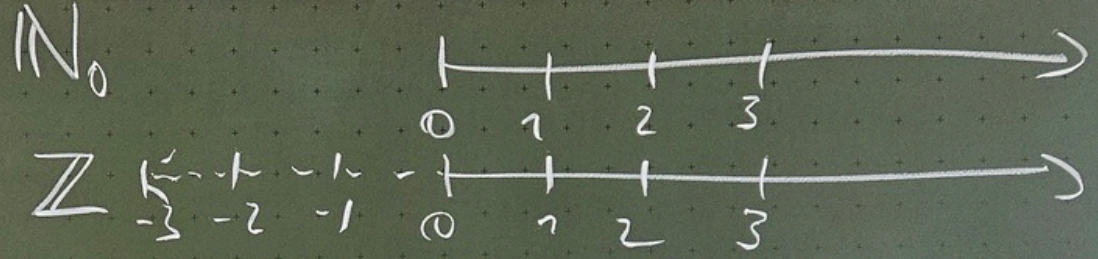


Analysis:



$$\mathbb{Q} = \{p/q \mid p, q \in \mathbb{Z}, q \neq 0\}$$

$\mathbb{R} = \mathbb{Q} + \text{Grenzwerte}$

$$(a_n)_{n \in \mathbb{N}} \subseteq \mathbb{Q}$$

Zahlenth.

$$\mathbb{Z}/n\mathbb{Z} = \{[0], [1], \dots, [n-1]\}$$

$$\mathbb{Z}[n]$$

Bsp.  $n=5, \mathbb{Z}/5\mathbb{Z} = \{[0], \dots, [4]\} = \{\bar{0}, \bar{1}, \dots, \bar{4}\}$

$$[x] + [y] = [x+y] = \{0, \dots, 4\} (!)$$

$$[x] \cdot [y] = [x \cdot y] \quad [2] \cdot [3] = [1]$$

Elemente in

$\mathbb{Z}/5\mathbb{Z}$

[0]	[1]	[2]	[3]	[4]
0, 5, 10, 15, 20, ...	1, 6, 11, 16, 21, 26, ...	2, 7, 12, ...	3, 8, 13, ...	4, 9, 14, ...

$$ggT(12, 20)$$

$$= ggT(20, 12)$$

$$= ggT(12, 8)$$

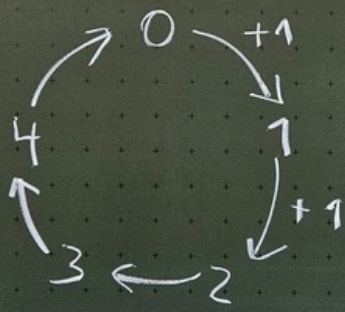
$$= ggT(8, 4)$$

$$= ggT(4, 0) = 4$$

Graph

Audio

$\mathbb{Z}_5$ :



$$\begin{aligned} 0 &\stackrel{?}{<} 3 \quad | +14 \\ 14 &\stackrel{?}{<} 17 = 2 \\ 0 &< 0 \quad ?? \end{aligned}$$

P4

$\mathbb{Z}$	0	1	2	3	4
$\mathbb{Z}_5$	$\mathbb{Z}^{-1}$	1	3	2	4

$$\mathbb{Z}_5^* = \{1, 2, 3, 4\}$$

$$|\mathbb{Z}_5^*| = 4, \quad \varphi(5) = 5 \cdot \left(1 - \frac{1}{5}\right) = 4$$

$$\begin{aligned} \mathbb{Z}_{10} &= \mathbb{Z}_2 \times \mathbb{Z}_5 \\ n &\mapsto ([n]_2, [n]_5) \\ & \quad (n \bmod 2, n \bmod 5) \end{aligned}$$

$\mathbb{Z}_{10}$	0	1	2	3	4	5	6	7	8	9
$\mathbb{Z}_2$	0	1	0	1	0	1	0	1	0	1
$\mathbb{Z}_5$	0	1	2	3	4	0	1	2	3	4