GOLDEN RATIO

$a > b > 0$

$\frac{a}{b} = \frac{a+b}{a} =: \varphi$

$\frac{a}{b} = \frac{a}{a} + \frac{b}{a} = \frac{1}{\frac{a}{b}}$

$\varphi = 1 + \frac{1}{\varphi} \quad / \cdot \varphi$

$\varphi^2 = \varphi + 1$

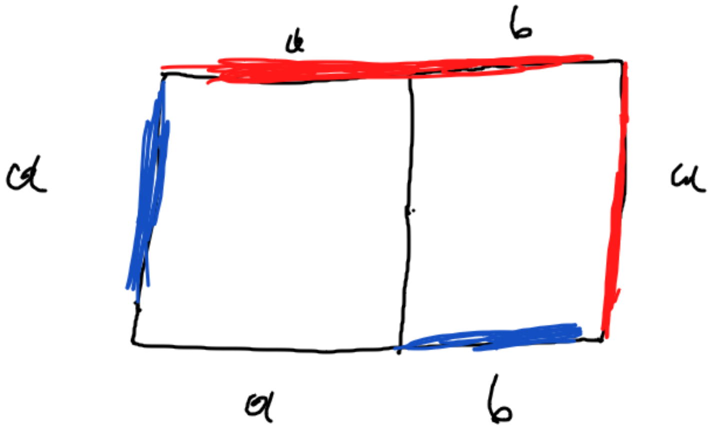
$\varphi^2 - \varphi - 1 = 0$

$\Delta = 1 + 4 = 5$

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

$\varphi = \frac{1+\sqrt{5}}{2} \approx 1.6180...$

$\frac{1-\sqrt{5}}{2} \approx -0.61803... = -\frac{1}{\varphi}$



$$\frac{a}{b} = \frac{a+b}{a}$$

FIBONACCI SEQUENCE

$$F_n = F_{n-1} + F_{n-2}$$ ← RECURSIVE EQUATION

$$F_1 = F_2 = 1$$

$1, 1, 1, 1$

$F_1, 1, F_2, 1, F_3$

$$F_n = F_{n-1} + F_{n-2}$$

$F_1 = 1$

$F_2 = 1$

$F_3 = F_2 + F_1 = 1 + 1 = 2$

$F_4 = F_3 + F_2 = 2 + 1 = 3$

$F_5 = F_4 + F_3 = 3 + 2 = 5$

$F_6 = 8$

$F_7 = 13$

$F_8 = 21$

...

$$F_{n+1} = F_n + F_{n-1} \quad / : F_n$$

$$\frac{F_{n+1}}{F_n} = 1 + \frac{F_{n-1}}{F_n}$$

$\downarrow n \to \infty$ $\qquad\qquad$ $\downarrow n \to \infty$

$$A = 1 + \frac{1}{A}$$

↑ THE SAME EQUATION AS FOR GOLDEN RATIO

$$\lim \frac{F_{n+1}}{F_n} = \varphi$$

$$\lim_{n \to \infty} \frac{F_{n+1}}{F_n} = A$$

$$\lim_{n \to \infty} \frac{F_{n-1}}{F_n} = 1/A$$