



数学之美：

斐波那契数列和黄金分割率

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2022/08/07



找规律

1

1, 4, 9, 16, 25, 36, 49, 64, 81, ____

2

25, 22, 19, 16, 13, 10, 7, 4, 1, ____

3

1, 3, 6, 10, 15, 21, 28, 36, 45, ____

4

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ____

斐波那契数列

Fibonacci Sequence

- 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...
- “Liber Abaci”



Liber Abaci

佛罗伦萨国立中央图书馆收藏



斐波那契数列 - 如何计算？

Fibonacci Sequence

- 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

斐波那契数列 - 如何应用？ Fibonacci Sequence

- 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...



百合



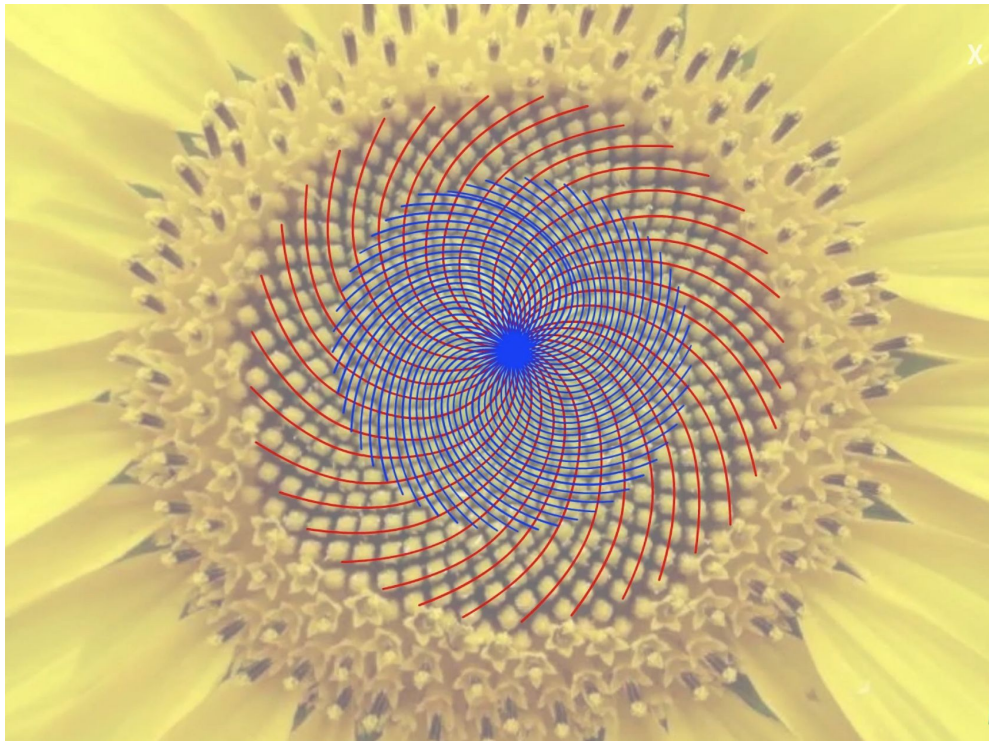
梅花



雏菊



向日葵



The Fibonacci Numbers

1 1 2 3 5 8 13 21 34 55 ...
1 1 4

The Fibonacci Numbers

1	1	2	3	5	8	13	21	34	55	...
1	1	4	9							

The Fibonacci Numbers

1	1	2	3	5	8	13	21	34	55	...
1	1	4	9	25						

The Fibonacci Numbers

1	1	2	3	5	8	13	21	34	55	...
1	1	4	9	25	64					

The Fibonacci Numbers

1	1	2	3	5	8	13	21	34	55	...
1	1	4	9	25	64	169	441	1156	3025	...

The Fibonacci Numbers

1 1 2 3 5 8 13 21 34 55 ...

1 1 4 9 25 64 169 441 1156 3025 ...

$$1 + 1 + 4 = 6 = 2 \times 3$$

$$1 + 1 + 4 + 9 = 15 = 3 \times 5$$

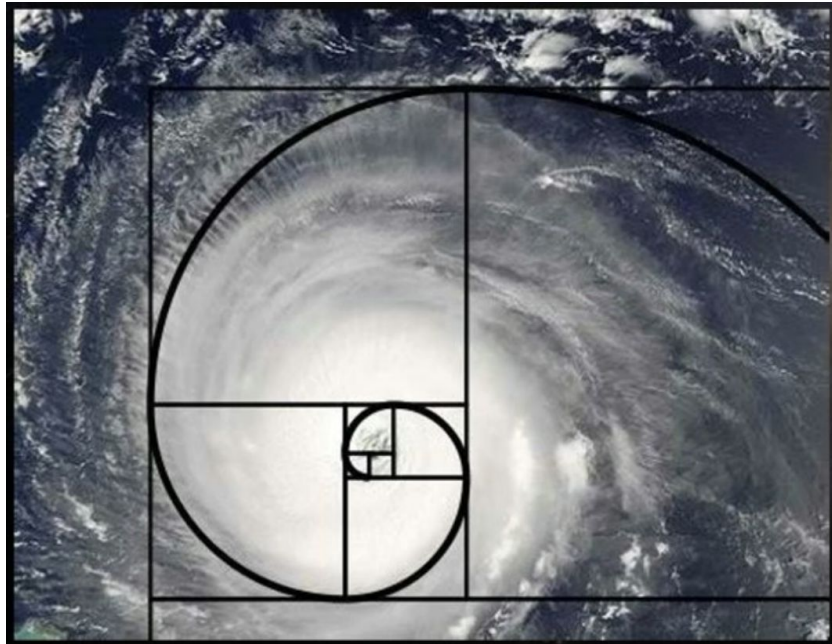
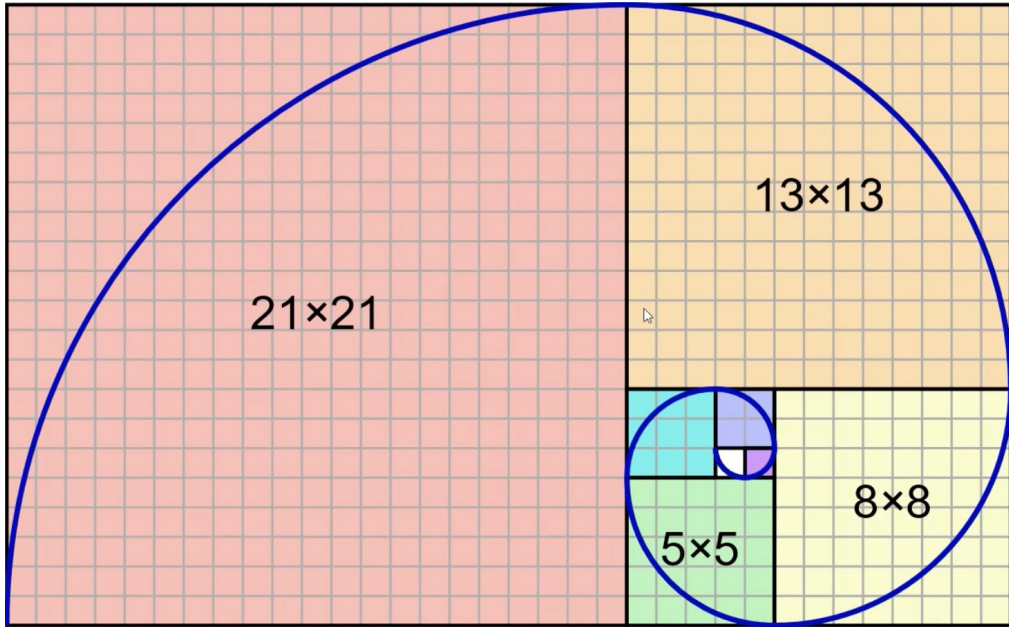
$$1 + 1 + 4 + 9 + 25 = 40 = 5 \times 8$$

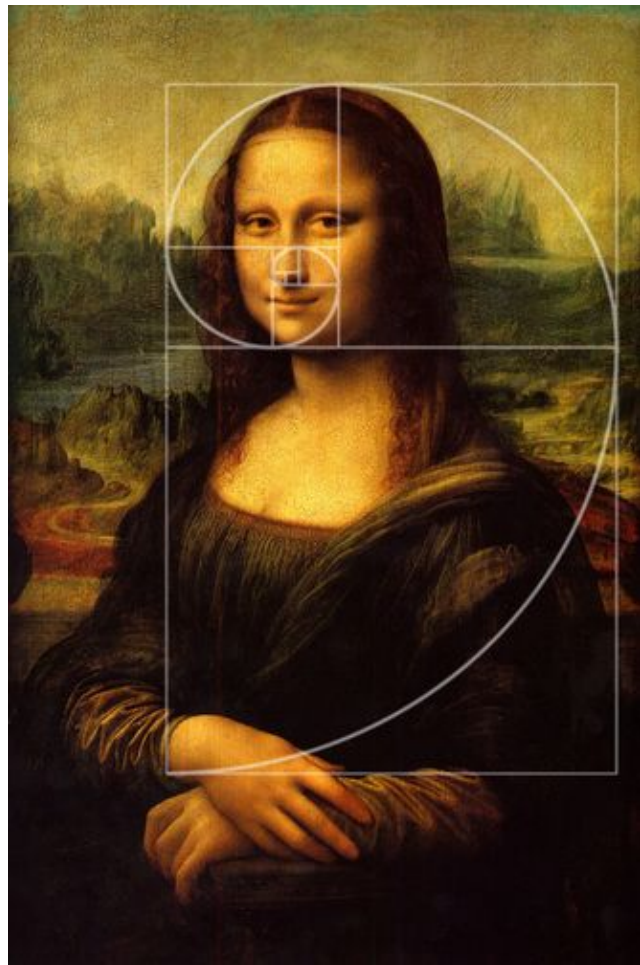
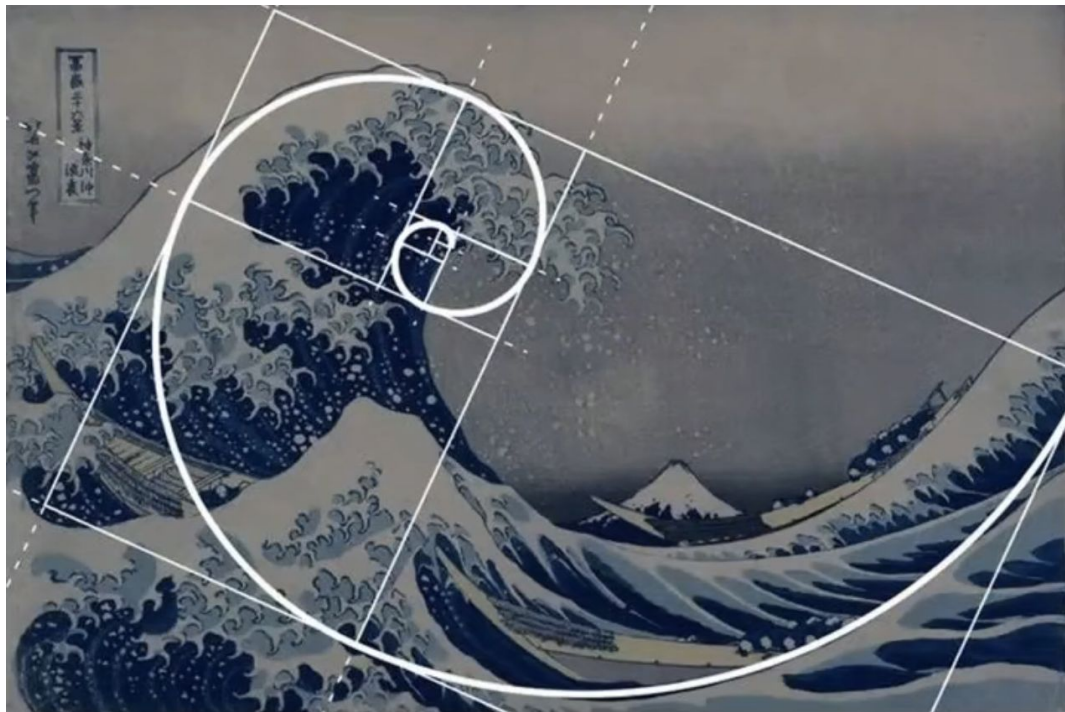
$$1 + 1 + 4 + 9 + 25 + 64 = 104 = 8 \times 13$$

$$1^2 + 1^2 + 2^2 + 3^2 + 5^2 + 8^2 = 8 \times 13$$

Why?







$8 \times 13 \quad 13 \div 8 = 1.625$

$13 \times 21 \quad 21 \div 13 = 1.615\dots$

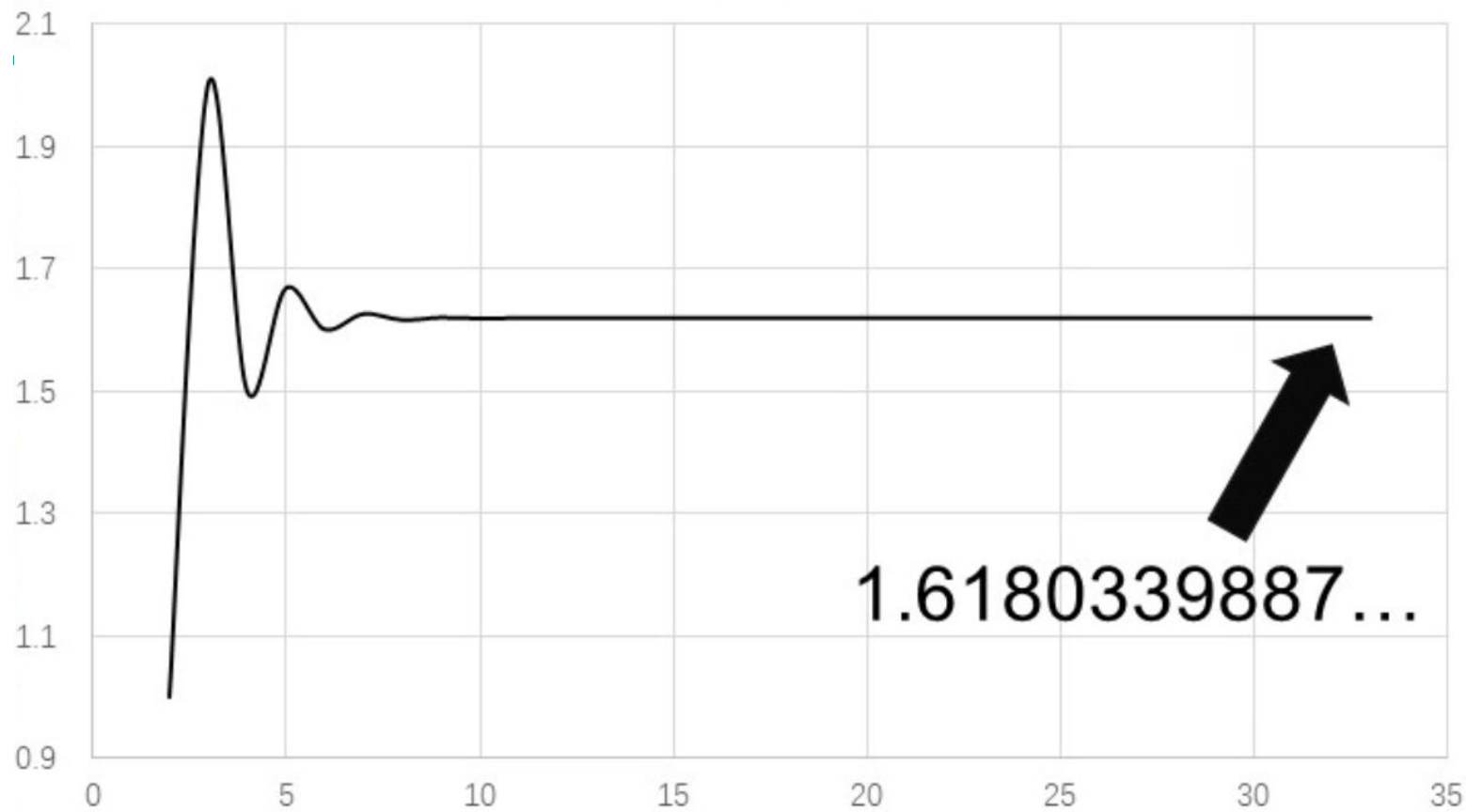
$21 \times 34 \quad 34 \div 21 = 1.619\dots$

$34 \times 55 \quad 55 \div 34 = 1.6176\dots$

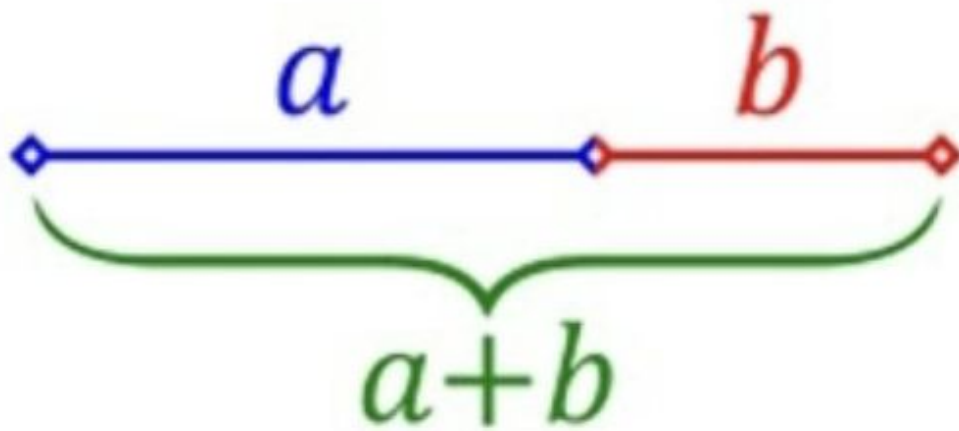
$55 \times 89 \quad 89 \div 55 = 1.61818\dots$

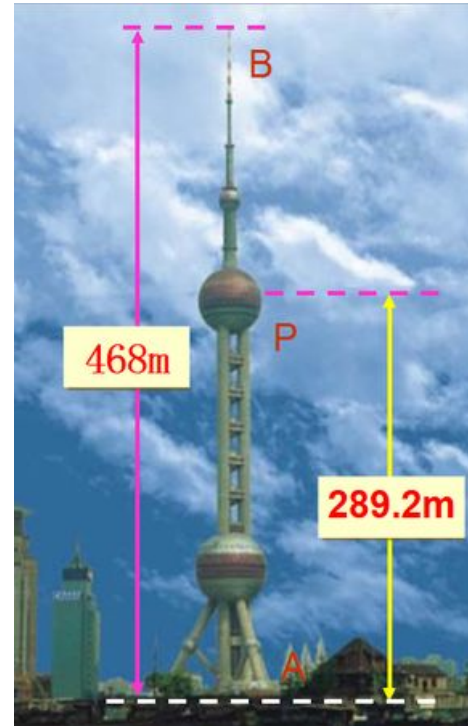
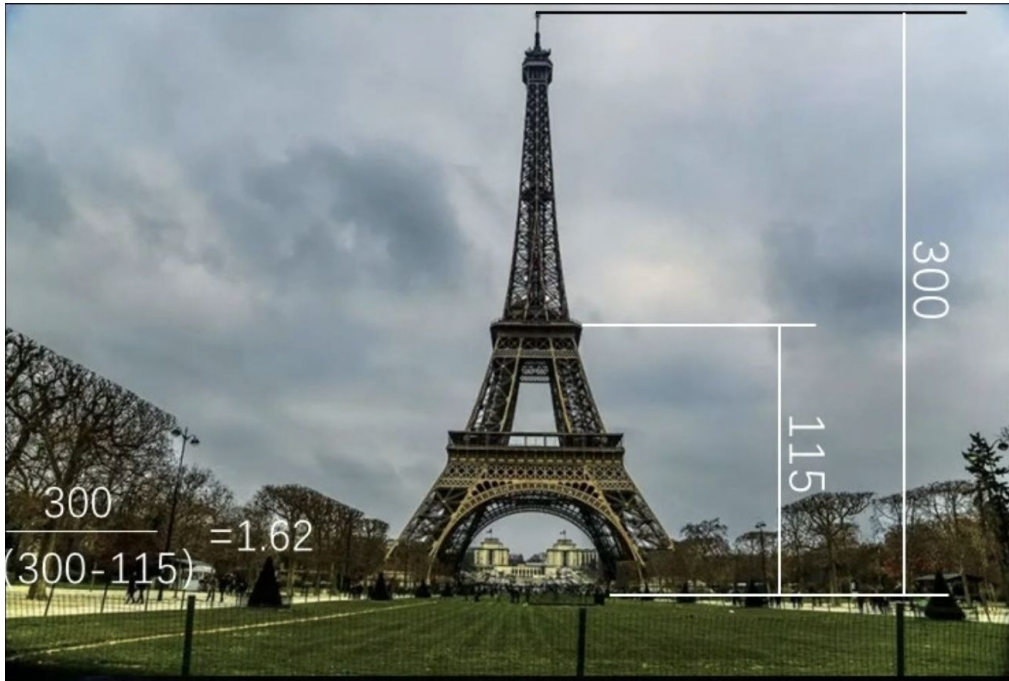
The Golden Ratio:
1.618033....

$F(n)/F(n-1)$



$1.6180339887\dots$







为什么我们要学习数学？

- 学会计算 Calculation
- 懂得应用 Application
- 激发灵感 Inspiration



谢谢！

