

## Note on square root of 2

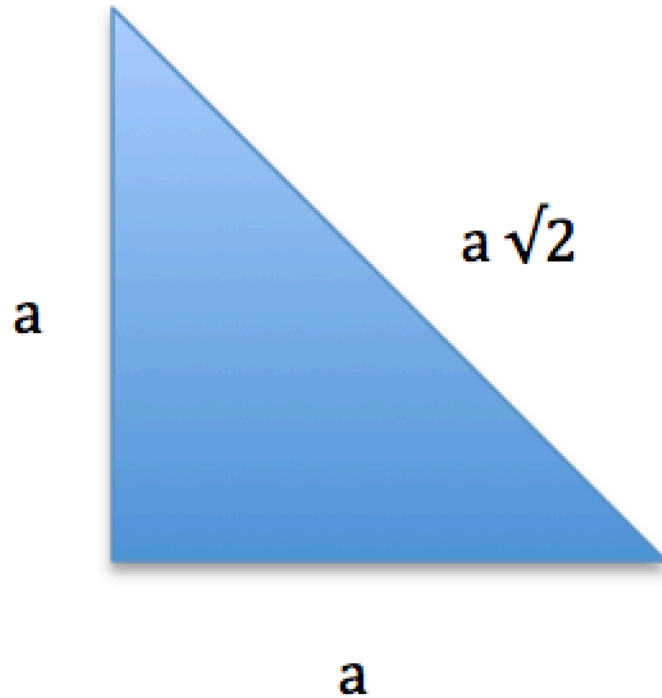


Figure 1:  $c^2 = 2a^2$  what gives the length of the square diagonal  $c = a\sqrt{2}$

Let us assume that  $\sqrt{2}$  is a rational number what means that  $\sqrt{2}$  can be written as a ratio of two whole numbers

$$\sqrt{2} = \frac{m}{n} \quad (1)$$

and that the numerator  $m$  does not have a common factor with the denominator  $n$ . The above is equivalent to

$$2n^2 = m^2 \quad (2)$$

what means that  $m^2$  is a number divisible by 2 and  $m$  is divisible by 2

$$m = 2l \tag{3}$$

$$2n^2 = 4l^2 \tag{4}$$

and  $n$  is a number divisible by 2. Our conclusion is then that both numbers  $m$  and  $n$  are divisible by 2 and that is in contradiction with the assumption that  $m$  and  $n$  do not have common factors, what means that the square root of 2 cannot be presented as a fraction or ratio and what in other words is stated that the square root of 2 is irrational.

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