

**BACCALAURÉAT GENERAL
EPREUVE SPECIFIQUE DES SECTIONS EUROPEENNES
MATHÉMATIQUES – ANGLAIS**

SUJET 1

The golden ratio

Sujet comportant deux pages. L'usage de tout modèle de calculatrice, avec ou sans mode examen est autorisé.

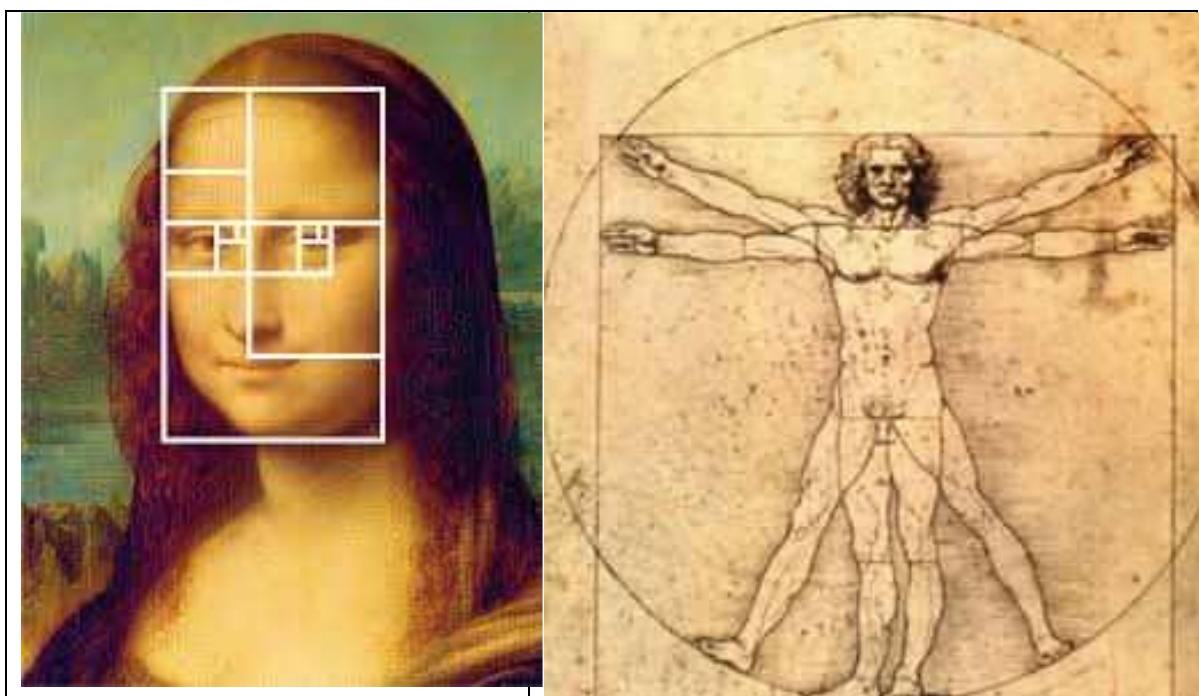
Leonardo da Vinci (15 April 1452– 2 May 1519) was an Italian **polymath**¹ of the Renaissance, whose areas of interest included invention, painting, architecture, science, mathematics, anatomy...He is sometimes credited with the inventions of the parachute, helicopter and tank.

One very famous piece, known as the *Mona Lisa*, painted by Leonardo Da Vinci, is drawn according to the golden ratio. The *Mona Lisa* has many golden rectangles all over the painting. By drawing a rectangle on her face, we can see that it is indeed golden. There are other golden rectangles that can be drawn on the rest of her body, from her neck to the top of her hands.

Da Vinci created other pieces that were also drawn according to the golden ratio such as *The Last Supper*, *Old Man*, and *The Vitruvian Man*.

polymath¹ : esprit universel

From "wikipedia" and «goldennumber.net »



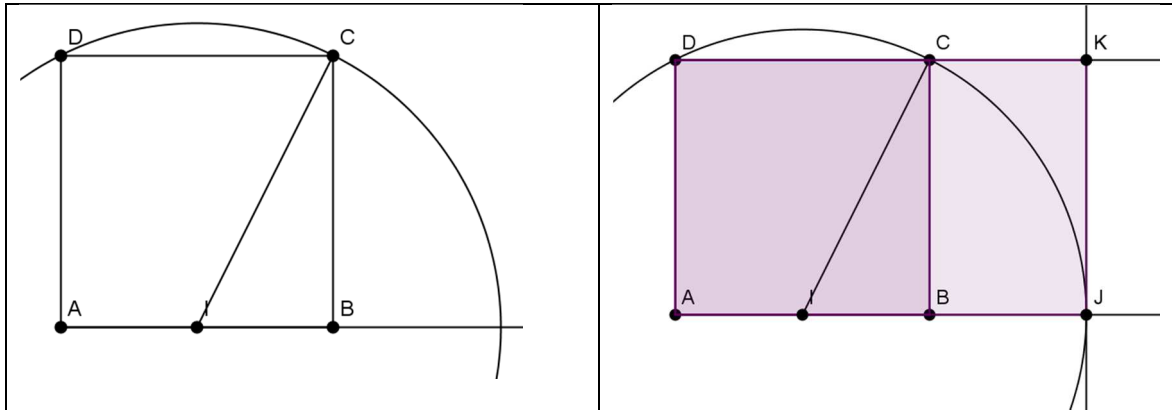
Le sujet doit être restitué à la fin de l'épreuve.

I. Explain what the text deals with and comment on it.

II. Exercise.

1. ABCD is a square with $AB = 1$. I is the midpoint of [AB].

Explain how J and K are built.



2. Work out IC and AJ.

3. A **golden rectangle** is a rectangle in which the ratio of its length to its width is the **golden ratio** ϕ .

Let's assume that AJKD is a golden rectangle with length AJ and width AD. Compute the exact value of the golden ratio.

4. Let's consider this sequence :

1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13 ; 21 ; ; ;

Guess a pattern to complete.

Compute a few more terms.