«Золотое сечение»

Подготовил: ст. гр. 513
Анисимов Денис

История «Золотого сечения»

Формула «Золотого сечения» (Ф)

$$Ф = \frac{1+\sqrt{5}}{2} \cong 1{,}6180339887.$$

«Золотой прямоугольник»

-прямоугольник стороны которого находятся в золотом отношении

Последовательность Фибоначчи

1,1,2,3,5,8,13,21,34,55,89,144,233,377…

$$F_0 = 0, \qquad F_1 = 1,$$

$$F_n = F_{n-1} + F_{n-2}, \qquad n \geqslant 2, \quad n \in \mathbb{Z}.$$

Отношение членов F_n / F_{n-1}

В последовательности Фибоначчи

- 1/1 = 1
- 2/1 = 2
- 3/2 = 1.5
- 5/3 = 1.666…
- 8/5 =1.6
- 13/8 = 1,625
- 21/13 = 1.615348…
- 34/21 = 1.61904…
- 55/34 = 1.61764…
- 89/55 = 1.61818…
- 144/89 = 1,61797…

Основные свойства «золотого сечения»

- $Ф^2 = Ф+1$

$Ф^3=Ф^2+Ф=Ф+1+Ф=2Ф+1$

$Ф^4 =Ф^3+Ф^2 =(2Ф+1)+(Ф+1)=3Ф+2$

$Ф^5 =Ф^4+Ф^3 =(3Ф+2)+(2Ф+1)=5Ф+3$

$Ф^6=Ф^5+Ф^4 =8Ф+5$

$Ф^7 =Ф^6+Ф^5 =13Ф+8$

$Ф^8 =Ф^7+Ф^6 =21Ф+13$

$\Phi^2 = \Phi + 1$

$\Phi^2 - \Phi = 1$

$(\Phi^2 - \Phi)/\Phi = 1/\Phi$

$\Phi - 1 = 1/\Phi$

$$\sqrt{1+\sqrt{1}} = 1{,}4142.$$

$$\sqrt{1+\sqrt{1+\sqrt{1}}} = 1{,}5538.$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1}}}} = 1{,}5931.$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1}}}}} = 1{,}6119.$$

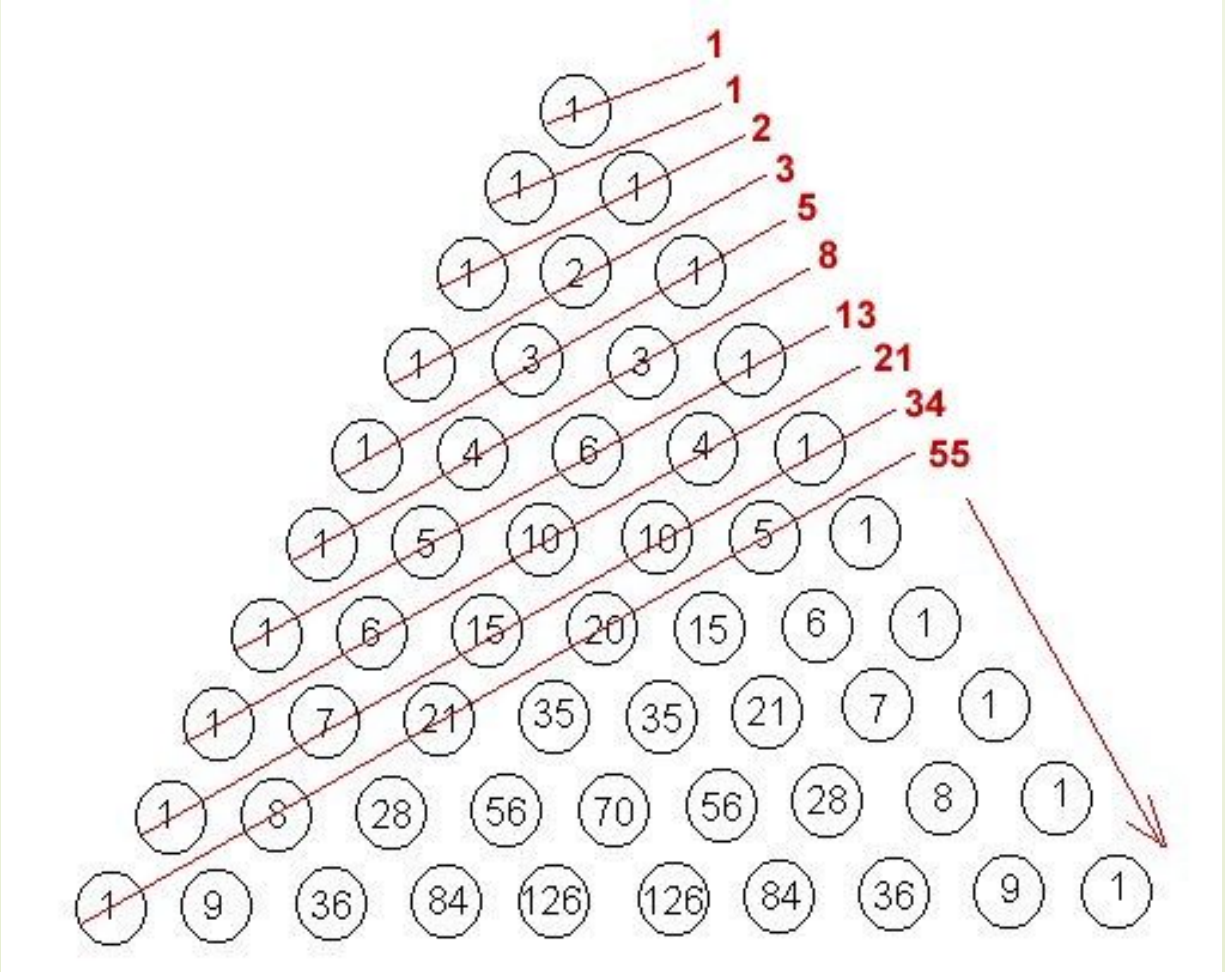
$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1}}}}}} = 1{,}6161.$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1}}}}}}} = 1{,}6174.$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1}}}}}}}} = 1{,}6178.$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1}}}}}}}}} = 1{,}6180.$$

Треугольник Паскаля

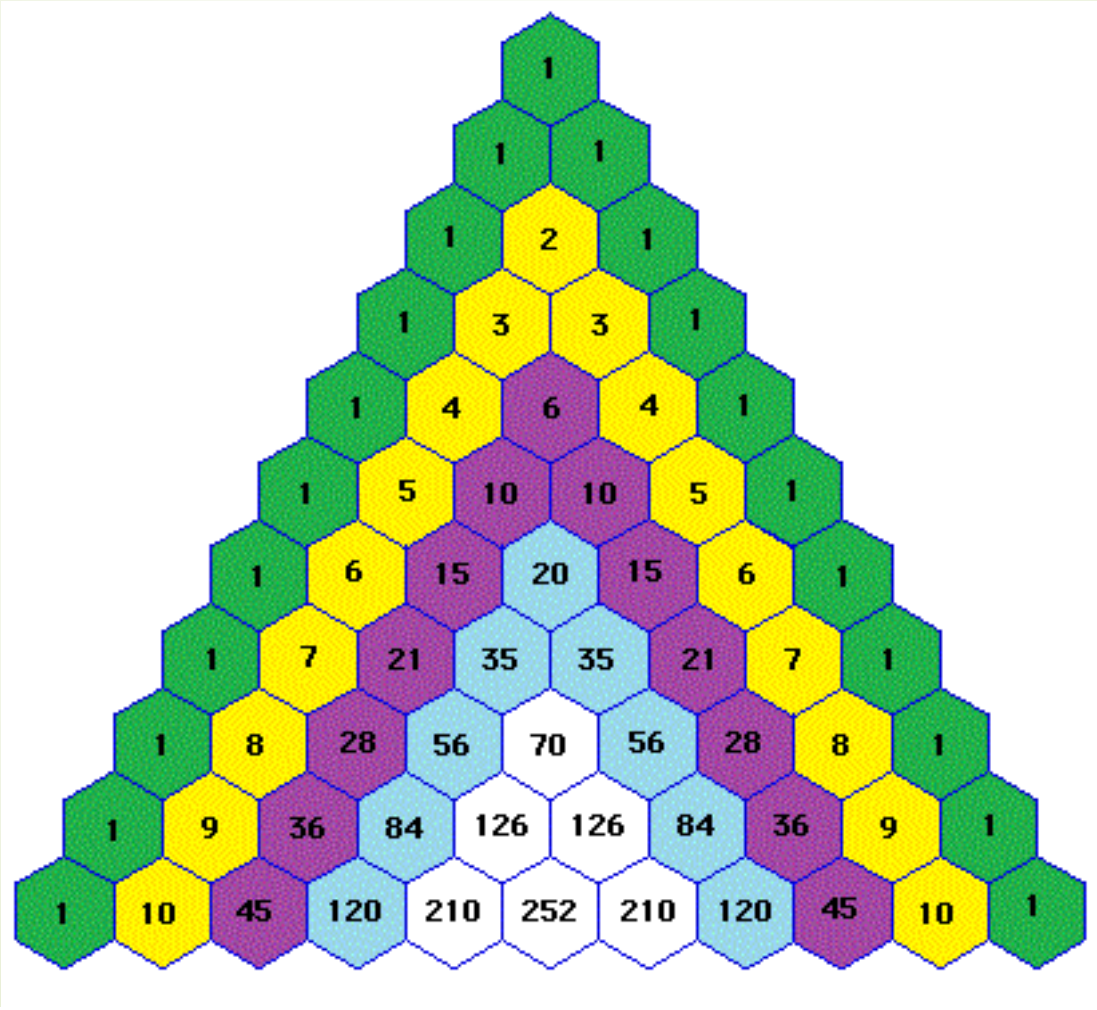


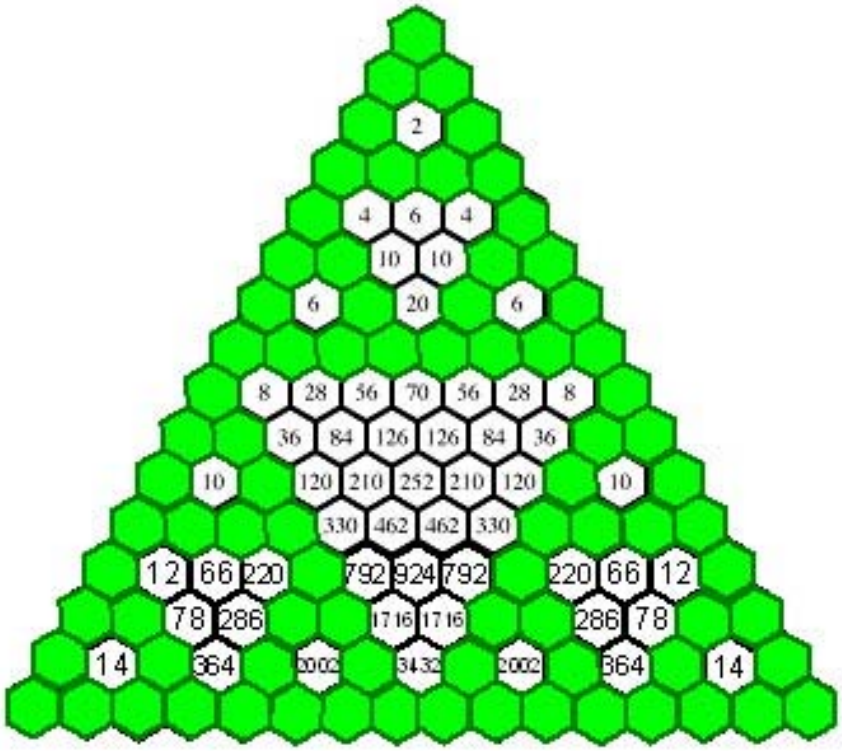
Биноминальное разложение с использованием треугольника Паскаля

$(x+y)^n$

$n=0$	1	$(a+b)^0 = 1$
$n=1$	1 1	$(a+b)^1 = a+b$
$n=2$	1 2 1	$(a+b)^2 = a^2+2ab+b^2$
$n=3$	1 3 3 1	$(a+b)^3 = a^3+3a^2b+3ab^2+b^3$
$n=4$	1 4 6 4 1	$(a+b)^4 = a^4+4a^3b+6a^2b^2+4ab^3+b^4$
$n=5$	1 5 10 10 5 1	$(a+b)^5 = a^5+5a^4b+10a^3b^2+10a^2b^3+5ab^4+b^5$
$n=6$	1 6 15 20 15 6 1	
$n=7$	1 7 21 35 35 21 7 1	
.....		

Геометрические закономерности треугольника Паскаля

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10 10
6 20 6
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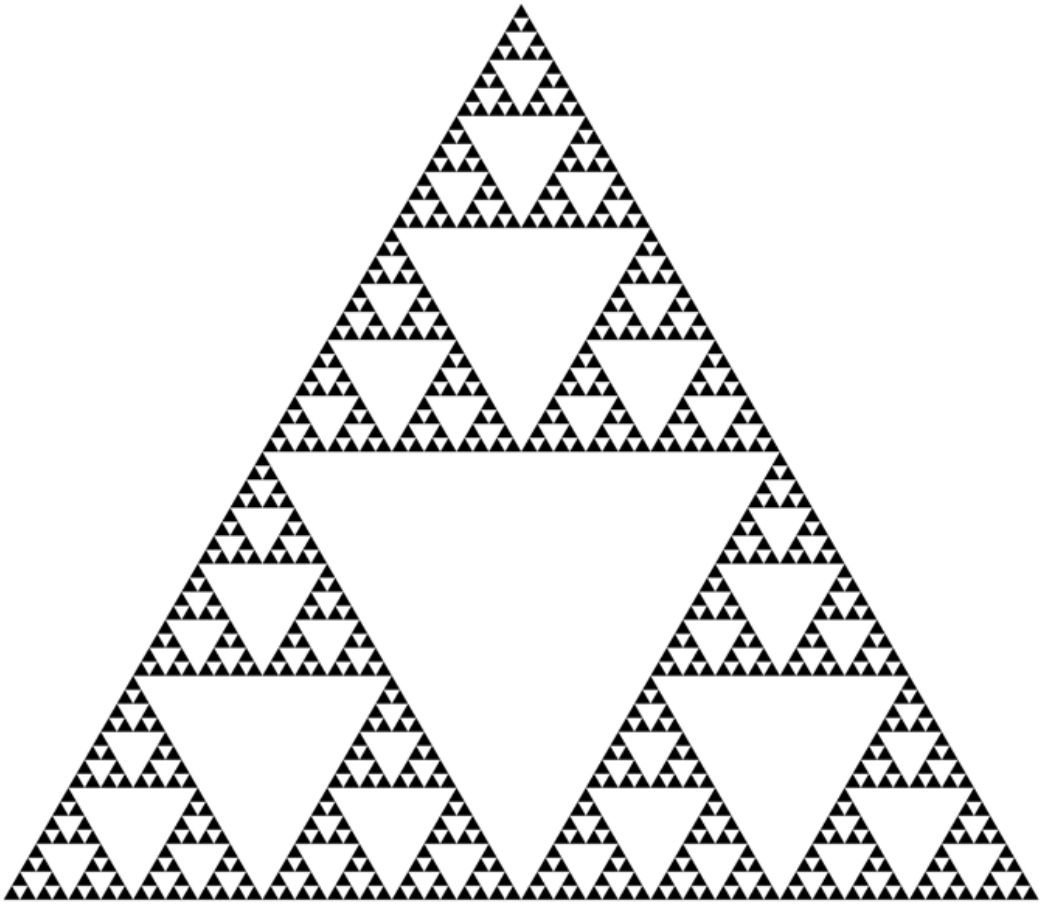
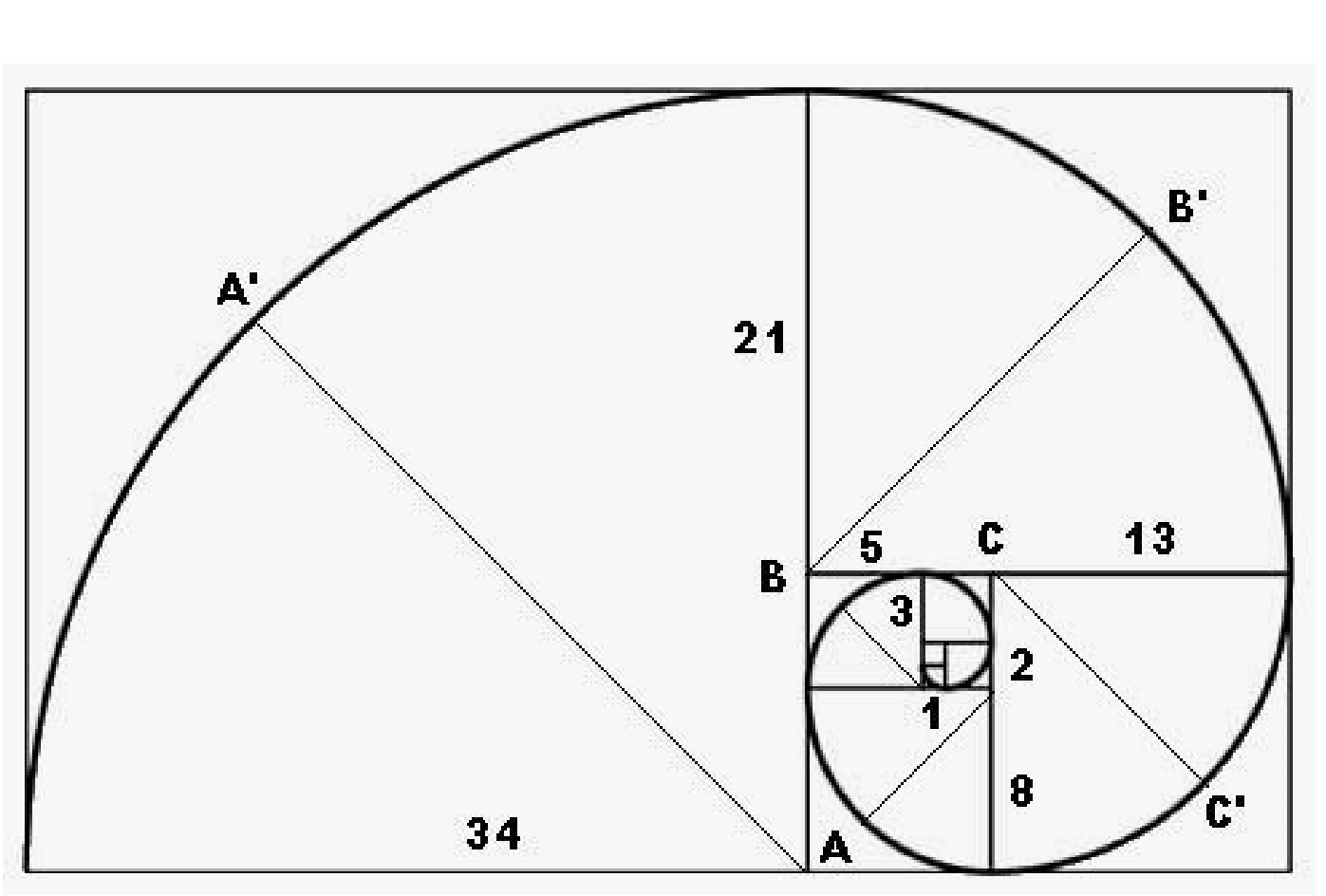
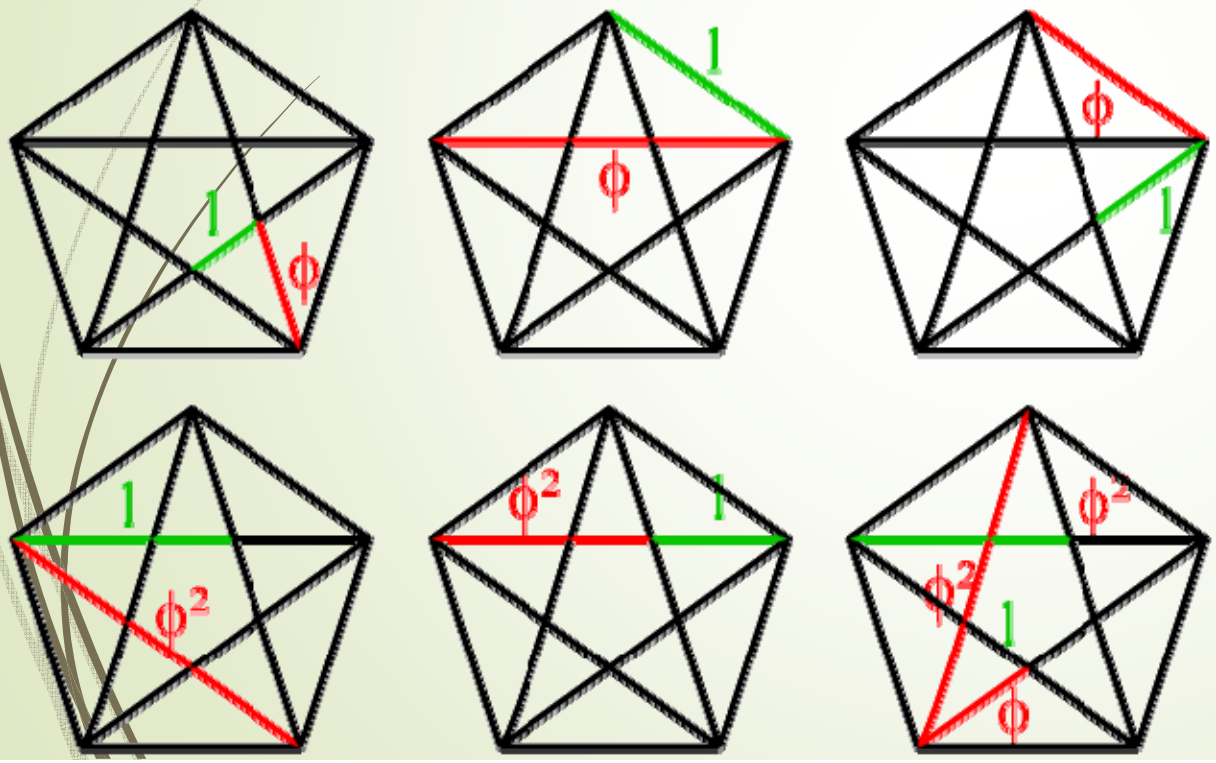
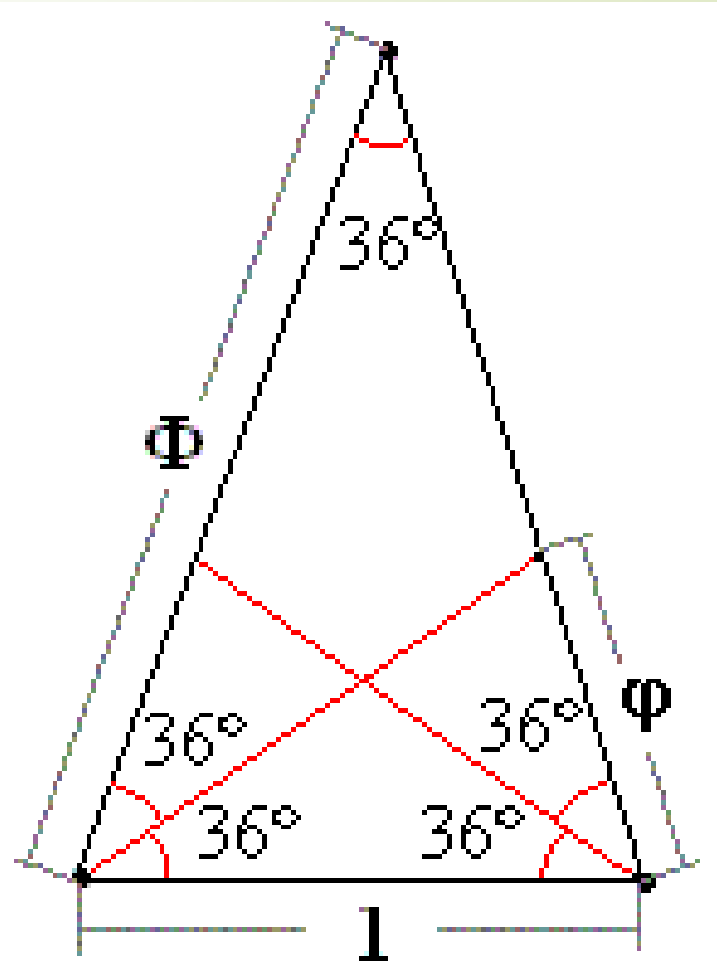


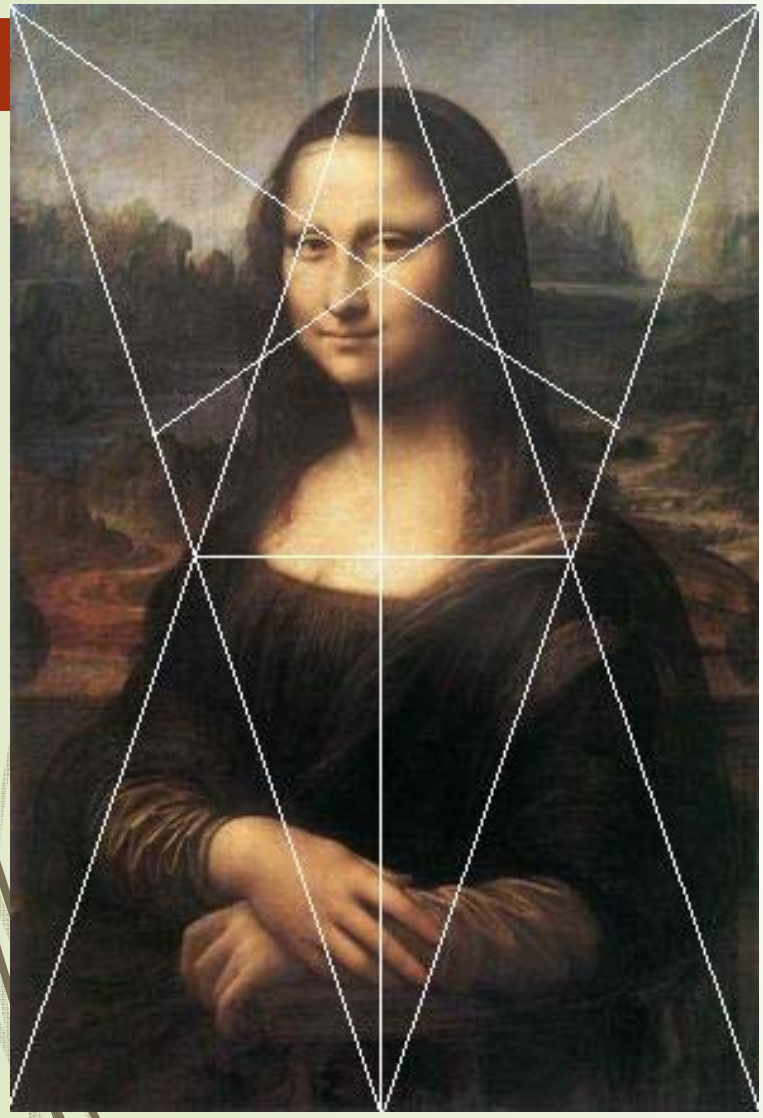
Золотой прямоугольник , спираль



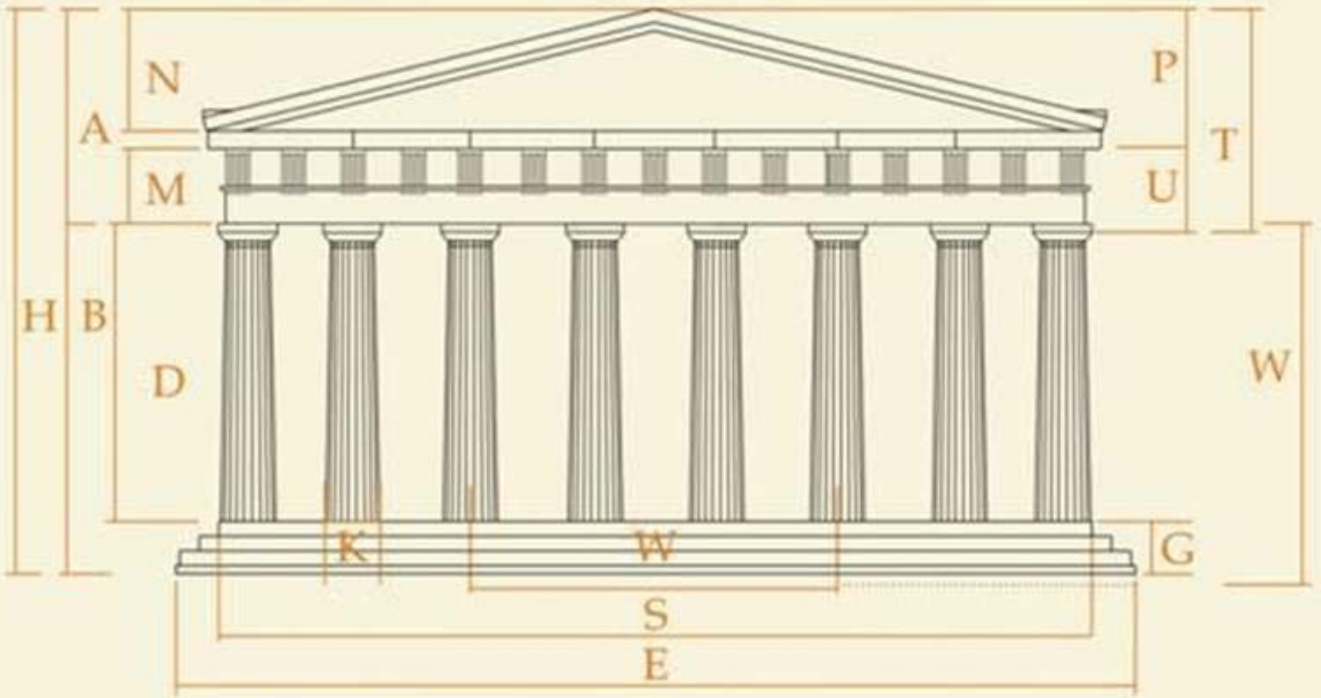
«Золотые» фигуры





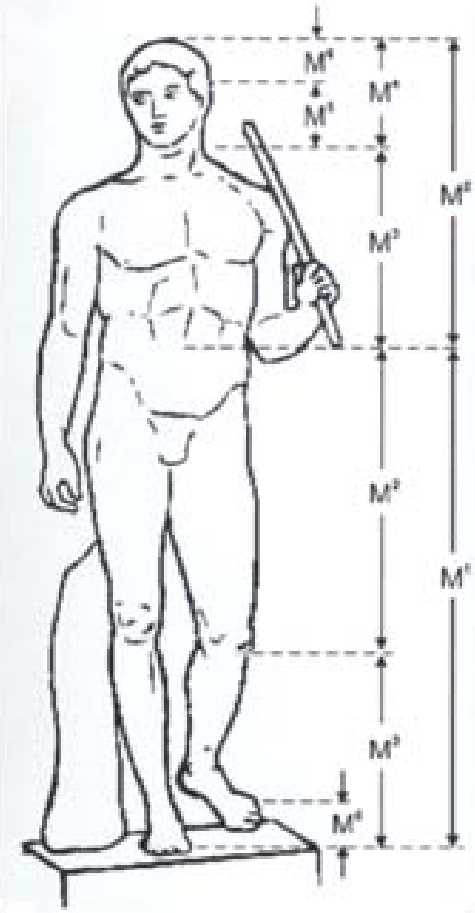


ЗОЛОТОЕ СЕЧЕНИЕ ПАРФЕНОНА



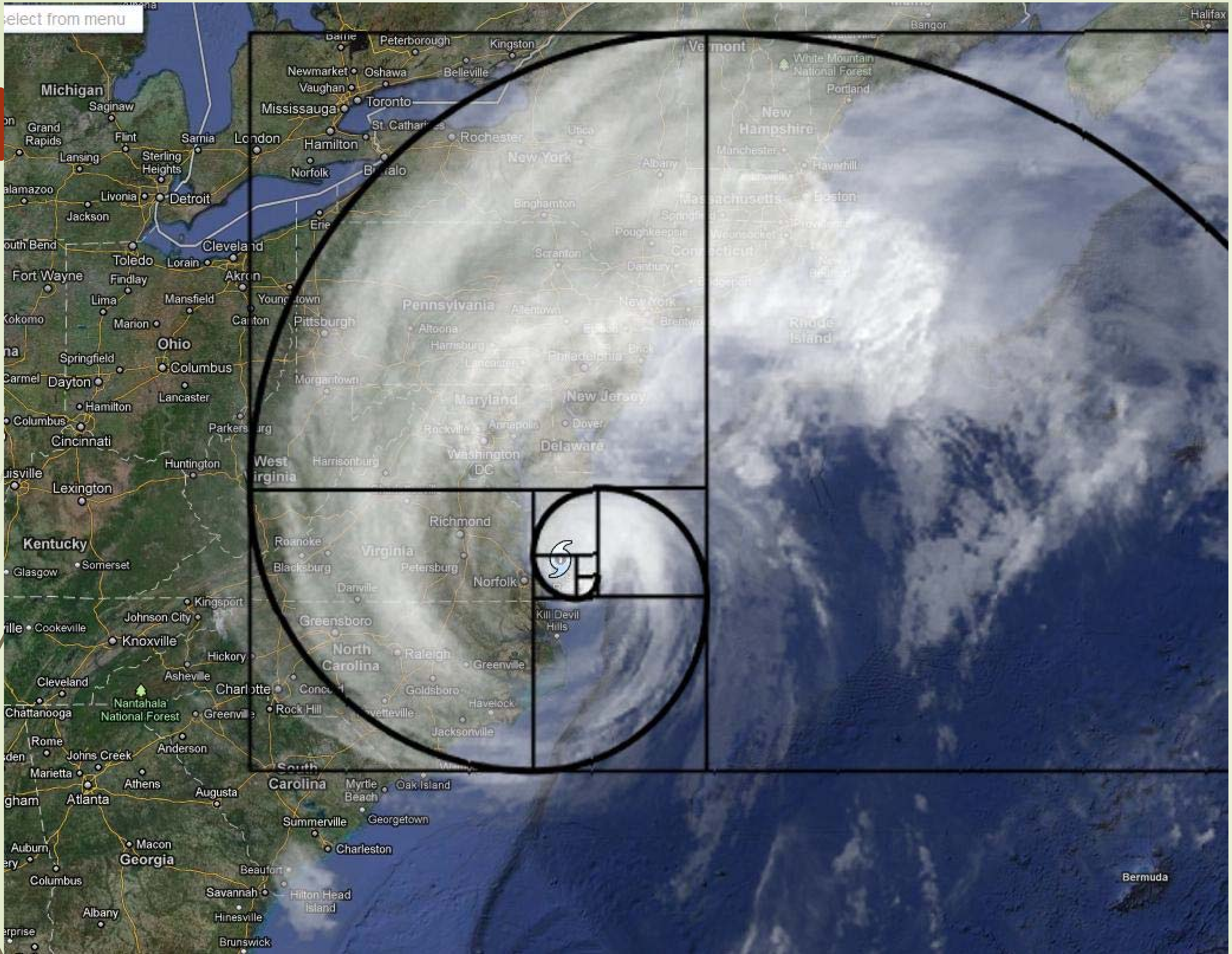
$$\frac{S}{10K} = \frac{H}{B} = \frac{B}{A} = \frac{N}{M} = \frac{E}{2D} = \frac{2D}{W} = \frac{W}{T} = \frac{T}{P} = \frac{P}{U} = \frac{U}{G} = \Phi = 1{,}618\ldots$$

S : 10Ф = K (*нижний диаметр рядовой колонны*)
3K · 2,25 = W (*три шага рядовой колонны*)
W · Ф = 2D (*две высоты колонны*)



Поликлет. Дорифор

Венера Милосская



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Lima
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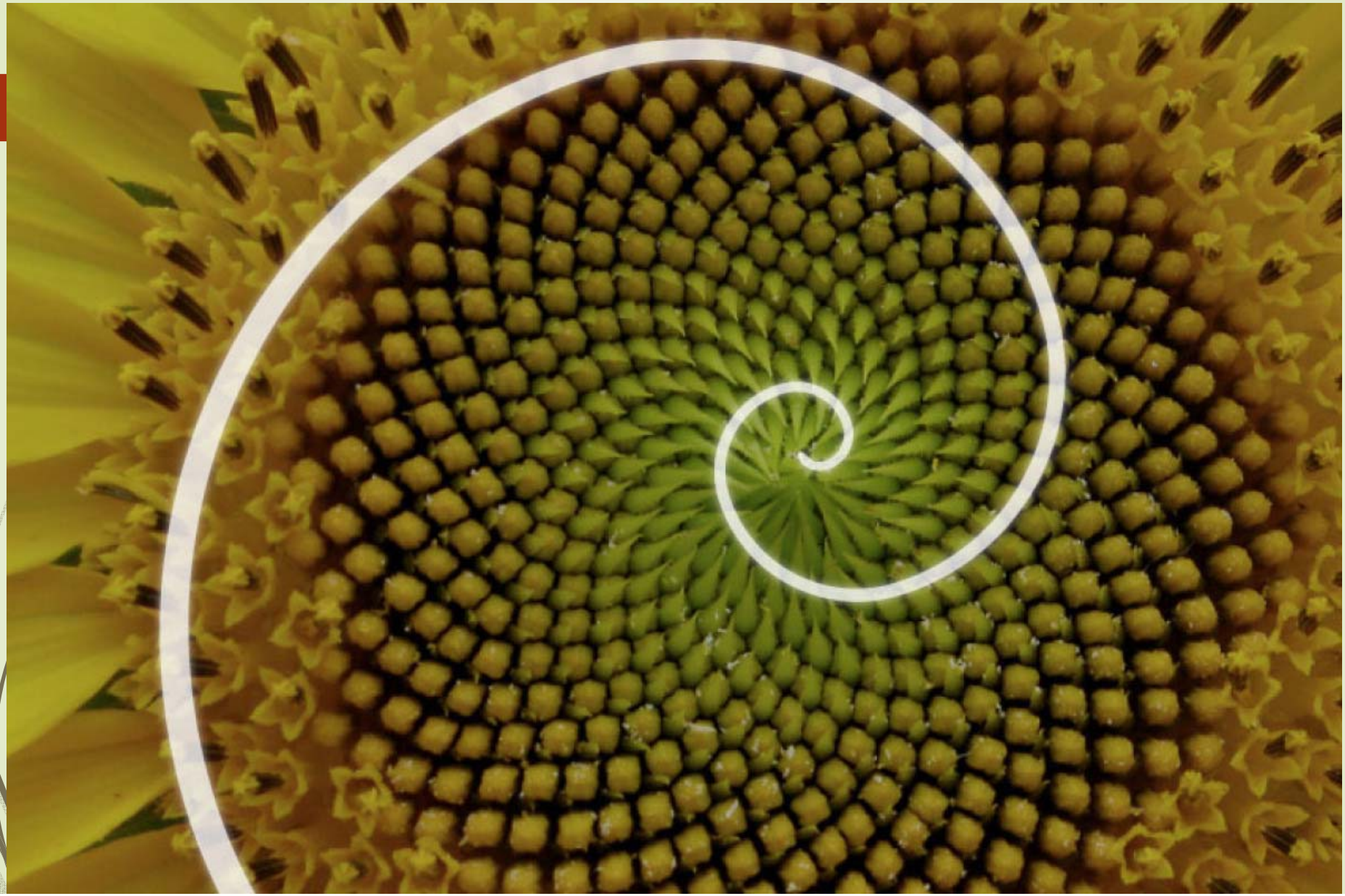
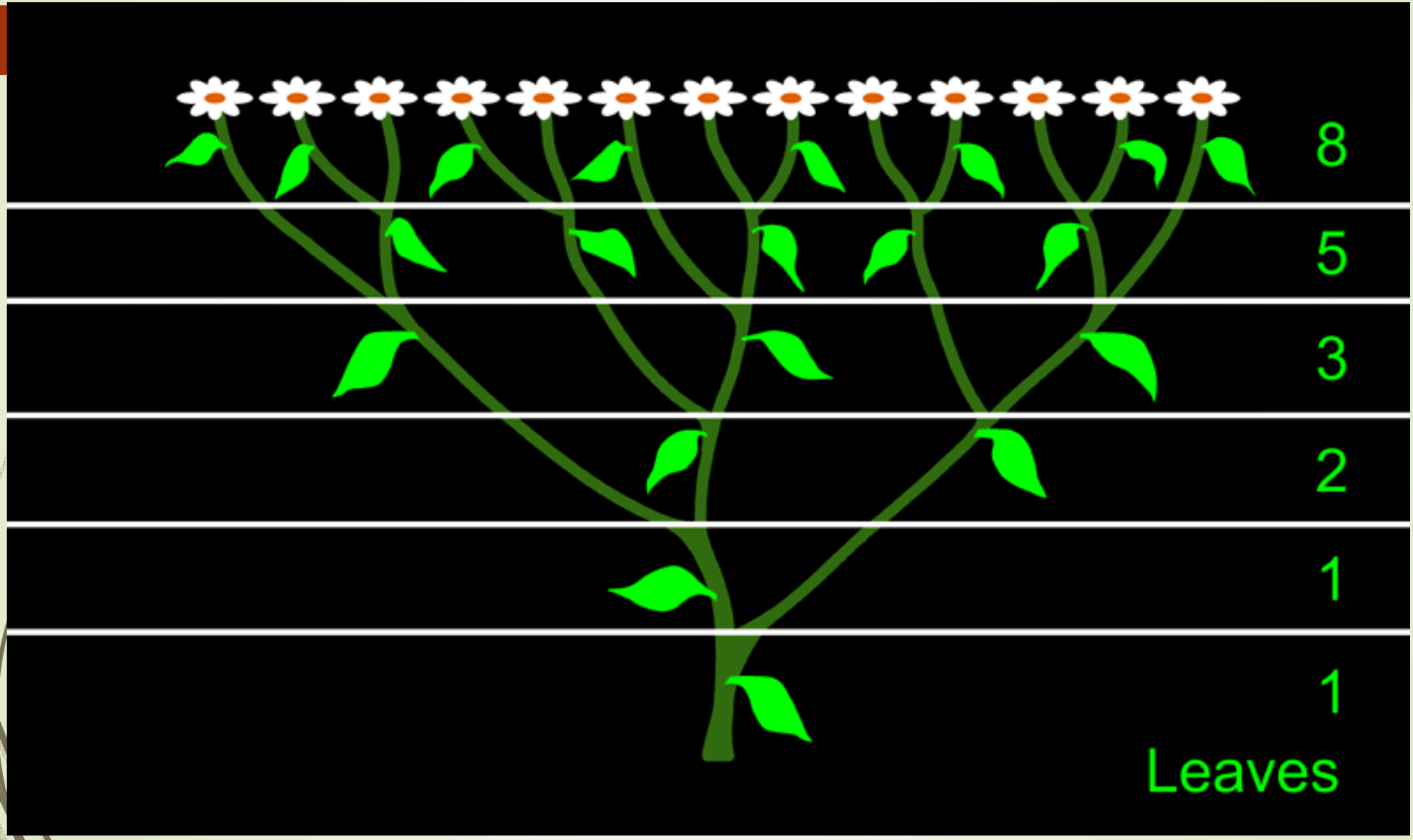
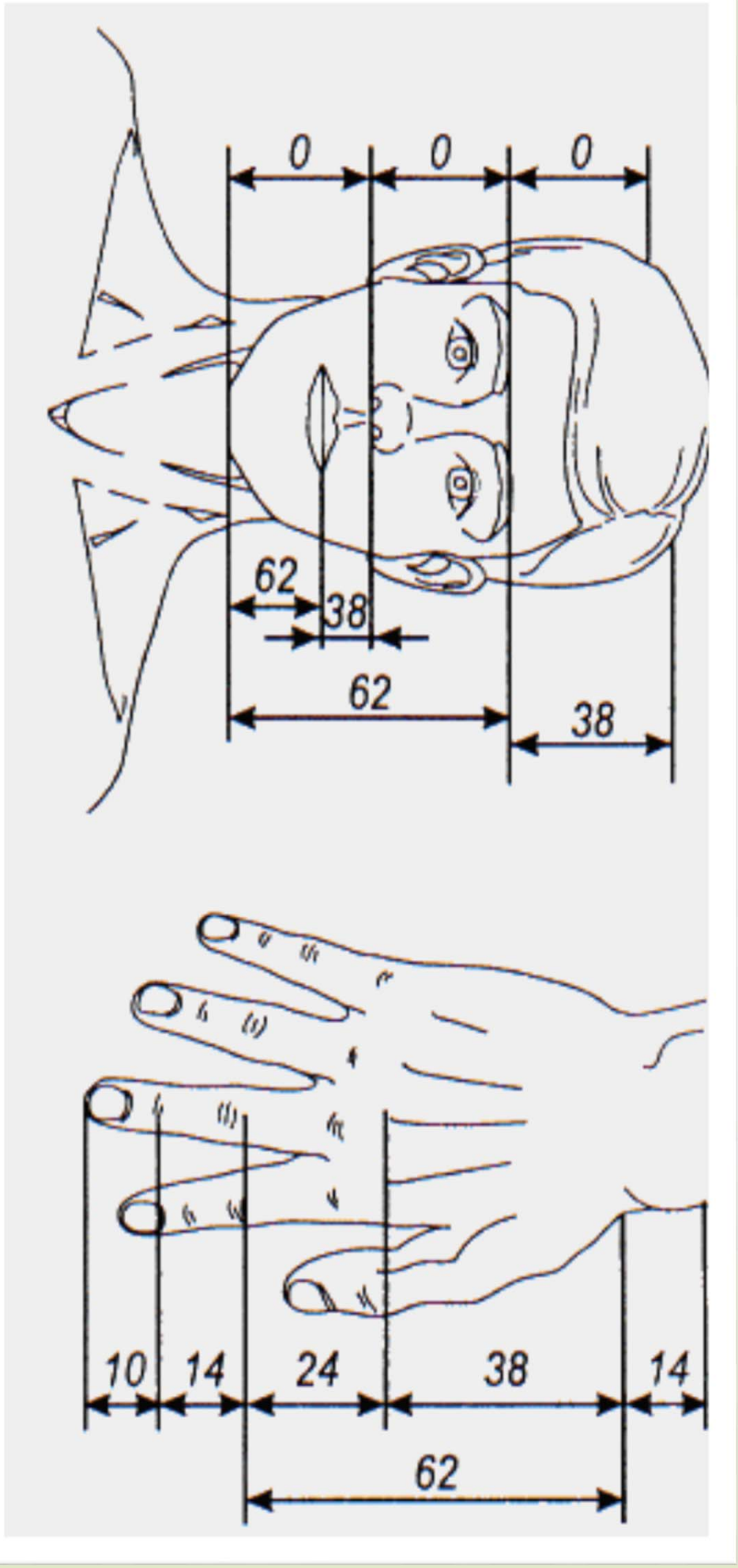



8
5
3
2
1
1
Leaves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62

Спасибо за внимание

Математика - это язык, на котором написана книга природы . (Г. Галилей)