The “Pascal” Triangle

1

1 1

1 2 1

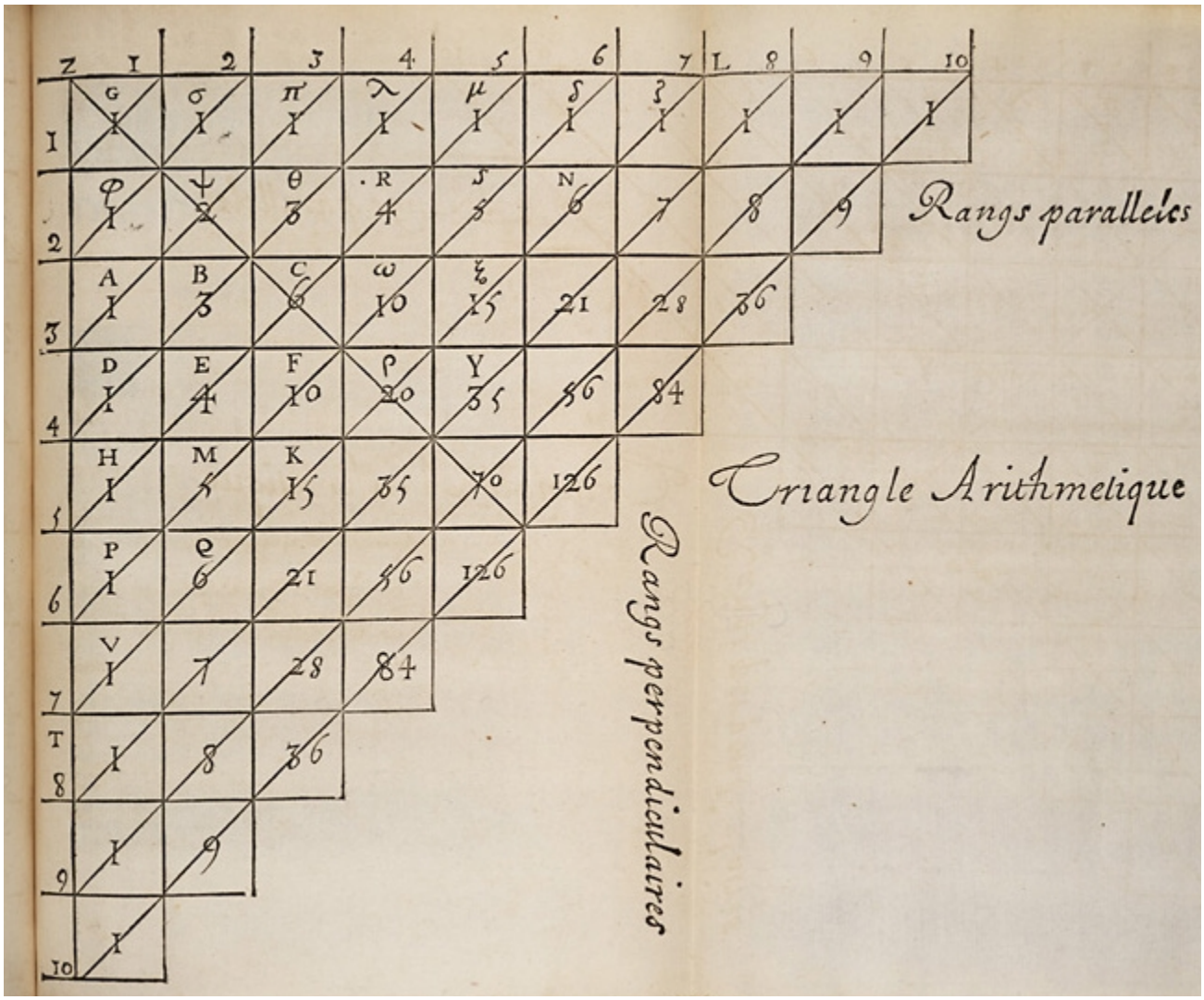
1 3 3 1

1 4 6 4 1

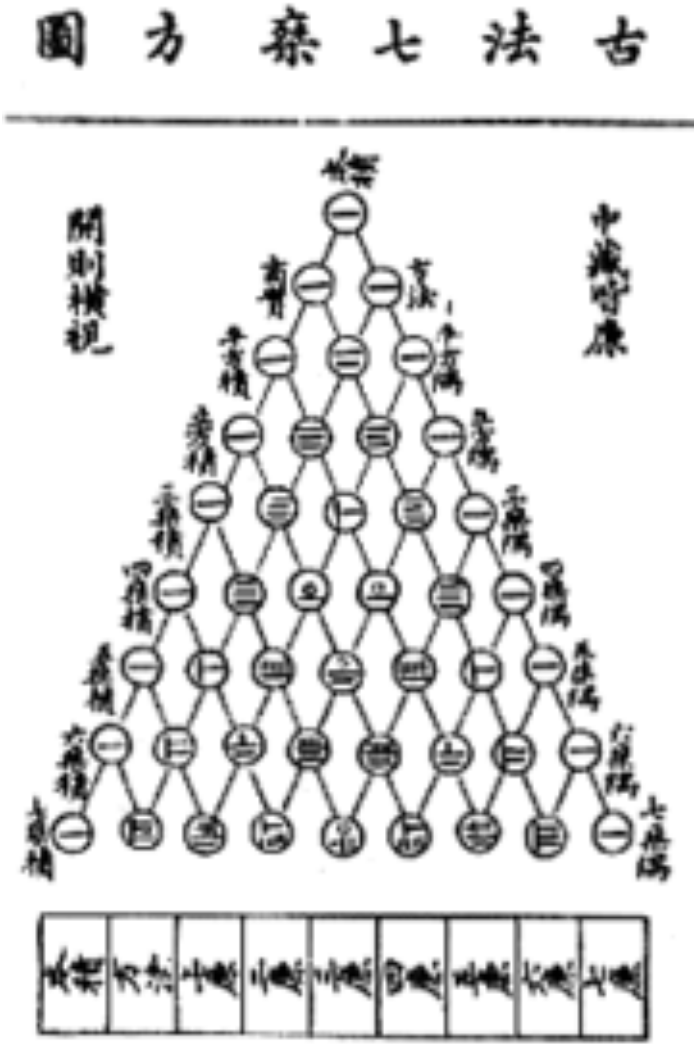
1 5 10 10 5 1

1 6 15 20 15 6 1

Blaise Pascal's version



Yang Hui (Pascal's) triangle, as depicted by the ancient Chinese (13th Century)



Pingala

(India, 5^{th} -2^{nd} century BCE)

- Used to count ways to combine syllables in Sanskrit poetry
- Pingala also developed concept now known as Fibonacci numbers

Al Karaji

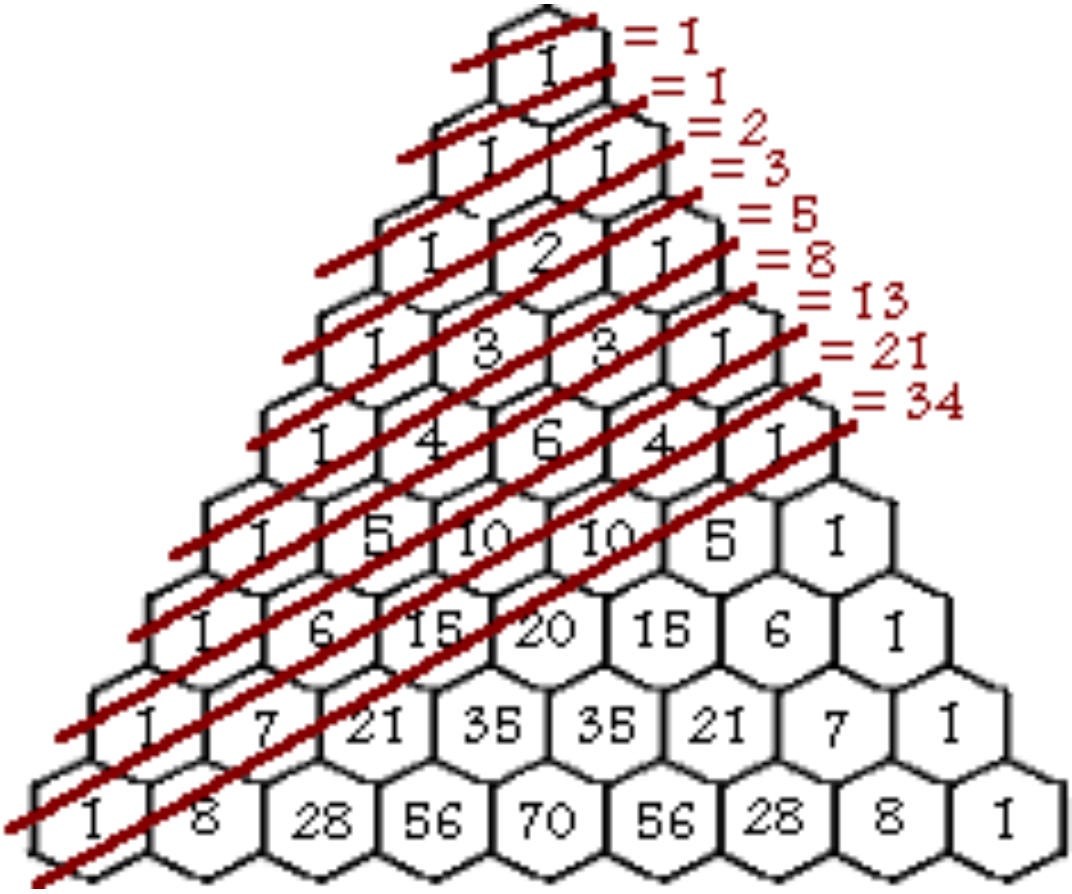
Persia, 953-1029 CE

Mathematician

Omar Khayyam

Persia, 1048-1131

Poet, astronomer, mathematician



Fibonacci numbers

Binomial Theorem

$$(x+y)^0 = 1$$

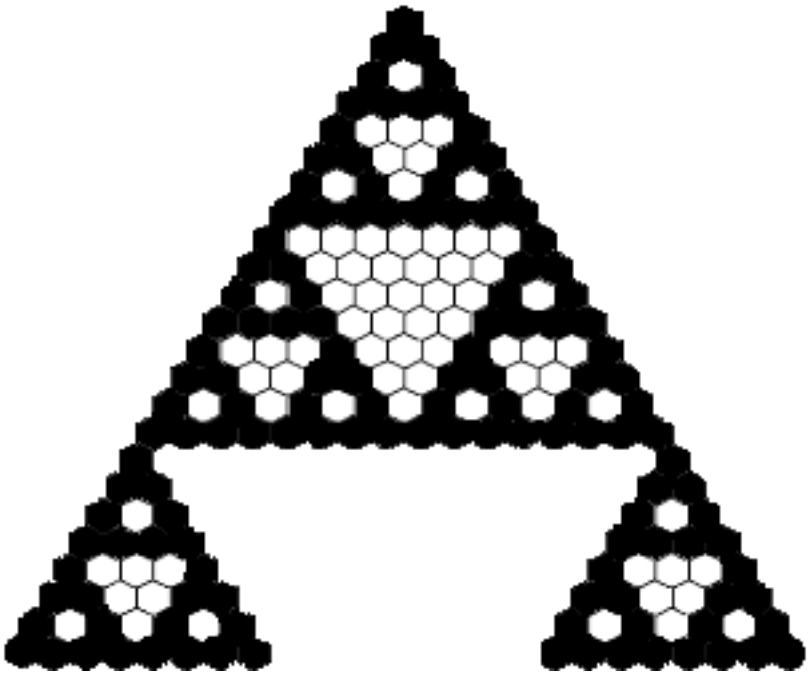
$$(x+y)^1 = 1x + 1y$$

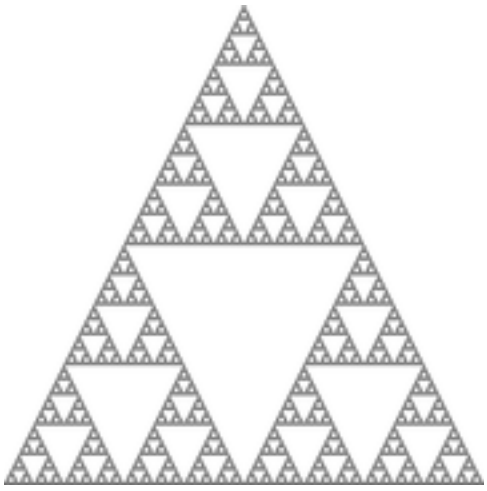
$$(x+y)^2 = 1x^2 + 2xy + 1y^2$$

$$(x+y)^3 = 1x^3 + 3x^2y + 3xy^2 + 1y^3$$

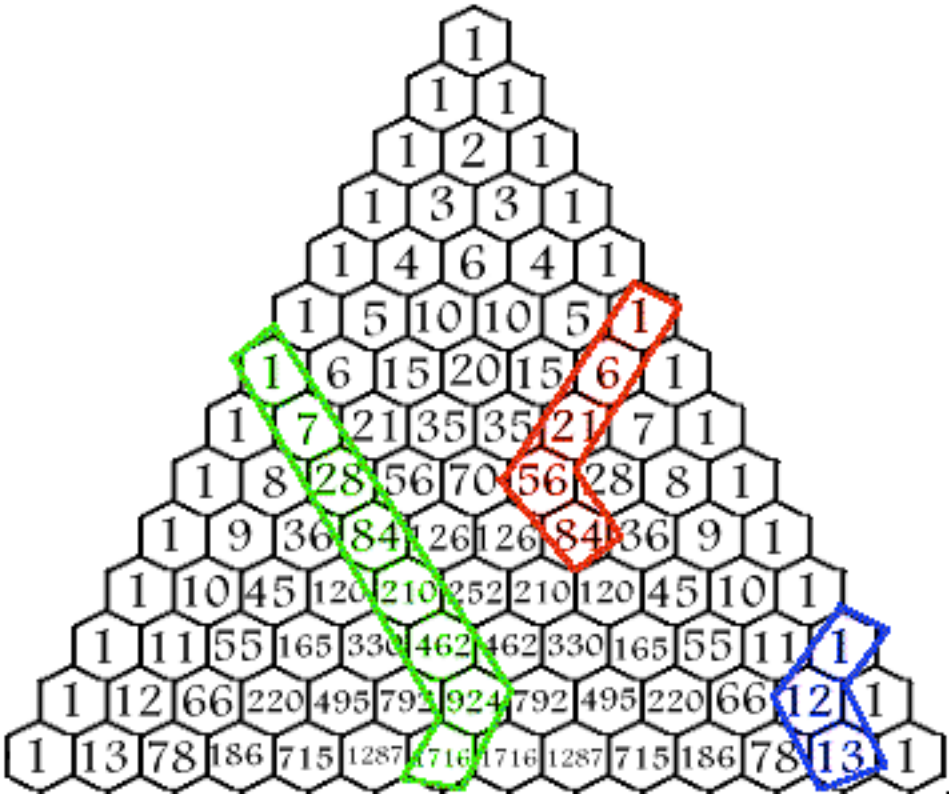
$$(x+y)^4 = 1x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + 1y^4$$

Sierpinski Triangle





odd = black, even = white



Patterns in the triangle: Each line of hexagons has sum equal to the bottom hexagon.