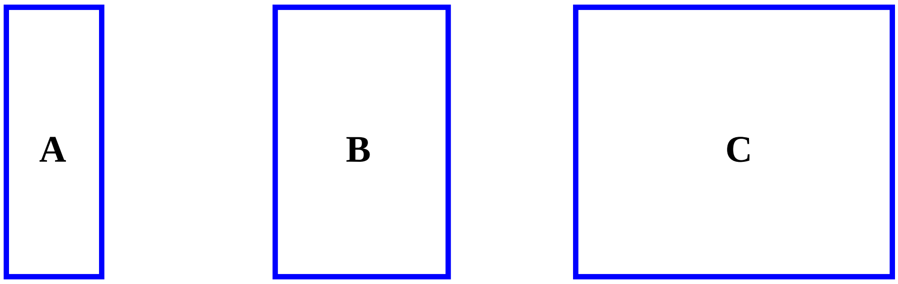
THE "GOLDEN" RECTANGLE.

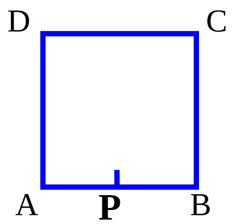
Which of these rectangles do you prefer?



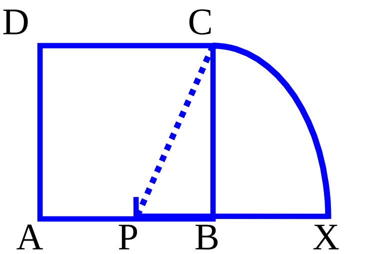
Most people choose rectangle **B.**
This is the special case called the **"Golden Rectangle".**

You can construct a golden rectangle as follows:

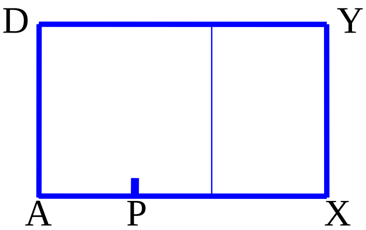
(i) Draw any square and bisect the base.
Let the mid-point of line AB be P.



(ii) Put your compass point on P and
open it to a radius of PC.
Draw the arc from C to AB
meeting the extended line AB
at X. (repeat the procedure to find Y)



(iii) Finally draw the golden
rectangle AXYD.

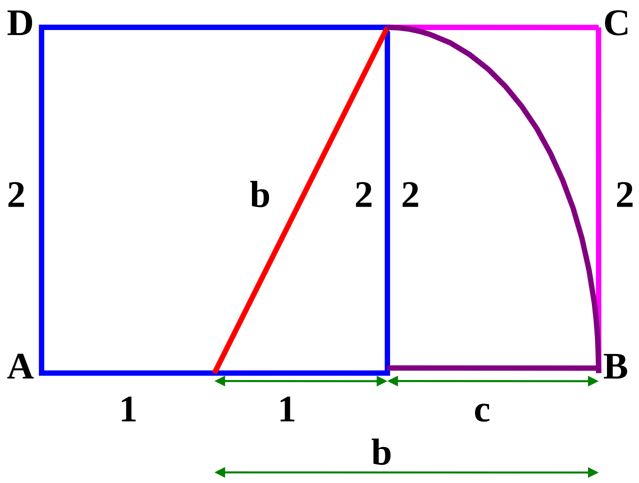


If you measure the lengths of the base and height of a golden rectangle and divide them then the answer is about 1.6.

This is called the **GOLDEN RATIO** and actually equals $\mathbf{\frac{1+\sqrt{5}}{2} \approx 1.618033989....}$

This number keeps occurring in nature in many places from the **human face** to **flower petals.**

To calculate the value of the GOLDEN RATIO



Clearly $b^2 = 1^2 + 2^2$

$b^2 = 5$

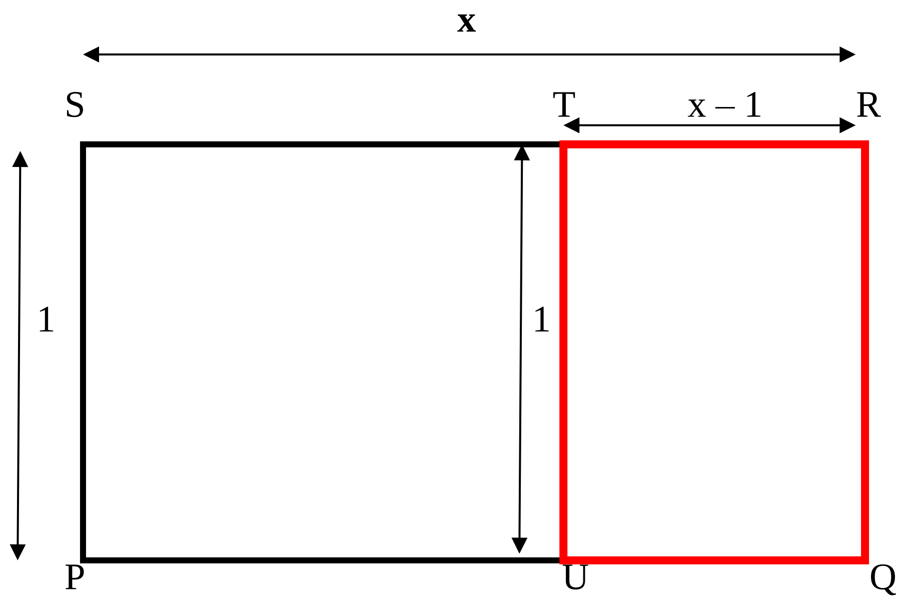
so $b = \sqrt{5}$

The sides of the rectangle are:

$AB = 1 + \sqrt{5}$ **and** $AD = 2$

so the GOLDEN RATIO is $\dfrac{1 + \sqrt{5}}{2}$

$\approx 1.618033989...$



PQRS and QRTU are golden rectangles.

The RATIOS of the sides are equal.

For PQRS: $\dfrac{\text{(Short side)}}{\text{(Long side)}} = \dfrac{1}{x}$

For QRTU: $\dfrac{\text{(Short side)}}{\text{(Long side)}} = \dfrac{x-1}{1}$

Equating these: $\dfrac{x-1}{1} = \dfrac{1}{x}$

If we solve this we get $x^2 - x = 1$

$$x^2 - x - 1 = 0$$

$$x = \frac{1 \pm \sqrt{(1+4)}}{2}$$

$$x = \frac{1 \pm \sqrt{5}}{2}$$

But since x is a positive value $x = \dfrac{1 + \sqrt{5}}{2}$