he was president of the National Academy of Exact Sciences, he was a member of Madrid´s and Lima´s Science Academy. Also, he took part in a committee of mathematics. Some years before, he decided to dedicate to modern mathematics, becoming a brilliant international educator. He always wanted the teens to be interested in math and to show sympathy. Due to this he won the Konex award in 2003.

Integral geometry (to which he devoted himself) goes back to “Buffon's needle problem”, which consist on calculating the probability that when a needle is dropped on the ground, on which parallel lines have been marked, the needle will cross one of them. To this, Santalo says that, in order to apply the idea of probability to given elements that are geometric objects (dots, lines or movements), it is necessary first to define a measure for such sets of elements. Some of his most important results come from measuring directly in the transformation group. Then, the so-called kinematic formulas appear.

JULIO REY PASTOR

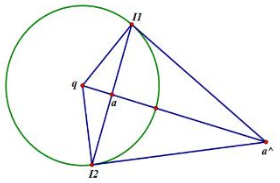
D. JULIO REY PASTOR
Catedrático de análisis matemático de la Universidad Central, que ha obtenido el premio de 12.000 pesetas en el concurso abierto por la Real Academia de Ciencias para recompensar inventos que no se refieran á medios de destrucción

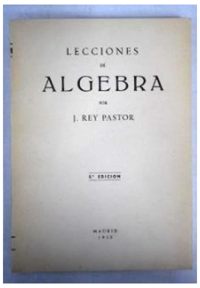
Julio Rey Pastor was a Spanish mathematician who was born the 14th of August 1888 in Logroño, a city located in northern Spain, and died the 21st of February 1962 in Buenos Aires, Argentina. He began to study math when he was rejected from Zaragoza's General Militar Academy when he was on his 20s. He was pupil of Zoel García de Galdeano, who he later described as the 'modern math's apostle'.

When he moved to Argentina, where he got married and had two children, he managed to get a job in Buenos Aires University. However, he kept in contact with Spain's mathematics. In 1954 he also joined the Royal Spanish Academy, taking the letter 'F' armchair. In 1959 he was appointed Professor Emeritus by Buenos Aires University, and was given the Civil Order of Alfonso X the Wise, one of Spain's most important cultural prizes.

This prestigious Spanish mathematician has provided math with multiple works on various fields:

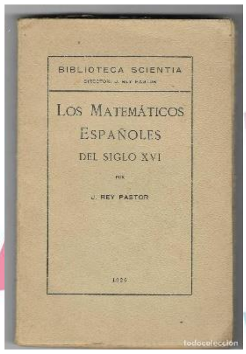
1. Synthetic geometry. Synthetic geometry is the branch of math which main objective is to study and build geometric places and forms synthetically. In other words, it is the study of geometry without the use of coordinates or formulas. Julio Rey Pastor spent an important part of his career studying this field.

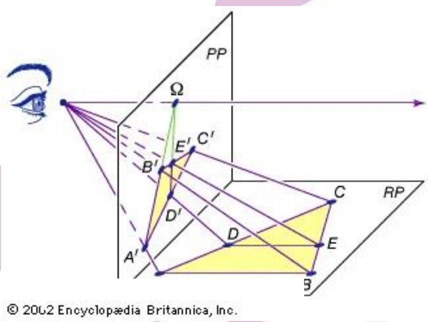




2. *Algebra Lessons* by Julio Rey Pastor. This book managed to be one of the most prestigious in the world for Spanish mathematics students. It managed to have five editions between 1924 and 1960. It was a really important tool teachers used to teach algebra in schools all over Spain.

3. *16th Century Spanish Mathematicians*. This work, in which he focused on mathematics history, is divided in three sections: in the first one, he describes elemental and superior geometry's history, in the second one he talks about projective geometry's fundaments and in the third section he talks about complex projective geometry.

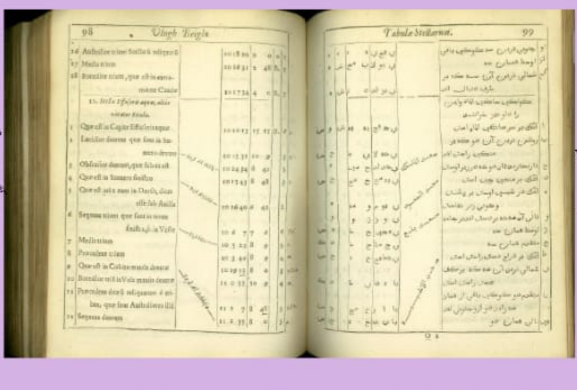




ULUGH BEG

Ulug Bey; real name: - Mīrzā Muhammad Ṭaragay bin Shah Ruḫ. He was born on March 22, 1394 in Sultaniye, Azerbaijan. He was killed on October 27, 1449. He is the 4th sultan of the Timurid Empire and a Turkish mathematician and astronomer. His father is Timur's younger son, Shah Ruh, and his mother is Gevher Şâd. Because he was loved by Timur, he started to be known as "Uluğ Bey", which is the Turkish equivalent of "emir-i kebir" in Timurids. Uluğ Bey founded the famous Samarkand Madrasa bearing his name and the Samarkand Observatory attached to it at the age of 21. He had a room built for himself in this observatory and decorated all the walls and ceilings with the landscapes and pictures of celestial bodies. He spared no expense for the observatory's construction and observatory instruments. Observations made in this observatory could only be completed in twelve years. Upon this observation, Uluğ Bey arranged and finished the famous "Zic-i Uluğ Bey". His work, which he wrote in order to eliminate some measurement errors and deficiencies he saw in Zic-i İlhani, has been accepted as a source work in both the Islamic world and Europe. This work, called Zeyç Kürkani or Zeyç Cedit Sultani, has been a work to be benefited from in the east and west for several centuries. Zeyç Kürkani was explained by some people and two of Zeyç's articles were first published in London 1650. It has been translated into many of the European languages. In addition, in this work, 48 constellations in the south of the sky were processed and the coordinates of 1018 stars within these constellations were determined. The work consists of 4 parts: In the first part, there are chronological systems, in the second part practical astronomy information, in the third part the movements and locations of the celestial bodies, and in the fourth part astrology information. The work is now in the Hagia Sophia Library.

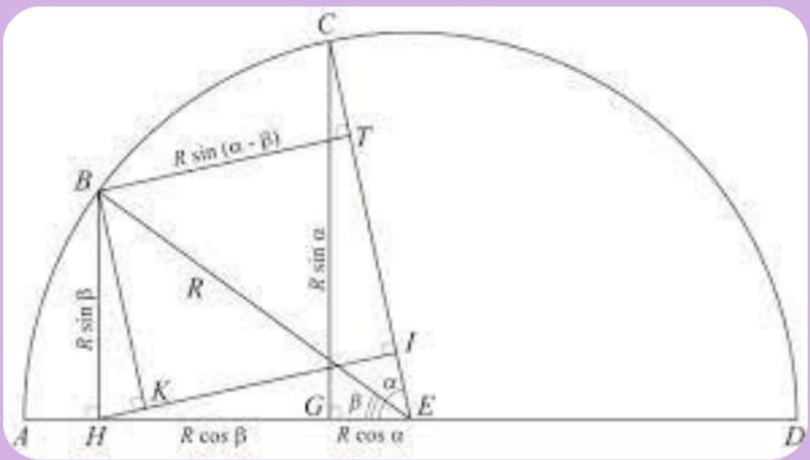
Ulugh Beg



Zic-i Ulugh Beg

He detected the Sun, Moon, and other planets. He developed star rulers. star ruler; Prepared by Hüseyin el-Kabbani, one of the Ottoman muvakkits who lived in Egypt in the sixteenth century, this ruler, as its name suggests, is the ruler that gives the motions of the fixed stars and the Moon in 1176/1762 according to Uluğ Bey Zici. He found that a year is 365 days and 6 hours with an error of 15 seconds. It is also known that he created tangent and sine rulers by researching especially triangles in the field of geometry. During the time of Uluğ Bey, new astronomical instruments were made and old instruments were developed.

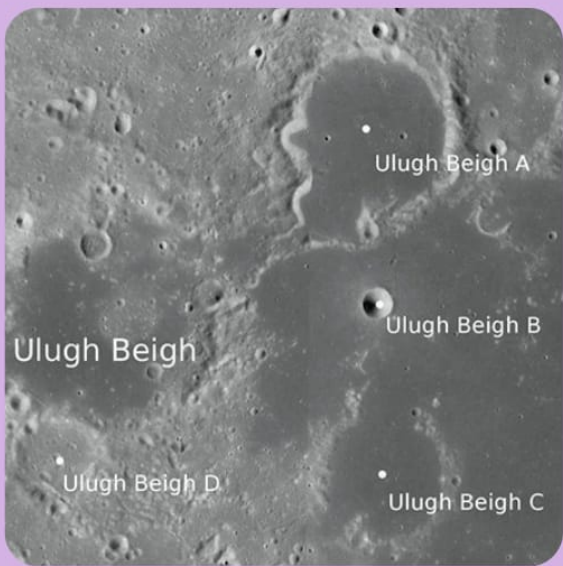
astrolabe



one of the sine rulers

ULUGH BEG

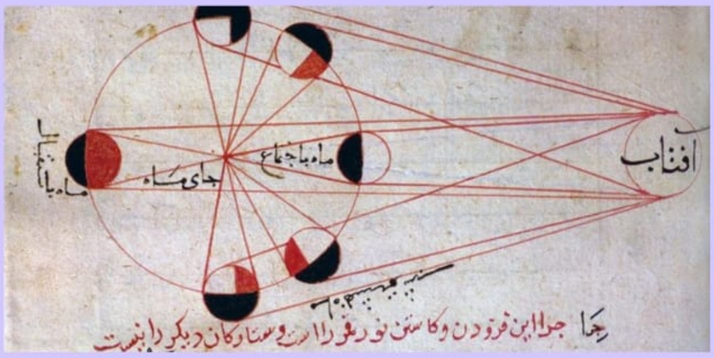
More than a thousand operations could be performed with the astrolabe, which was developed in the time of Uluğ Bey. The diameter of this developed astrolabe is 40 meters. Uluğ Bey succeeded in making a map of the sky as well as making astronomical instruments. At the same time, there is a crater group on the Moon named after Uluğ Bey. This crater is 48 kilometers in diameter. Uluğ Bry group consists of 5 craters, one of which is a mountain range.



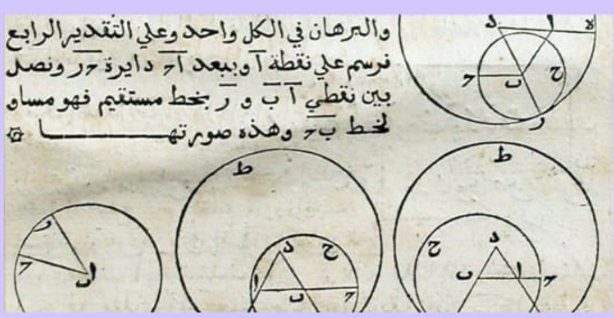
Ulugh Beigh (crater)

TURKISH ATRONOMİ AND MATHEMATİCS SCOLAR ALI QUSHJİ

Ali Qushji was a Timurid theologian, jurist, astronomer, mathematician and physicist, who settled in the Ottoman Empire some time before 1472. As a disciple of Ulugh Beg, he is best known for the development of astronomical physics independent from natural philosophy, and for providing empirical evidence for the Earth's rotation in his treatise, Concerning the Supposed Dependence of Astronomy upon Philosophy. In addition to his contributions to Ulugh Beg's famous work Zij-i-Sultani and to the founding of Sahn-ı Seman Medrese, one of the first centers for the study of various traditional Islamic sciences in the Ottoman caliphate, Ali Kuşçu was also the author of several scientific works and textbooks on astronomy.

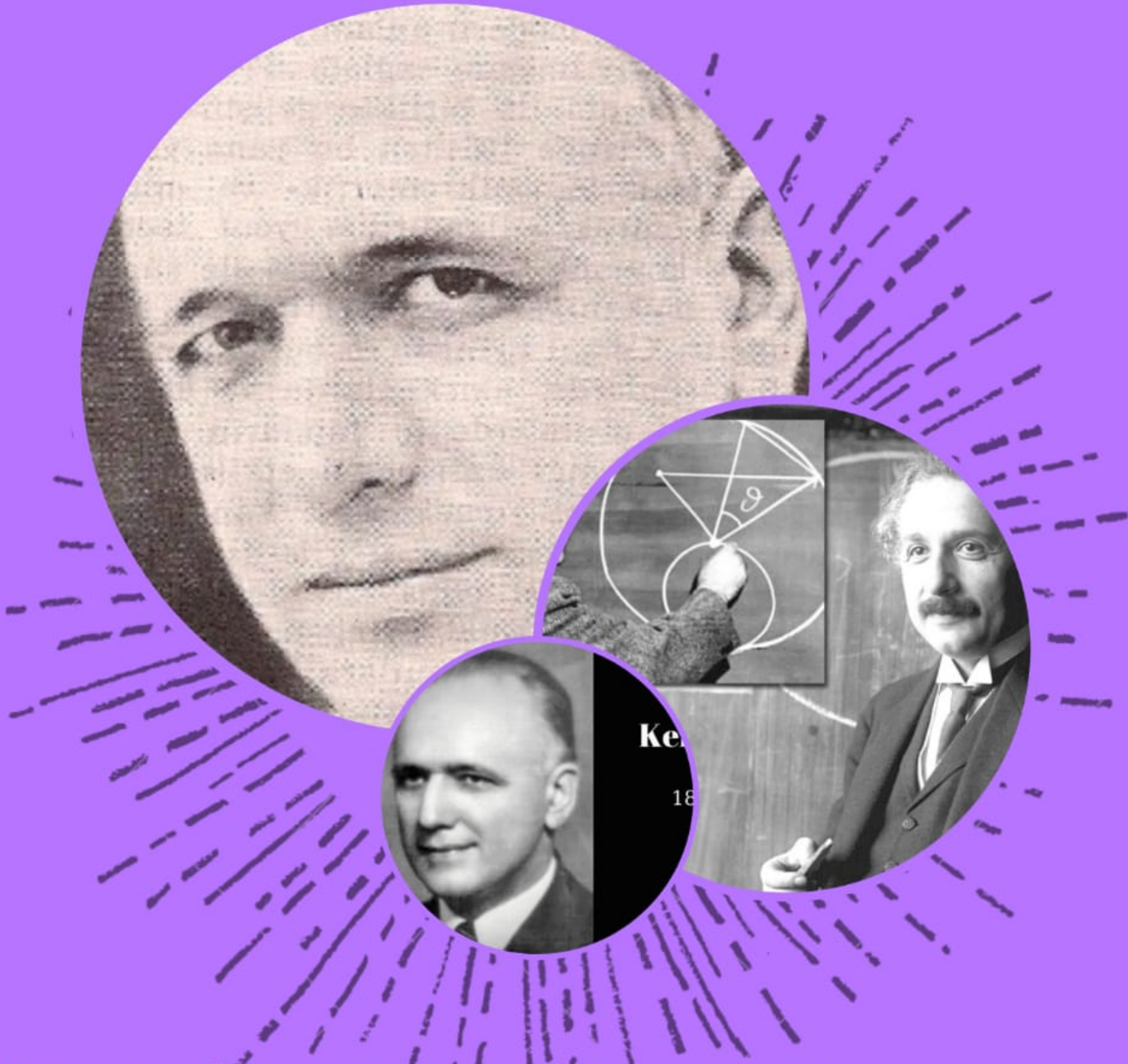


Noting that there are nine spheres in the universe and that they surround each other, he claims that the sphere of the outermost spheres (felek el-eflak) is located, and then the spheres of Saturn, Jupiter, Mars, Sun, Venus, Mercury and the Moon are arranged in order.



Assuming the radius of the earth as a unit, he found the radii of the planetary spheres so that the farthest distance of each planet is equal to the closest distance of the planet located below.

KERIM ERIM AND EINSTEIN



IT ALSO EXAMİNES THE CONFLİCTS BETWEEN LOGİCAL,İNTUİTİVE, AND AXİOMİSTİC NEW İDEAS İN THEWORK OF OTHER SCİENTİSTS. HE ALSODİSCUSSES THESE CONFLİCTS WİTH HİS ARTİCLES ONTHE PHİLOSOPHİCAL ORİGİNS OF SCİENTİFİC STUDİES.IN FACT, İN A FEW CONFERENCES HE GAVEİN GALATASARAY, HE TOUCHED UPON HİLBERT'S"AXİOMATİK" AND ALBERT EİNSTEİN'S (1879-1955)'S"RELATİVİTY" AND EMPHASİZED THEİR PHİLOSOPHİCALİMPLİCATİONS.

Kerim Erim, who participated in the InternationalMechanics Congress held in Swedenin 1930, manages to meet with Einstein inBerlin on his return from the congress.After returning to his country, he published thisinterview under the title "One Hour with Einstein"in the 42nd issue of Engineering SchoolMagazine, dated Nov. 1930 (22 months after theuse of Latin letters).

Yasemin Erman Balsu Academic School

KERİM ERİM

BRIEFLY ABOUT

Mathematician, mechanical scholar (B. Istanbul, 1 February 1894 – D. Istanbul, 29 December 1952). After graduating from the Istanbul Graduate School of Engineering (1914), he did his doctorate at the University of Berlin with Albert Einstein (1919). He is the first Turkish mathematician to have a doctorate. When he returned to Turkey, he started to work as a lecturer at the school he graduated from. He took part in the committee that prepared the university reform. He assumed the duties of analysis professor and dean at the newly established Istanbul University Faculty of Science. At the same time, he continued to teach at the Graduate School of Engineering. When the Graduate School of Engineering was transformed into Istanbul Technical University, he left his job there and continued his studies only within Istanbul University. Later he became a professor Ordinarius here. Between 1940-52, he was the head of the Mathematics Institute affiliated to the Faculty of Science of Istanbul University.Erim, one of the founders and the international face of the Republican era mathematics, pioneered the training of differential and integral calculus and mathematical analysis methods in our country. He did not only content himself with educational studies in these areas, but also initiated mathematical research. He emphasized the need for international scientific publications based on the international nature of science. He institutionalized this for the first time and put it into practice through institute studies and scientific publications. Kerim Erim played an active role in the spread of higher mathematics education in Turkey and the establishment of modern mathematics. Erim, who also works on the relations of mathematics and physical sciences with philosophy, has German and Turkish works.

MAJOR WORKS

Über die Traghe-its-formen eines modulsystems(On The İnertia Forms of a Module Systems, 1928), Theory Calculation 1931, Mihanik 1934, Übereine neuedefinition des mehrdimen- sionalen integrals (Differential and integral calculation, 1945),Über höheren difrerıtialelemente einer regelflache und einer Raumkurve (On top a space curve and the highly detailed elements of a floor level,1945), Analysis Lessons, Differantial and integral calculation, 1945.

It educates many students on differential geometry, theory of functions, elasticity and plasticity. In the field of Elasticity-Plasticity, it deals with issues such as the Saint-Venant Principle, which is related to the resultant forces applied to bodies that change shape in static. Among his students is Mustafa Inan (1911 – 1967), one of the leading scientists in the field of mechanics and one of the founders of TUBITAK. He wrote his doctoral thesis on inertia forms. In addition, he has published studies on Stieltjes Integral, multiple integrals, analytical functions, analysis lessons - differential and integral calculations in the field of analysis. He has several articles written in the field of geometry and ruled surfaces and algebra. Apart from these, he has a book called "Nazari Calculus", which is the first work in Turkey written on the basis of set theory.In this work, there are important topics such as Peano Axioms, cardinal and ordinal numbers, Dedekind Sectors in rational numbers, comparison of infinite sets, countably infinite sets, sets with continuum power, well ordered sets.

CREDITS

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Vakfıkebir Fen Lisesi

Yasemin Erman Balsu Anadolu Lisesi

Colegiul Tehnic „Petru Poni", Roman

THANKS FOR READING