Mathigon

Principles

Active Learning

Our unique content format allows students to explore, discover, be creative, and learn problem solving.

Personalisation

The content can adapt to different students, and a virtual personal tutor provides real-time feedback.

Storytelling

Abstract concepts come to live using captivating narratives, real-life applications, and colourful illustrations.

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Textbook of the Future

Circles and Pi

- Introduction
- Degrees and Radians
- Tangents, Chords and Arcs
- The Circle Theorems
- Cyclic Polygons
- Spheres, Cones and Cylinders
- Conic Sections

The Area of a Circle

But how do we actually calculate the area of a circle? Let's try the same technique we used for finding the area quadrilaterals: we cut the shape into multiple different parts, and then rearrange them into a different shape we already know the area of (e.g. a rectangle or a triangle).

The only difference is that, because circles are curved, we have to use some approximations:

Here you can see a circle divided into six wedges. Move the slider, to line up the wedges in one row.

If we increase the number of wedges to ◂ 6 ▸, this shape starts to look more and more like a ???.

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Source code of Mathigon's interactive textbooks https://mathigon.org

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465 commits | **3** branches | **49** releases | **8** contributors

Branch: **master** | New pull request | Create new file | Upload files | Find File | Clone or download

plegner Update server assets — Latest commit `3f35816` 6 days ago

content	Update server assets	6 days ago
server	Update server assets	6 days ago
.eslintrc	Geopad changes, new content for Transformations andTrigonometry	last year
.gitignore	Add local development server	last year
README.md	Update server assets	6 months ago
curriculum.yaml	Fix curriculum bugs	18 days ago
gruntfile.js	Bug fixes and updates server assets	11 days ago
package.json	Update server assets, escape $ characters	14 days ago

README.md

Mathigon Textbooks

序列和模式

預告片
介绍
算术序列和几何序列
形数
斐波那契序列
特殊序列
帕斯卡三角
极限与收敛

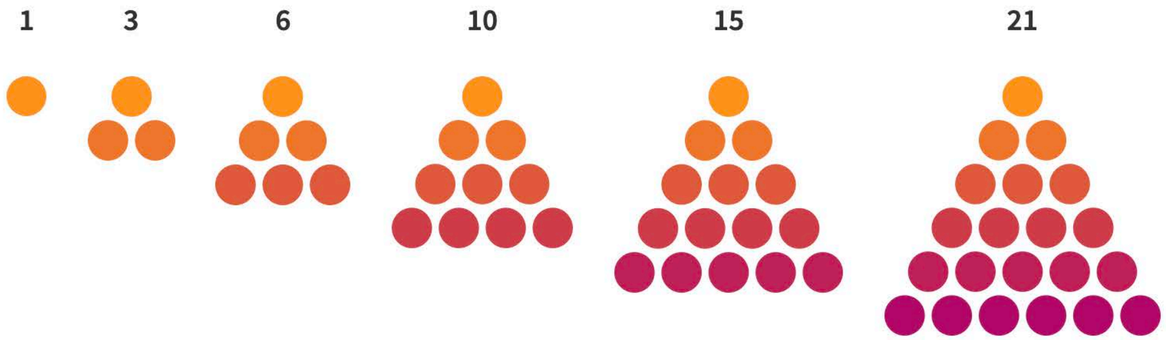
形数

几何序列的名称非常令人困惑，因为它们与几何没有任 何关系。事实上，这个名字是在几百年前发明的，当时数学家们以更为几何的方式思 考_乘法*和*平方根_。

然而，还有许多其他的序列*是*基于特定的几何图形的，其中一些已经在简介中看到。 这些序列通常被称为**形数**，在本节中，我们将更详细 地了解其中的一些序列。

三角形数

三角形数是通过创建逐渐增大的三角形而生成的：



经看到了三角形数的递归公式： x_n = ??? .

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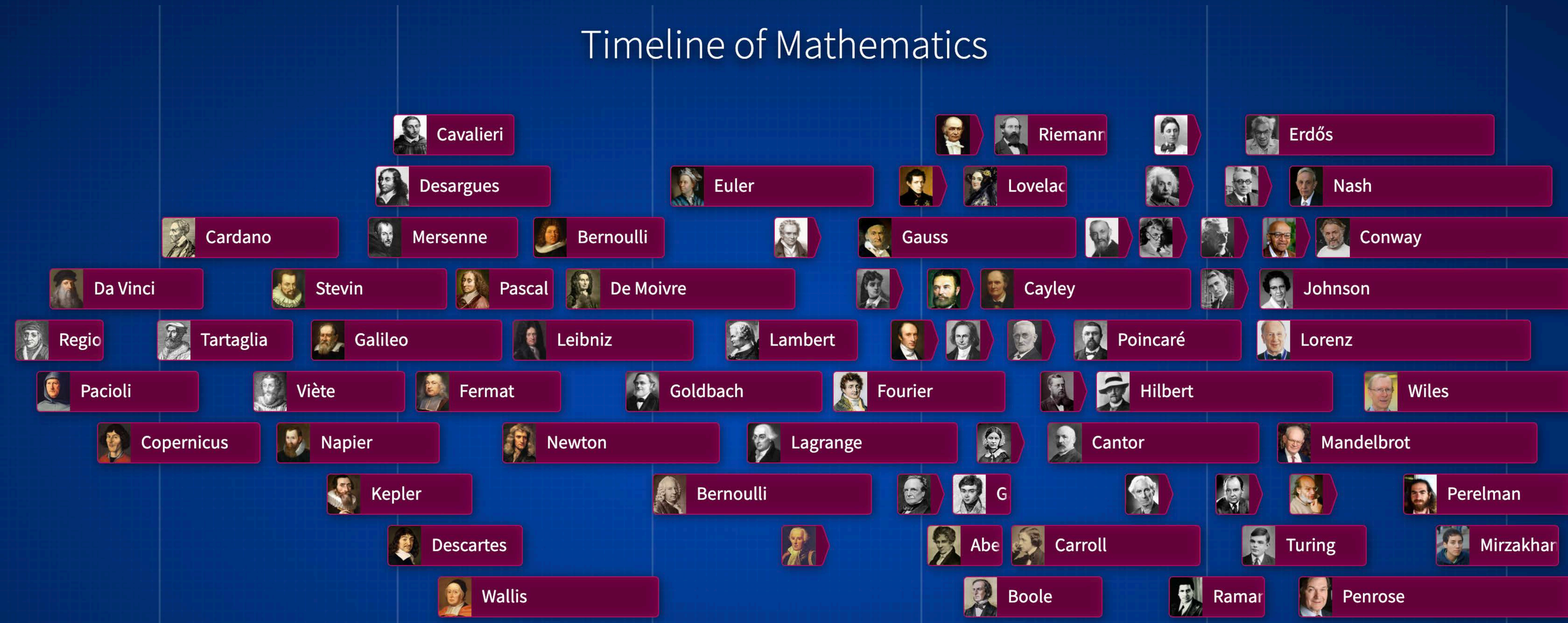
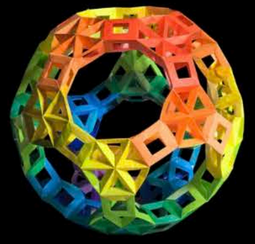
Timeline of Mathematics



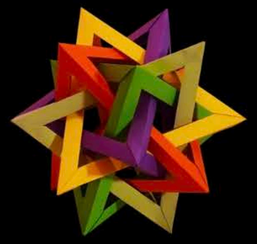
Rhombicosidodecahedron



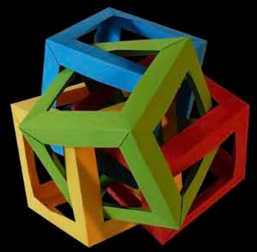
Truncated Icosidodecahedron

Snub Dodecahedron

Stars and Compounds



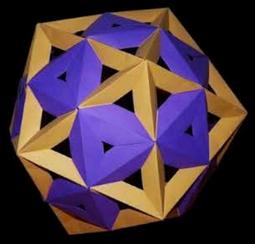
Intersecting Tetrahedra



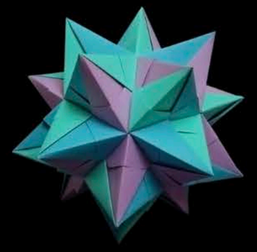
Intersecting Cubes

Intersecting Dodecahedra

Icosahedron and Dodecahedron

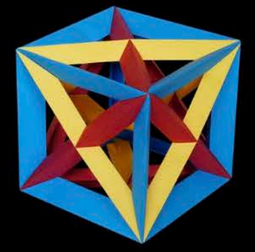


Icosahedron and Icosidodecahedron

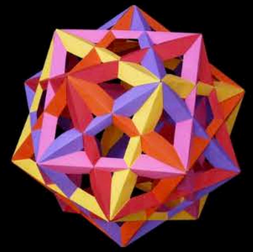


Spiked Icosahedron

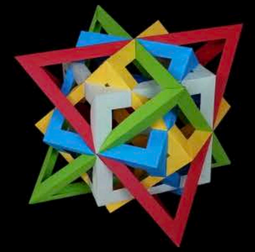
Stellated Icosahedron



Two Tetrahedra and a Sunken Cube



Intersection of Four Cubes



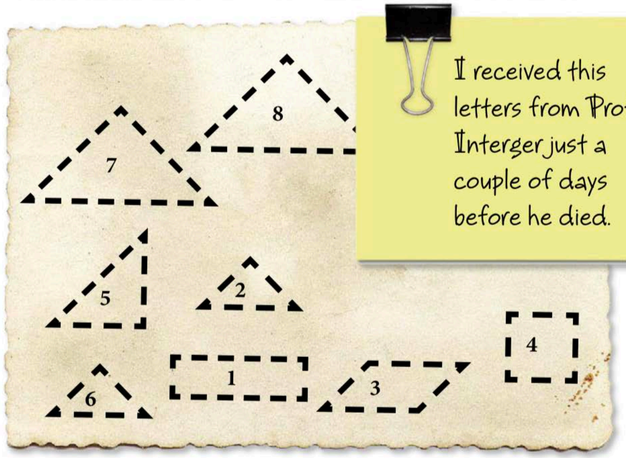
Three Cubes and Two Tetrahedra

Problem I: Tangram

Today when browsing a shop in Chinatown, I discovered a fantastic game, called Tangram: it consists of geometric shapes which can be combined to make new ones.

You are given a certain shape, like a square, and you have to use all of the tiles available to make that shape.

Unfortunately I mixed up two games and couldn't figure out which tile didn't belong there. 8 of the tiles on the back can be used to make a square: find the one that is left over.



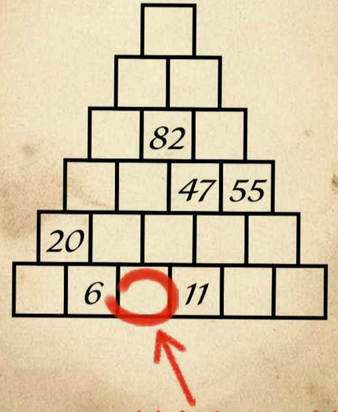
I received this letters from Prof. Interger just a couple of days before he died.

Hurry, less than
80 days,
For you to reach
the problem's place.

Up and down
and left and right,
The staircases,
they do excite.

Problem D: Number Pyramid

Last night I was thinking about a large number pyramid. Unfortunately I spilled my coffee, and I lost many of the numbers – only 6 remained legible. I was thinking about it for some time, and I think it is possible to reconstruct the whole pyramid using only those 6 numbers!

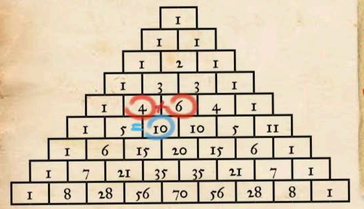


Two lines or curves are orthogonal if they are perpendicular at their point of intersection. Two vectors are orthogonal if and only if their dot product is zero.

Pascal's Triangle

In mathematics, Pascal's triangle is a triangular array of binomial coefficients. It is named after the French mathematician Blaise Pascal, but other mathematicians studied it centuries before him in India and China.

A simple construction of the triangle proceeds in the following manner. In the first row, write only the number 1. Then, to construct the elements of following rows, add the two numbers above a cell to make the number in the new cell. For example, the first number in the first row is 0 & 1 = 1, whereas the numbers 1 and 3 in the third row are added to produce the number 4 in the fourth row.



Problem E: Pascal's Triangle

I tried colouring in all cells divisible by 3 in Pascal's triangle with 16 rows. Guess how long the base of the largest coloured triangle was ...

Pascal's triangle has many interesting properties. It is symmetric, the diagonals are all 1s, the second diagonals are the integers 1, 2, 3, ... and the third diagonal are the triangle numbers 1, 2, 6, 10, ... Many other interesting number sequences and patterns can be found if you look more closely.

A particularly interesting thing happens when you colour in all cells that are divisible by 2 or 3. The result will be a pattern of many more triangles of various sizes. As you try this with bigger and bigger versions of Pascal's triangle, it starts looking like a fractal, a shape which repeats itself on

Full of paper,
books and files,
Pay the school office
some smiles!

In breaktime its brawling,
In lessons is still,
On the playground the next
Riddle finding you will

Great Mathematicians,

When you read this letter, I will be dead, and my treasure will be hidden in a very safe location. Only the best mathematicians deserve to find it.

In my notes and diaries, I have left 10 problems which you need to solve. The answer to every problem is a single number, which you can write down here:

A	B	C	D	E	F	G	H	I	J

Once you have solved all problems, turn the numbers into letters (1-a, 2-b, 3-c and so on) and bring the letters into the correct order to spell the location of the treasure:

___ _____

Hurry, though, because other teams may be onto it as well...

Regards – and good Luck!
Prof. Integer

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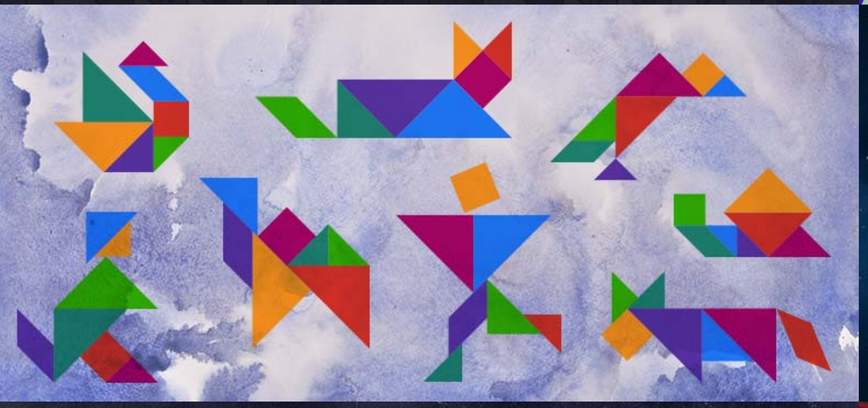
parallel
by Simon Singh



Polygon
BY MOMATH

Reviews and Awards

"One of the most engaging maths resources on the web."

The Guardian

"A front-runner for a new generation of textbooks."

★★★★

common sense

"The content of Mathigon is superb."

★★★★★

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