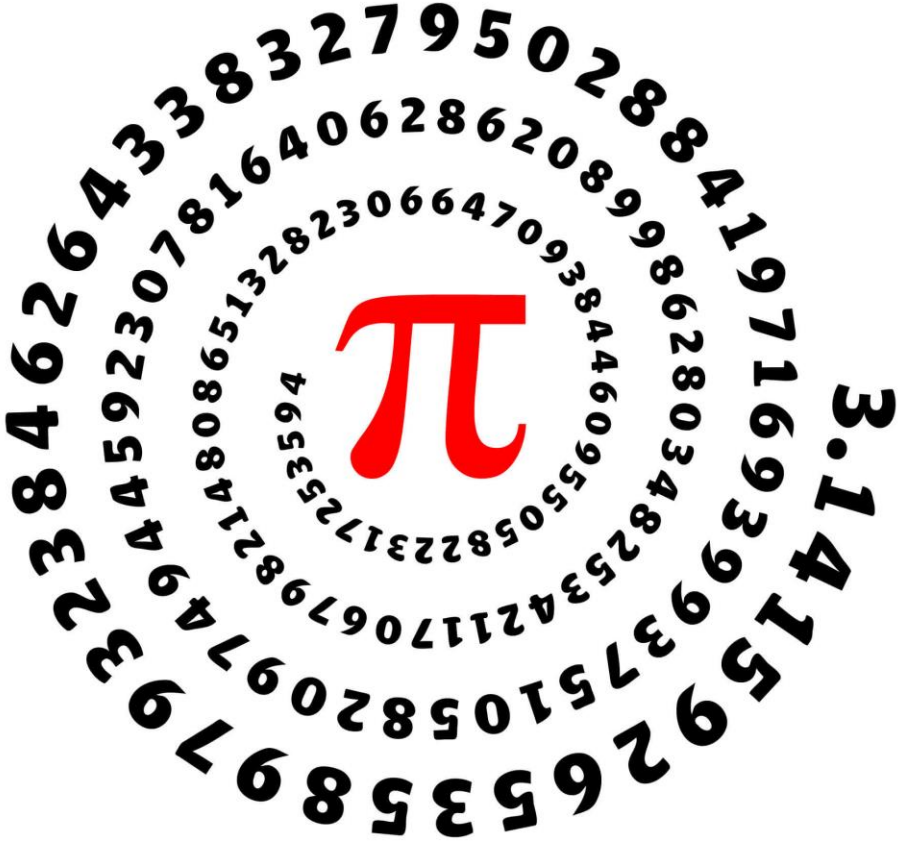
INTERNATIONAL DAY OF MATHEMATICS
MARCH 14

https://www.idm314.org

МІЖНАРОДНИЙ ДЕНЬ МАТЕМАТИКИ
14 БЕРЕЗНЯ

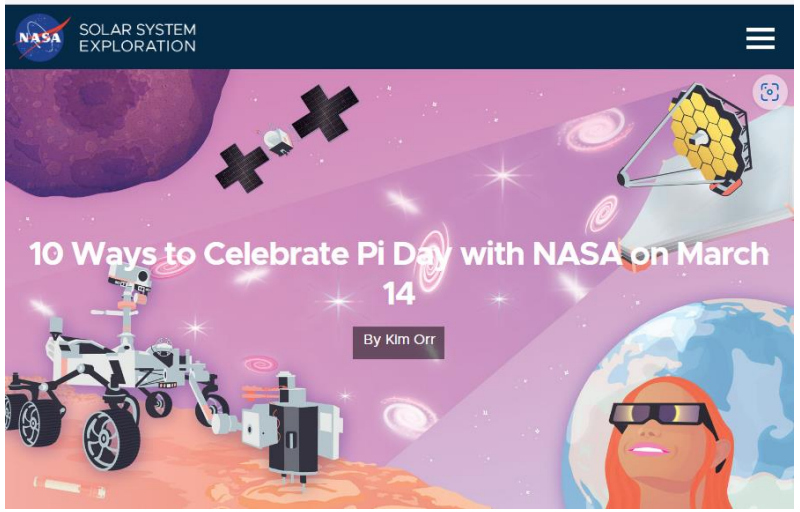
The International Day of Mathematics (IDM) is a worldwide celebration. Each year on March 14 all countries will be invited to participate through activities for both students and the general public in schools, museums, libraries and other spaces.



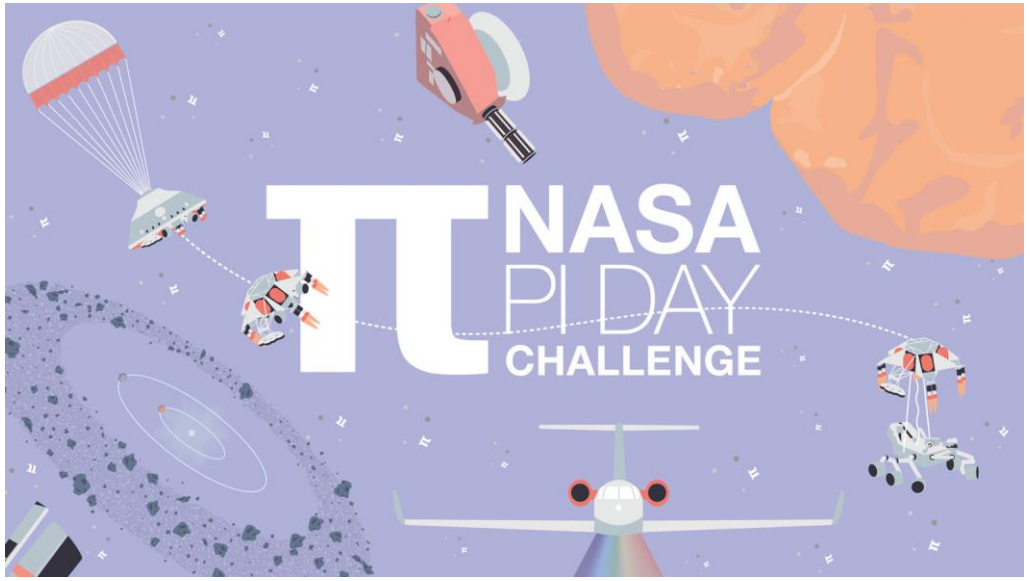
https://www.3plearning.com/world-maths-day/?

In 1987, the famous popularizer of science, physicist Larry Shaw (Lawrence N. Shaw) proposedused to celebrate Pi Day on March 14 (3.14 according to the American notation system). WITHat that time in the Exploratorium science museum (San Francisco, California), where he workedled by Larry Shaw, a mathematical festival was held every year, the popularity of which grew over timewent far beyond California. For the most ardent connoisseurs, the holiday begins with Fr1:59 AM, which together with the date is the first six digits of **π (3.14159**).

https://www.youtube.com/watch?v=4mzkSSrIdT0



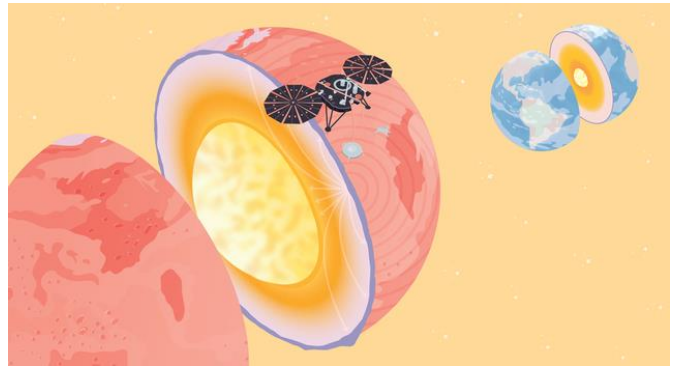
https://solarsystem.nasa.gov/news/350/10-ways-to-celebrate-pi-day-with-nasa-on-march-14/



Pi helps us explore space!

Space is full of circular and spherical features, and to explore them, engineers at NASA build spacecraft that make elliptical orbits and guzzle fuel from cylindrical fuel tanks, and measure distances on circular wheels. Beyond measurements and space travel, pi is used to find out what planets are made of and how deep alien oceans are, and to study newly discovered worlds. In other words, pi goes a long way at NASA.

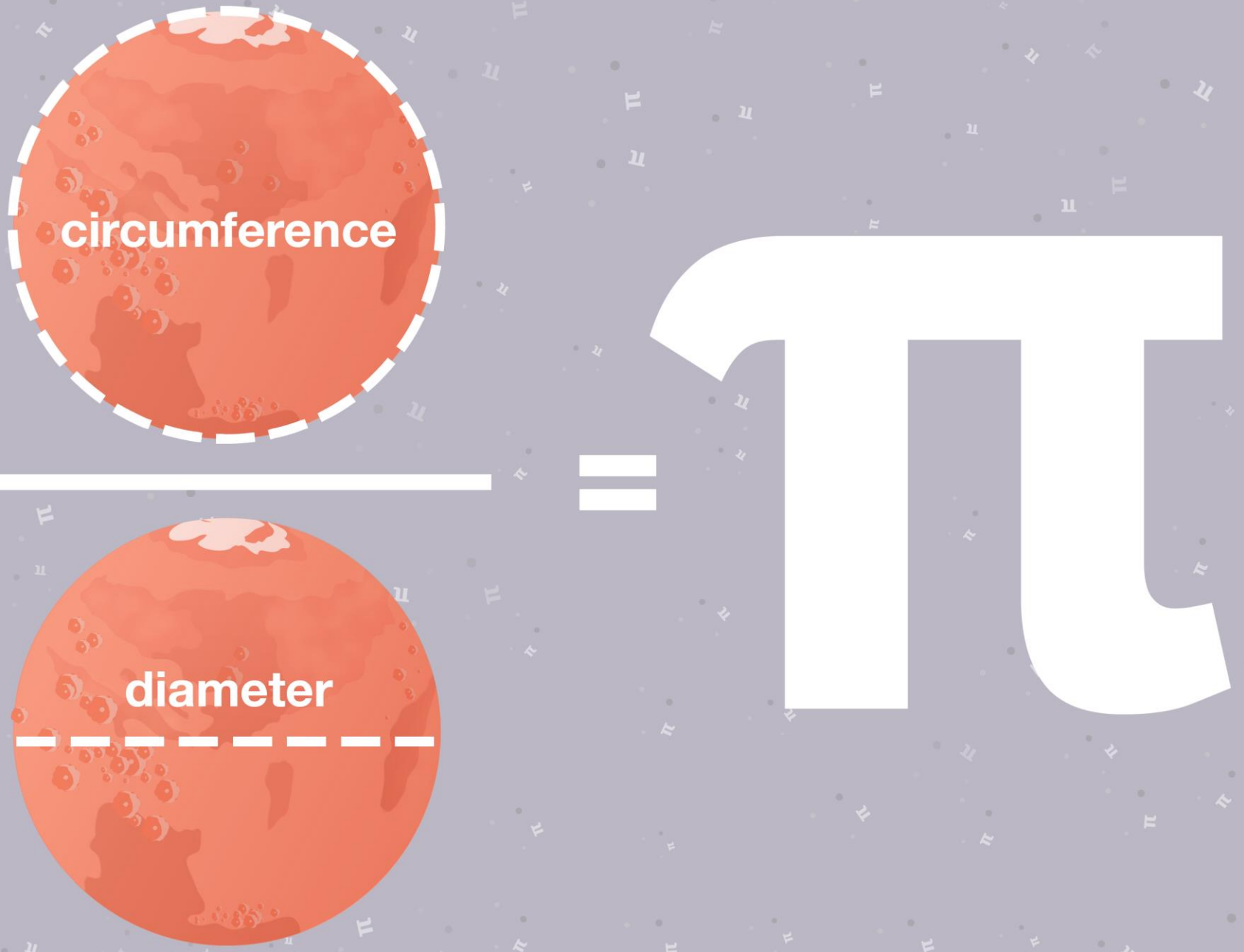
https://www.jpl.nasa.gov/edu/learn/list/oh-the-places-we-go-18-ways-nasa-uses-pi/



Not just for rocket scientists.

No Pi Day is complete without a little problem-solving. Even the math-averse will find something to love about this illustrated math challenge from NASA that features real questions scientists and engineers must answer to explore and study space – like how to determine the size of a distant planet you can't actually see. Four new problems are added to the challenge each year and answers are released soon after Pi Day.

https://www.jpl.nasa.gov/edu/pdfs/piday2022_insight_handout.pdf

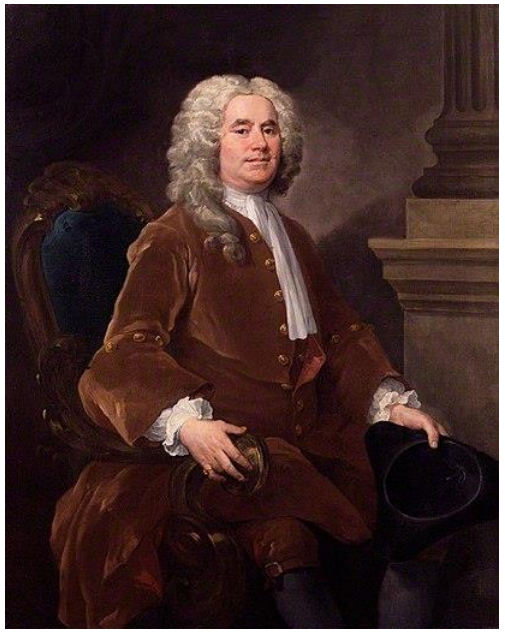

circumference
diameter
=
π

Archimedes' number The idea of replacing the circumference of a circle with the perimeter of an inscribed or circumscribed polygon was introduced by Archimedes (3rd century BC). Starting with a 6-gon, I moved on to a 12-gon, then to a 24-gon, and so on - up to a 96-gon. A good approximation turned out to give the number 22/7 ≈ 3.14.

There are various other ways of finding the *Lengths*, or *Areas* of particular *Curve Lines*, or *Planes*, which may very much facilitate the Practice; as for Inſtance, in the *Circle*, the Diameter is to Circumference as 1 to

$$\frac{16}{5}-\frac{4}{239}-\frac{1}{3}\cdot\frac{16}{5^3}-\frac{4}{239^3}+\frac{1}{5}\cdot\frac{16}{5^5}-\frac{4}{239^5}-,\&c.=$$

3.14159, &c. = π. This *Series* (among others for the ſame purpoſe, and drawn from the ſame Principle) I receiv'd from the Excellent Analyſt, and my much Eſteem'd Friend Mr. *John Machin*; and by means thereof, *Van Ceulen*'s Number, or that in Art. 64. 38. may be Examin'd with all deſireable Eaſe and Diſpatch.



Archimedes of Syracuse (/ˌɑːrkɪˈmiːdiːz/; c. 287 – c. 212 BC) was a Greek mathematician, physicist, engineer, astronomer, and inventor from the ancient city of Syracuse in Sicily.

mathematical constant π

3.14159265358979323846264338..

William Jones, FRS (1675 – 1 July 1749) was a Welsh mathematician, most noted for his use of the symbol π (the Greek letter Pi) to represent the ratio of the circumference of a circle to its diameter. He was a close friend of Sir Isaac Newton and Sir Edmund Halley. In November 1711 he became a Fellow of the Royal Society, and was later its vice-president.

We write "Pi-verse"

In American schools, students try to write poems dedicated to the number Pi. It is something like haiku - Japanese lyrical poetry, which consists of three-line unrhymed poems.
The poems have a different number of syllables in each line, that is, based on the number Pi.

Pi paper chain

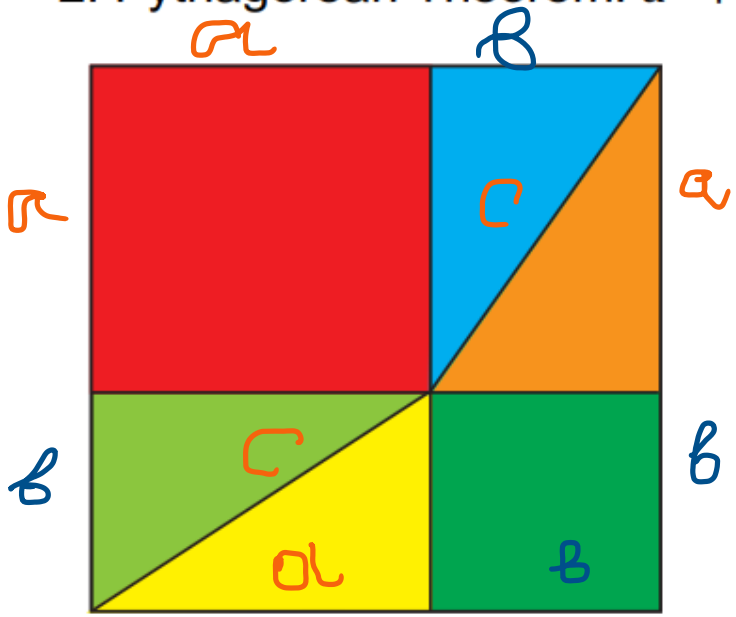
On Pi Day, American schools try to create an endless chain of colored paper. Try to repeat the same fun in your classroom. Use a different color for each of the 10 numbers. Each colored block of the chain is a component of the digits of Pi. Using a ruler and scissors, cut long rectangular strips and connect them together with an additional strip of paper signed with each student's name.

A drawing dedicated to the number Pi

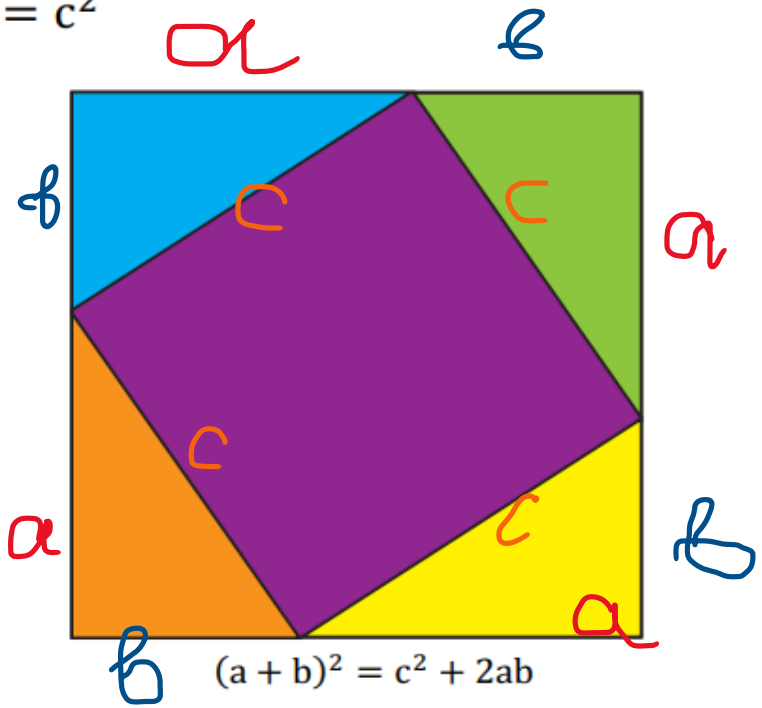
Ask the children to bring colored pencils or felt-tip pens to class and try to represent the number Pi. As an example, print a histogram of Pi. Draw the city against the background of the starry sky.

Proofs without words

2. Pythagorean Theorem: $a^2 + b^2 = c^2$



$(a + b)^2 = a^2 + b^2 + 2ab$



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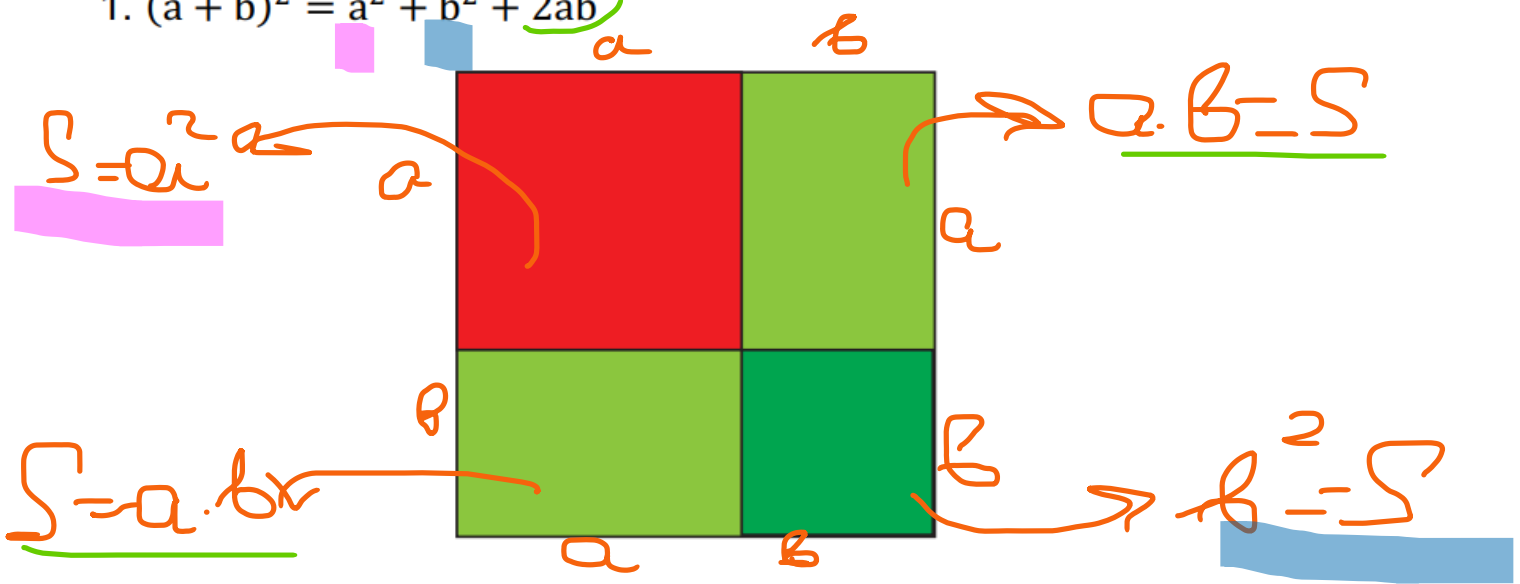
1. $(a + b)^2 = a^2 + b^2 + 2ab$



$A = \pi r^2$

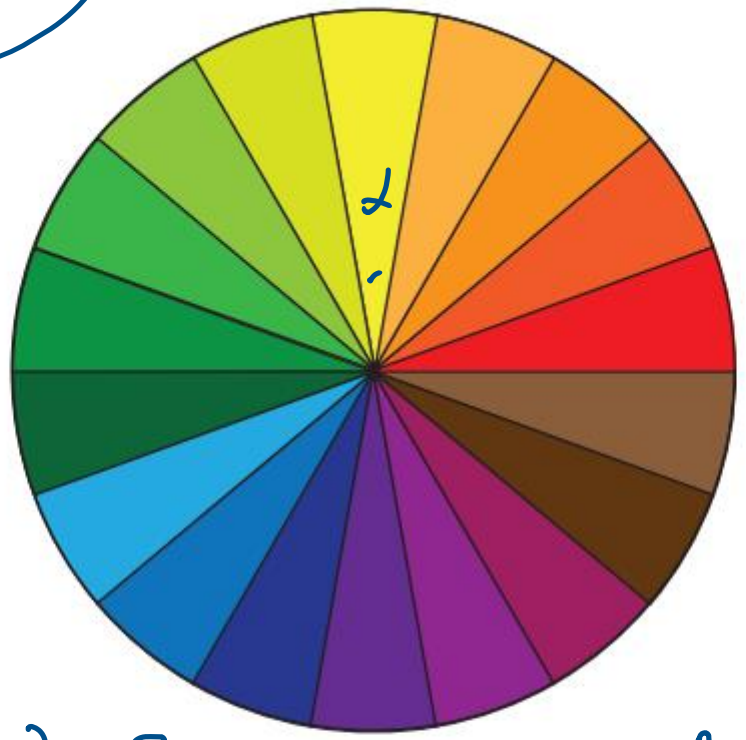
$360^\circ = 2\pi$

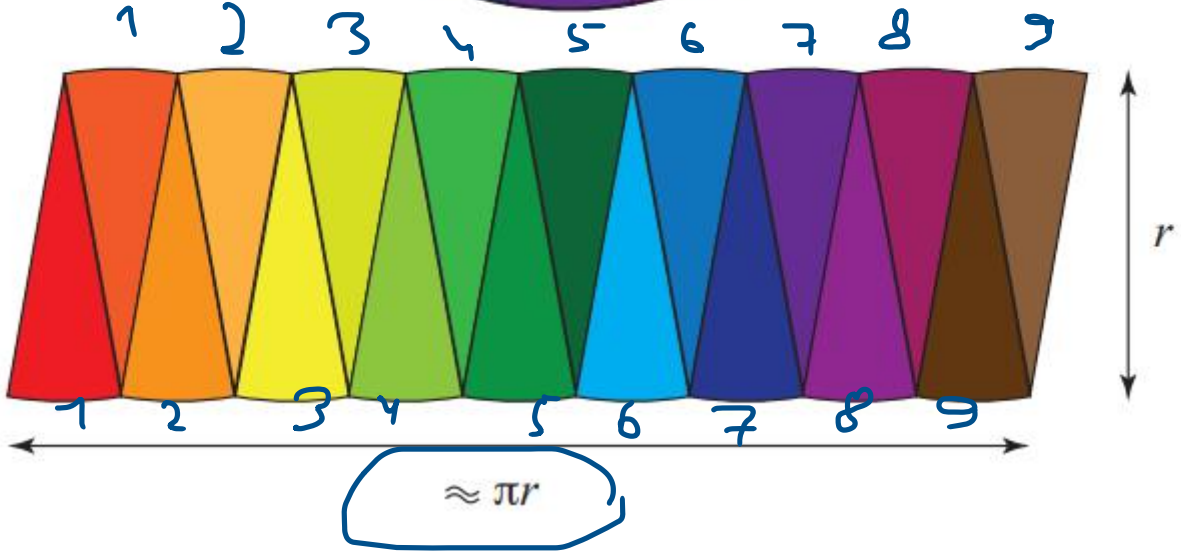
$\frac{1}{18} \cdot 360^\circ = 20^\circ = \alpha$

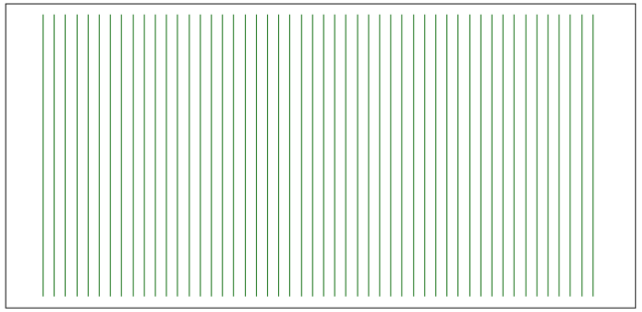
$S = \pi r^2$

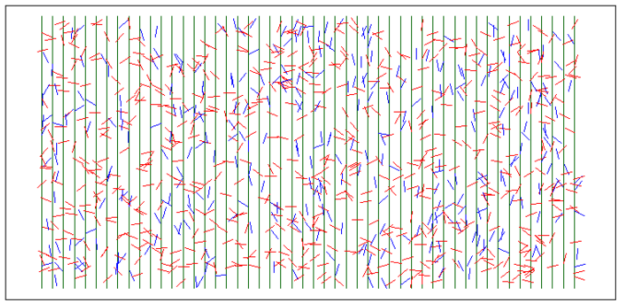
$C = 2\pi r = \pi d$

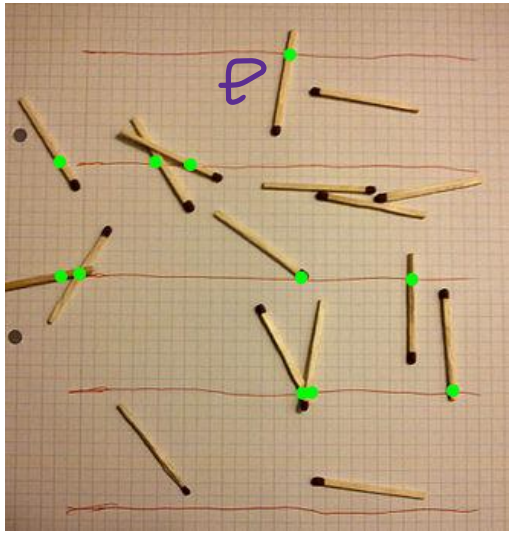
$d = 2r$











An experiment to find π. Matches with the length of 9 squares have been thrown 17 times between rows with the width of 9 squares. 11 of the matches have landed at random across the drawn lines marked by the green points.

$(2\ell \cdot n)/(am) = (2 \cdot 9 \cdot 17)/(9 \cdot 11) \approx 3.1 \approx \pi.$

$\ell = 9 \quad n = 17 \quad m = 11$

https://en.wikipedia.org/wiki/Buffon%27s_needle_problem

Suppose we threw not all the needles at once, but one at a time, and recorded at each step the ratio of the number of needles that fell on the thread to the total number of needles thrown, thereby obtaining a more and more approximation of the probability that the needle, falling, will cross the thread .

Divide the number of sticks thrown by the number of sticks that crossed the lines. The result should be close to the number π.

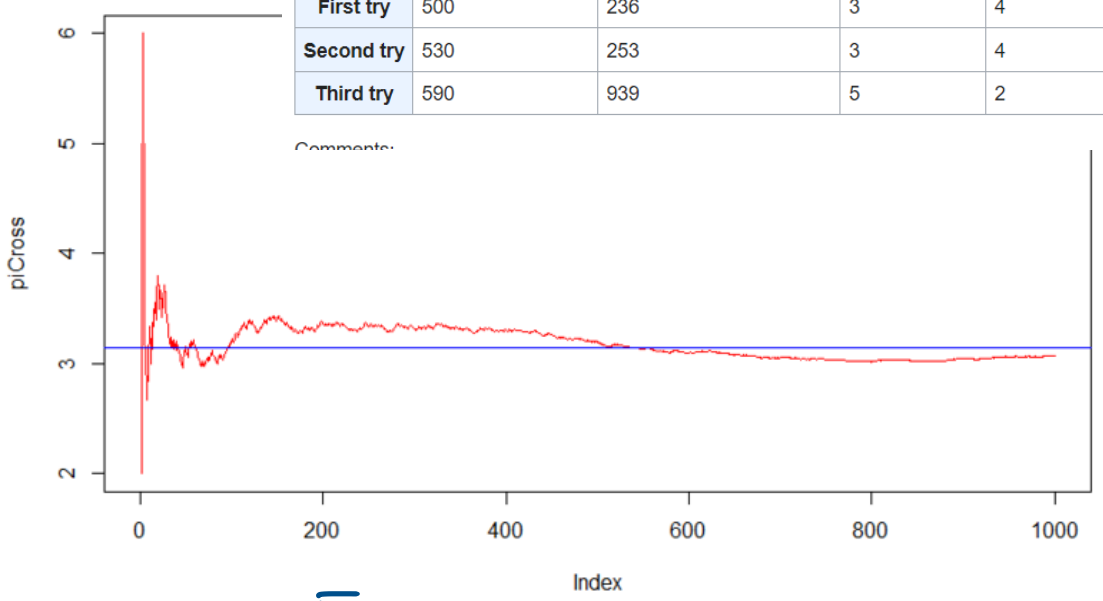
$$\pi \approx \frac{2l}{a} \cdot \frac{n}{m}$$

$2l < 2a$

2ℓ

	Number of throws	Number of intersections	Needle length	Distance between straight lines	Rotation	Pi value	Error
First try	500	236	3	4	absent	3.1780	−0.03640734
Second try	530	253	3	4	present	3.1423	−0.00070734
Third try	590	939	5	2	present	3.1416	+0.00000734

Comments:



Georges-Louis Leclerc, Comte de Buffon (1707-1788) - French natural philosopher and naturalist, mathematician and writer, quartermaster of the Royal Botanical Gardens in Paris.

$m = 25$

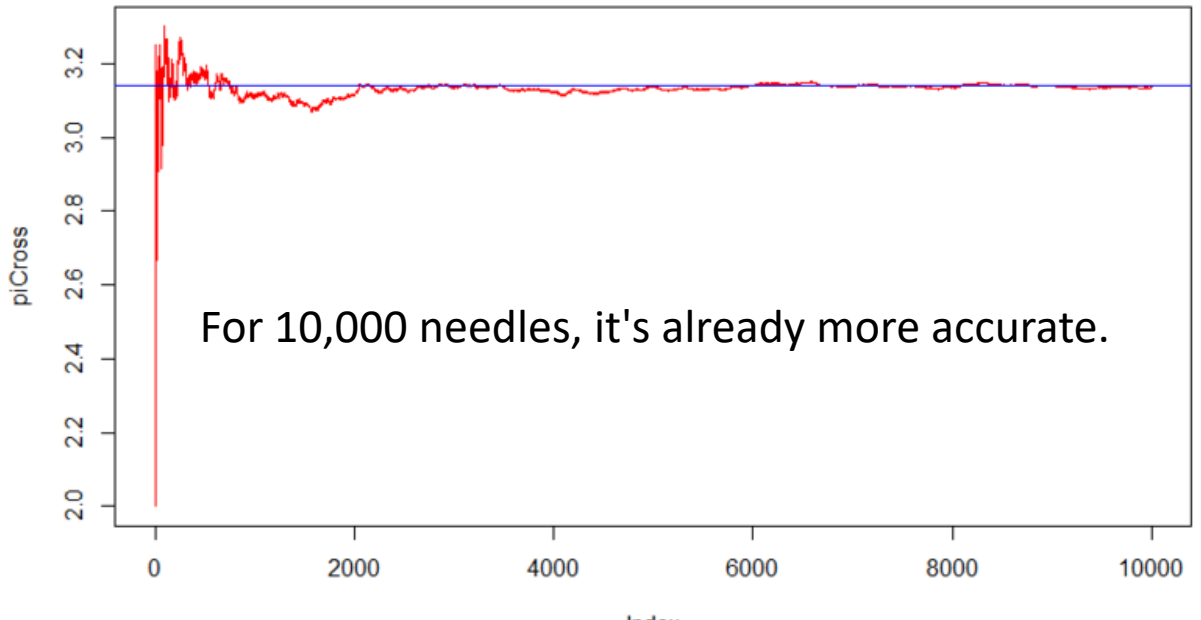
$n = 50$

$2a = 8 \Rightarrow a = 4 \quad (l < a)$

$2l = 6 \Rightarrow l = 3$

$\Rightarrow \pi \approx \frac{2l}{a} \cdot \frac{n}{m} = \frac{6}{4} \cdot \frac{50}{25} \approx 3$

This problem is based on Buffon's Needle Problem, named after the French mathematician Georges-Louis Leclerc, comte de Buffon, who first published it in the 18th century.



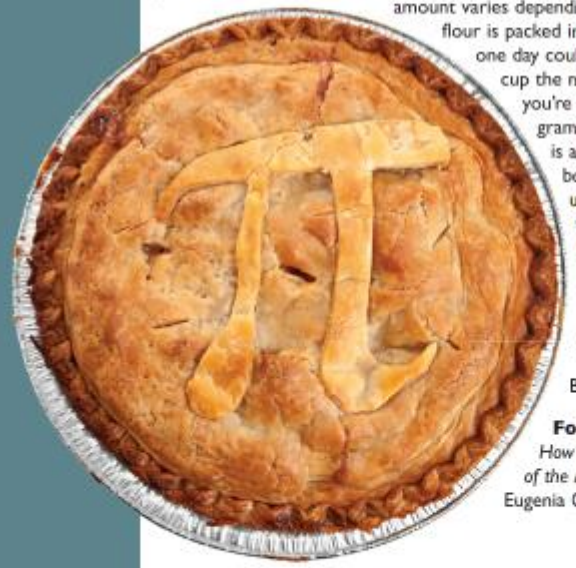
For 10,000 needles, it's already more accurate.

MATHEMATICAL MOMENTS

Mixing Math and Cooking

Math's connection with cooking extends beyond the mathematical constant that sounds like a dessert. For example, using differential equations to model fluid flow and heat transfer, research teams have found how spaghetti curls as it's cooked, how to rotate a pan to make the perfect crepe (thin pancake), and the temperature setting to get the perfect steak. Mathematics helps understand cooking, and parallels it in that following a recipe can lead to good results, but asking questions like "What if we tried this?" can lead to a masterpiece.

Most of us use volume measurements—a cup of this, a tablespoon of that—when cooking, but good cooks will tell you that it is better to measure by weight than by volume. Why? Because even though ingredients like sugar and flour are solids, their grains don't fill up 100% of the space they occupy (in fact, more like 65%), and that amount varies depending on how well the sugar or flour is packed into the cup. So a cup of flour one day could weigh more or less than a cup the next day, and thus change what you're mixing or cooking, whereas 120 grams of flour is constant. Packing is an active area of math research, both in finding packings that take up the least space and in finding those that minimize the number of containers used. Results in packing can be useful for error-correcting codes, which are crucial in cell phone and Internet communication.



Bon appétit!

For More Information:

How to Bake Pi: An Edible Exploration of the Mathematics of Mathematics, Eugenia Cheng, 2016.

Listen Up!

MM152

AMS American Mathematical Society

*The **Mathematical Moments** program promotes appreciation and understanding of the role mathematics plays in science, nature, technology, and human culture.*

www.ams.org/mathmoments

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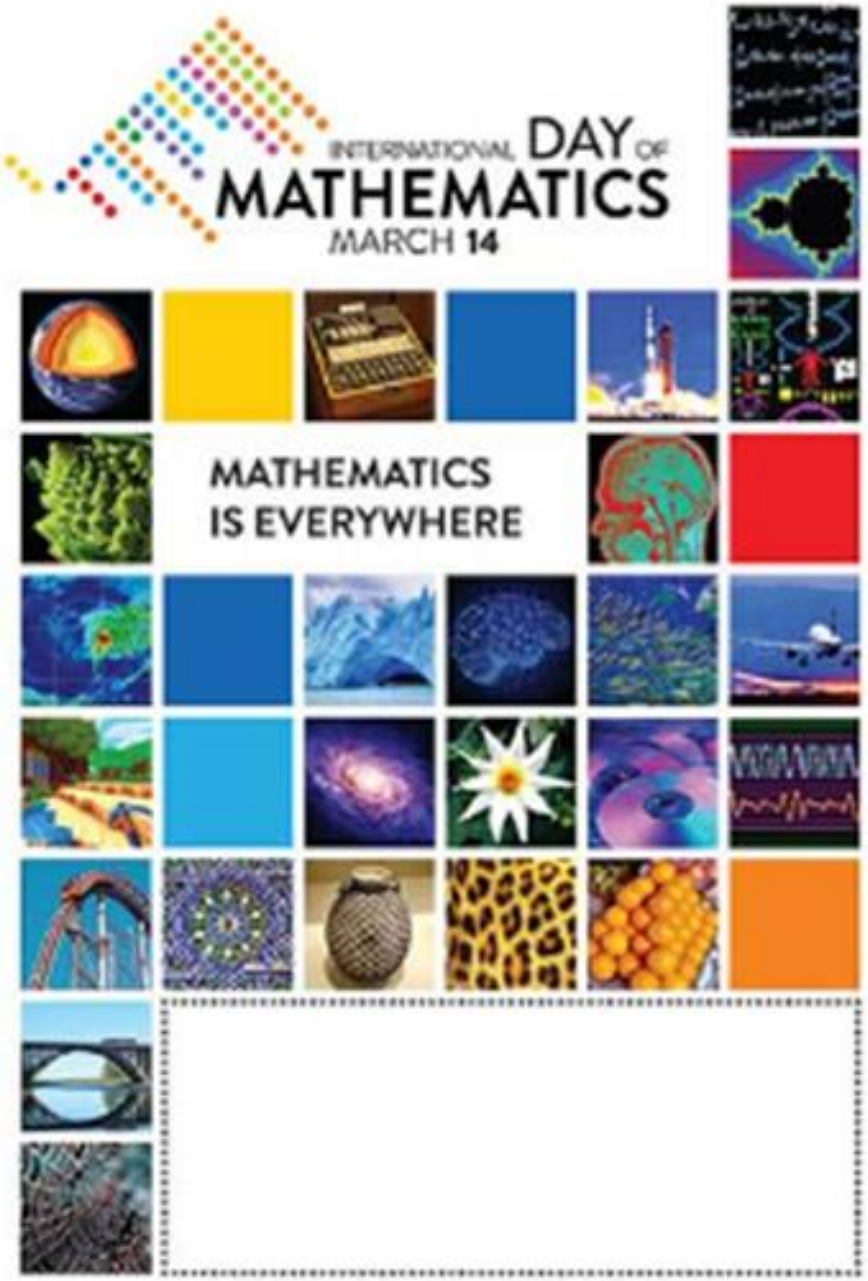
AMS

How does NASA celebrate?

In a way, we celebrate Pi Day every day by using pi to explore space. But in our free time, we've been known to make and eat space-themed pies, too! Share your own nerdy celebrations with us here.



Find objects around you related to mathematics

Numbers that represent something else. For example: the numbers in a clock represent amounts of time (minutes, hours).	The largest number you can find.	Something from nature with a very geometrical shape. A flower, plant, fruit, vegetable, rock, etc.	A very geometrical construction. A building, sculpture, bridge, arch, doorway, window or other things built by humans.
			
A piece of art that uses interesting geometric shapes.	A group of things too large to be counted.	A thing whose shape is made of flat surfaces and hard edges, with no curves.	A thing whose shape is made only of curved surfaces
			

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Something you imagine requiring very precise measurements or complex calculations to build.

Circles inside other circles.

As many squares or rectangles as you can fit in the same picture.

The polygon with the largest amount of sides you can find.

A polygon is a flat closed shape whose sides are all straight lines.

An imperfect circle.

Something that is almost perfectly circular, but not quite.

A hidden triangle.

A triangle formed by edges of things or in the space between things and that is only visible from a particular position and direction.

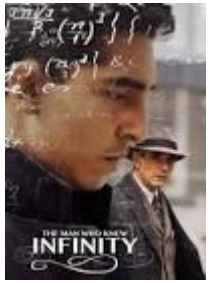
A design made by placing geometric shapes one next to the other, with no gaps.

For example geometric floor or wall tiles.

Things or shapes arranged in a colorful and symmetrical design.

Similar to a kaleidoscope, a geometrical flower or the wings of a butterfly.

A group of things whose color, size or shape follows a repeating pattern.	A group of similar things that apparently are randomly distributed, following no pattern.	A group of similar things, ordered by size.	An object that would be a very fast and exciting slide if you could shrink your body.
			



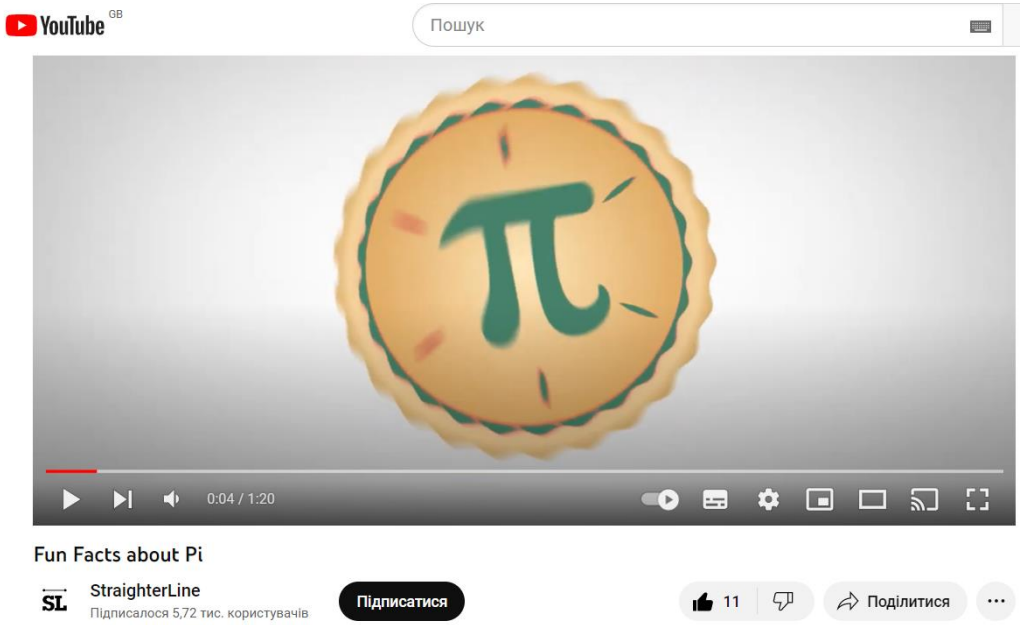
The Man Who Knew Infinity is a 2015 British biographical drama film based on the book of the same name by Robert Kanigel.

"**Mind Games**" (English: A Beautiful Mind) is a biographical drama directed by Ron Howard based on the book of the same name by Sylvia Nazar . The film received four "Oscars" (best film , adapted screenplay , direction , supporting actress - Jennifer Connelly) [4] , "Golden Globe" (best film - drama) and was awarded several BAFTA prizes . The premiere took place on December 21, 2001 in the USA. The tape was positively received by critics and collected more than 300 million dollars worldwide. As of February 1, 2023, the film was ranked 143rd in the list of the 250 best films by IMDb .

"Hidden Figures" (English: Hidden Figures) is an American drama film directed by Ted Melfi based on the book of the same name by Margot Lee Shetterly, which is based on real events.The film tells the story of a group of African-American women who carry out for NASA a series of mathematical calculations necessary to launch the first manned US space missions.

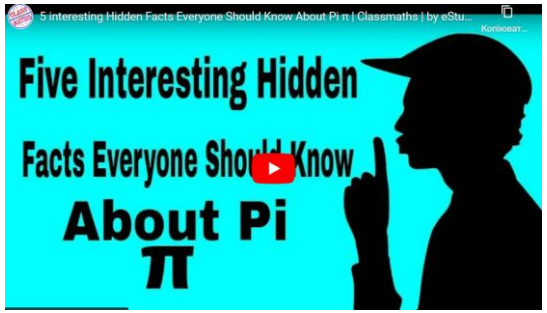
Gifted is an American drama film directed by Mark Webb . Starring Chris Evans , McKenna Grace, Lindsay Duncan, Jenny Slate and Octavia Spencer . The plot revolves around an intellectually gifted 7-year-old girl, for whose custody her uncle and grandmother begin to fight. The film was released on April 7, 2017

X+Y, released in the US as A Brilliant Young Mind, is a 2014 British drama film directed by Morgan Matthews and starring Asa Butterfield, Rafe Spall and Sally Hawkins.
The film, inspired by the documentary Beautiful Young Minds, focuses on a teenage English mathematics prodigy named Nathan (Asa Butterfield) who has difficulty understanding people, and is autistic, but finds comfort in numbers. When he is chosen to represent the United Kingdom at the International Mathematical Olympiad (IMO), Nathan embarks on a journey in which he faces unexpected challenges, such as understanding the nature of love. The character of Nathan was based on Daniel Lightwing who won a silver medal at the 2006 IMO



https://www.youtube.com/watch?v=0py5ZVlgdlc

https://www.youtube.com/watch?v=9a5vHXsUvUw



https://estudynow.com/interesting-facts-about-pi/#Relationship_between_Pi_and_Gravity

https://www.imdb.com/title/tt1186830/

A historical drama set in Roman Egypt, concerning a slave who turns to the rising tide of Christianity in the hope of pursuing freedom while falling in love with his mistress, the philosophy and mathematics professor Hypatia of Alexandria.

Biographies of Women Mathematicians
https://mathwomen.agnesscott.o/women/women.htm

AGNES SCOTT COLLEGE
THE WORLD. FOR WOMEN.

Maria Gaetana Agnesi

May 16, 1718 - January 9, 1799

https://mathwomen.agnesscott.org/women/agnesi.htm

https://www.desmos.com/calculator/kfocsjfch9