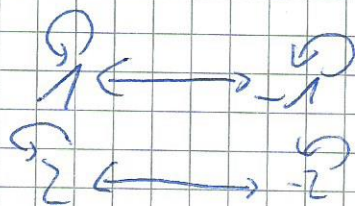


2

$$a) \quad (3a) \quad R_1 = \{(a, b) \in \mathbb{R} \times \mathbb{R} \mid |a| = |b|\}$$



$$\Rightarrow [a] = \{a, -a\} \quad \forall a \in \mathbb{R}$$

$$(3c) \quad R_3^p = \{(a, b) \in \mathbb{Z} \times \mathbb{Z} \mid \exists z \in \mathbb{Z} : a - b = z \cdot p\},$$

für ein  $p \in \mathbb{N}$

$$\Rightarrow [a] = \{\dots, a-2p, a-p, a, a+p, a+2p, \dots\}$$

$$\forall a \in \mathbb{Z}$$

b)

$$i) [42] \oplus_{47} [276]$$

$$\Rightarrow [42 + 276] \quad \forall 42, 276 \in \{0, 1, \dots, 46\}$$

$$\Rightarrow [276] = [276 + a \cdot 47] \quad \forall a \in \mathbb{Z}$$

$$\Rightarrow [276] = [276 - 5 \cdot 47] = [41]$$

$$\Rightarrow [42] \oplus_{47} [41] = [83] = [83 - 47] = [36]$$

$$ii) [7] \oplus_{11} [19] = [7] \oplus_{11} [8] = [56] = [56 - 5 \cdot 11]$$

$$= [1]$$