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The Golden Rectangle in a Square Lattice

1 First Example

1.1 The Golden Rectangle

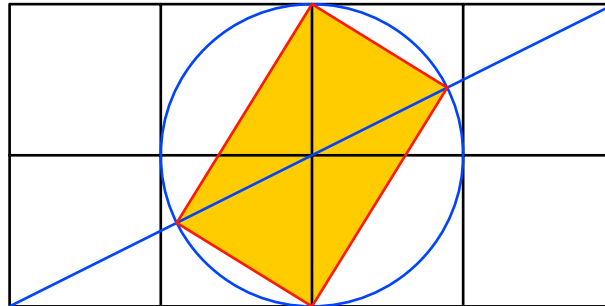


Fig. 1: Golden Rectangle

1.2 Proof

We use the labeling of Figure 2.

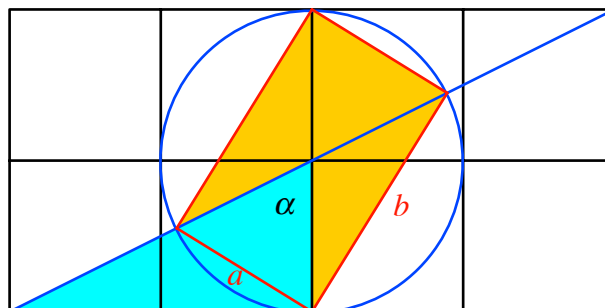


Fig. 2: Labeling

First we have $\tan(\alpha) = 2$. Since

$$\tan\left(\frac{\alpha}{2}\right) = \frac{-1 + \sqrt{1 + \tan^2(\alpha)}}{\tan(\alpha)}$$

we get:

$$\tan\left(\frac{\alpha}{2}\right) = \frac{-1 + \sqrt{1 + 2^2}}{2} = \frac{1}{\Phi}$$

Moreover we have:

$$\frac{a}{b} = \tan\left(\frac{\alpha}{2}\right) = \frac{1}{\Phi}$$

Hence we have a Golden Rectangle.

2 Second Example

2.1 The Golden Rectangle

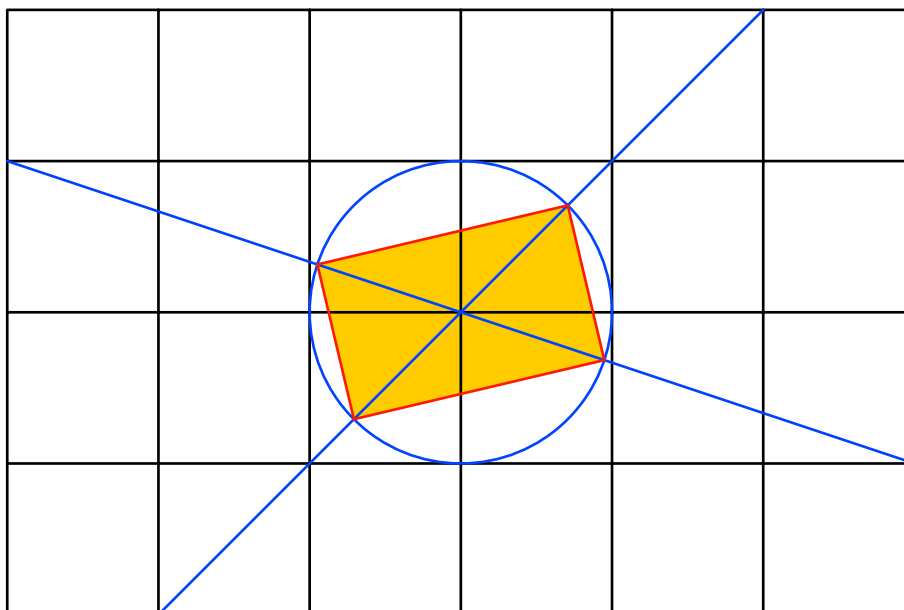


Fig. 3: The Golden Rectangle

2.2 Proof

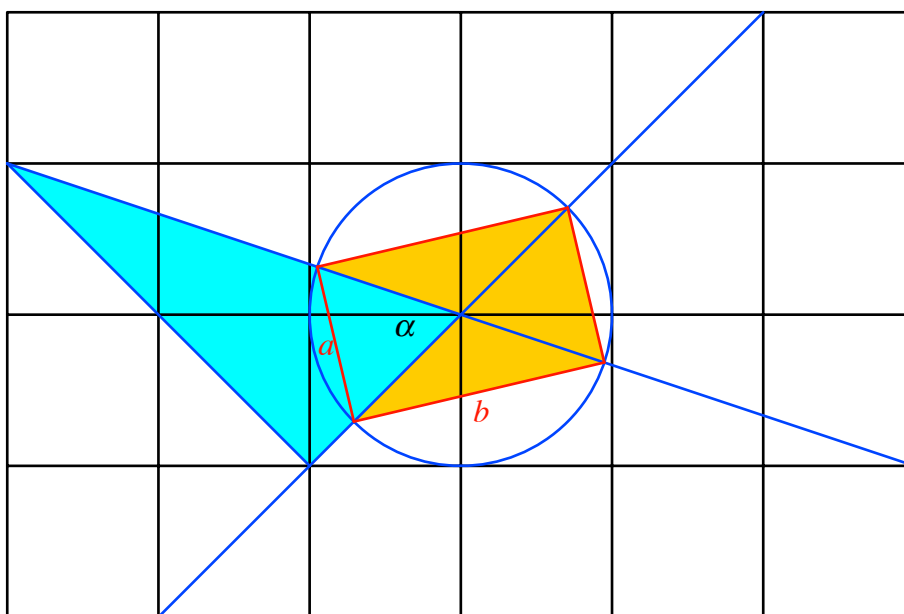


Fig. 4: Labeling

Using the labeling of Figure 4, we get again $\tan(\alpha) = 2$ and the proof goes according to the first example.