

**BACCALAURÉAT GENERAL**  
**EPREUVE SPECIFIQUE DES SECTIONS EUROPEENNES**  
**MATHEMATIQUES – ANGLAIS**  
**CORRIGÉ DU SUJET 1**

**Text :**

**Ideas :**

Mona Lisa, Parthenon, golden ratio in Nature ( shell , flowers..)

Fibonacci sequence. Golden rectangle, golden spiral...

Leonardo Da Vinci died in Amboise ( Clos Lucé..) 500 years ago.

The Vitruvian Man ( in Venise ) is based on the correlations of ideal human proportions.

**Exercise :**

1. Draw the circle with center I and radius IC.

The intersection with (AB) is J.

Draw the perpendicular to (AB) in J.

The intersection between this line and (DC) is K.

Draw the golden rectangle AJKD.

2. Thanks to Pythagora's theorem :

$$IC^2 = IB^2 + BC^2 = \frac{1}{4} + 1 = \frac{5}{4}$$

$$IC = \frac{\sqrt{5}}{2} = IJ \quad \text{and} \quad AJ = AI + IJ = \frac{1}{2} + \frac{\sqrt{5}}{2} = \frac{1+\sqrt{5}}{2}$$

3.  $\phi = \frac{AJ}{AD} = \frac{1+\sqrt{5}}{2} \approx 1.618$  The golden ratio.

4. 1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13 ; 21 ; 34 ; 55 ; 89 ....

The Fibonacci sequence. The ratio is close to the golden ratio.

Quadratic equation :  $x^2 - x - 1 = 0$  .....