

The golden mean

The golden mean is the number

$$\frac{1 + \sqrt{5}}{2},$$

that is the root larger in modulus of

$$x^2 - x - 1. \tag{1}$$

It is usually defined as the ratio of two lengths a and b such that

$$(a + b) : a = a : b.$$

Let x be the ratio $\frac{a}{b}$, we have $\frac{a+b}{a} = 1 + \frac{1}{x}$, from which we get the equation $x^2 = x + 1$.