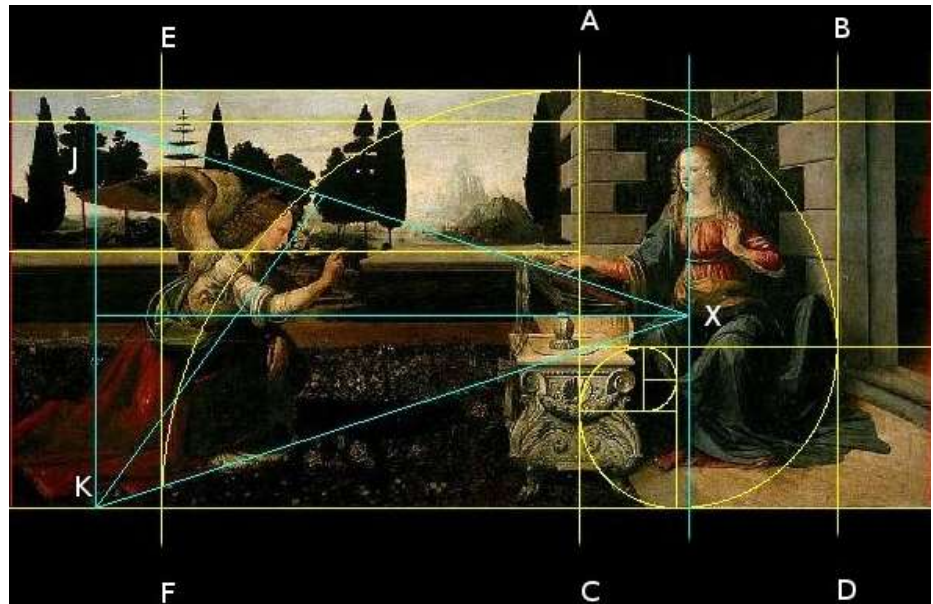
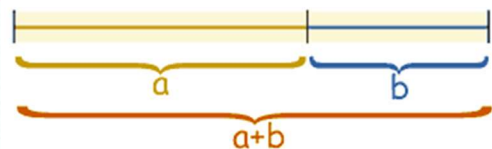


Golden section laboratory

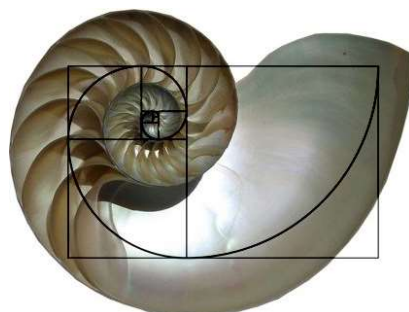
“Annunciazione” – Leonardo da Vinci (1472-1475) Many painters and sculptors had used **golden proportions** in their paintings: The ratio between the lengths of the sides of a golden rectangle. In the picture, the rectangle ABCD is golden, also EBFD.



The Golden Section (or golden ratio) also appears in all forms of nature and science, such as: **Sunflower seeds**: The seeds are often produced at the center and migrate outward to fill the space. **Pinecones**: The spiral pattern of the seed pods spiral upward in opposite directions. Also many **shells**, including snail shells and nautilus shells, are perfect examples of the **Golden spiral**.

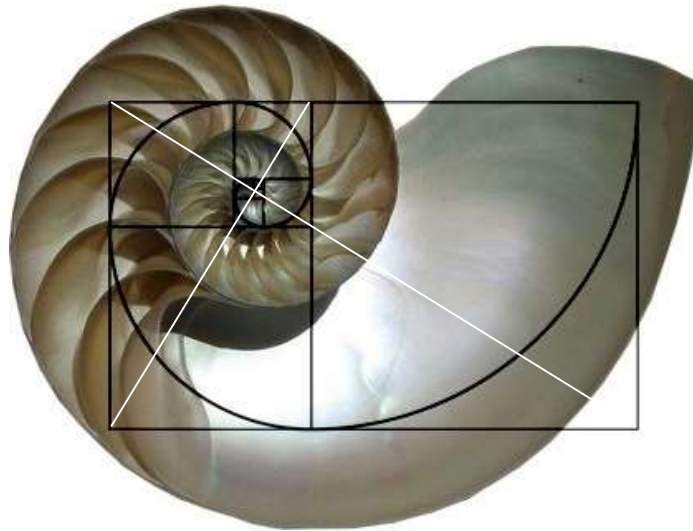


$$\frac{a}{b} = \frac{a+b}{a} = 1.618... = \phi$$



NOW, TRY TO DRAW A GOLDEN SPIRAL!

You already have a “golden rectangangle”. Now, follow the instructions here below to go on!



- 1) Subdivide the rectangle in a square (on the right) and in a golden rectangle (on the left).
- 2) Draw an arc of circumference, which has the center in a vertex of the square (on the left-low side).
- 3) Subdivide the small rectangle again into a square (on the up-side) and a golden rectangle (down-side).
- 4) Draw a circumferential arc in the square.
- 5) Continue drawing until you can.
- 6) Finally draw the diagonals of the two larger rectangles. If you have carefully executed your design, the intersection of the diagonals is in the most internal rectangle.



Gaio Giulio Cesare



Founder of the Roman Empire, **Gaio Giulio Cesare** (Rome, July 100 BC –44 BC) was a military, consul, dictator, maximum pontiff, orator and roman writer. He used to communicate by encrypted messages during wars.

To encrypt a message, Giulio Cesare just used a rule in which each letter is replaced with the one who is three steps forward in the alphabet.

The last three letters X, Y, Z, are replaced with A, B, and C.

We can call this rule with ROT 3, because alphabet is rotated by three positions.

1) Imagine to be the one who has to encrypt an important message for your city fate. You have to use the Cesare's rule to encode the following message:

“Tomorrow, enemies will attack from WEST”

alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
encrypted																											

.....

2) By using the rule ROT 3, try to encode the following message

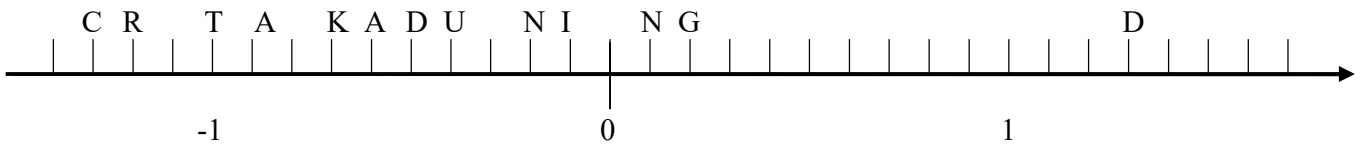
Suhihuluhl hvvhuh lo sulpr wud frvwrur slxwrvwr fkh lo vhfrqgr d urpd

alphabet																												
encrypted	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C		

.....

Who is the murderer?

Write the corresponding letter to the right position of each number on the line.



0,2	-----
-0,4	-----
-0,9	-----
-1,2	-----
1,3	-----
-0,1	-----
-0,6	-----
0,1	-----