19 February 2022 11:36

$\alpha = \frac{1+\sqrt{5}}{2}$; $\alpha^2 = \frac{1}{4}(1+2\sqrt{5}+5)$

$= 1/4 + \frac{\sqrt{5}}{2} + 5/4$

$= \frac{\sqrt{5}}{2} + \frac{6}{4} = \frac{\sqrt{5}}{2} + \frac{3}{2}$

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

$= \frac{\sqrt{5}+1}{2} + 1 = \alpha + 1$

$\therefore$ $\boxed{\alpha \text{ satisfies } \alpha^2 = \alpha+1}$

GCD → positive integers

Let a, b be positive integers

Greatest $\boxed{\text{Common}}$ divisor

$d = \gcd(a,b)$ when

(i) d divides a && d divides b

$\underline{d|a}$ && $\underline{d|b}$

(ii) $c|a$ && $c|b$ $\Rightarrow c|d$

I $(3, 9)$ 3 (1, 3) $3|3$ $3|9$

9 (1, 3, 9) $1|3$ $1|9$

$1|3$

II $(3, 18) = 3$ 3 (1, 3)

18 (1, $\cancel{2}$, 3, $\cancel{6}$, $\cancel{9}$, $\cancel{18}$)

$3|18$, $3|3$

$1|18$, $1|3$ $1|3$

(i) $d = \gcd(a,b)$, $\exists$ $\boxed{\text{unique integers}}$

x & y s. that $\quad d = ax + by$

(ii) $\quad d = g.c.d(a, b)$, $g.c.d\left(\frac{a}{d}, \frac{b}{d}\right) = 1$

(iii) $\quad d = gcd(a, b) \Rightarrow gcd(a^n, b^n) = d^n$.

(iv) $\quad \underbrace{l.c.m(a, b)} \cdot g.c.d(a.b) = a * b$

$45 = r_1 \overline{)53 = r_0}\ 1 = q_1$

45

$r_2\ 8 \overline{)45\ r_1}\ 5\ q_2$

40

$r_3\ 5 \overline{)8\ r_2}\ 1\ q_3$

5

$r_4\ 3 \overline{)5}\ 1$

3

$2 \overline{)3}\ 1$

2

$1 \overline{)2}\ 2$

2

0