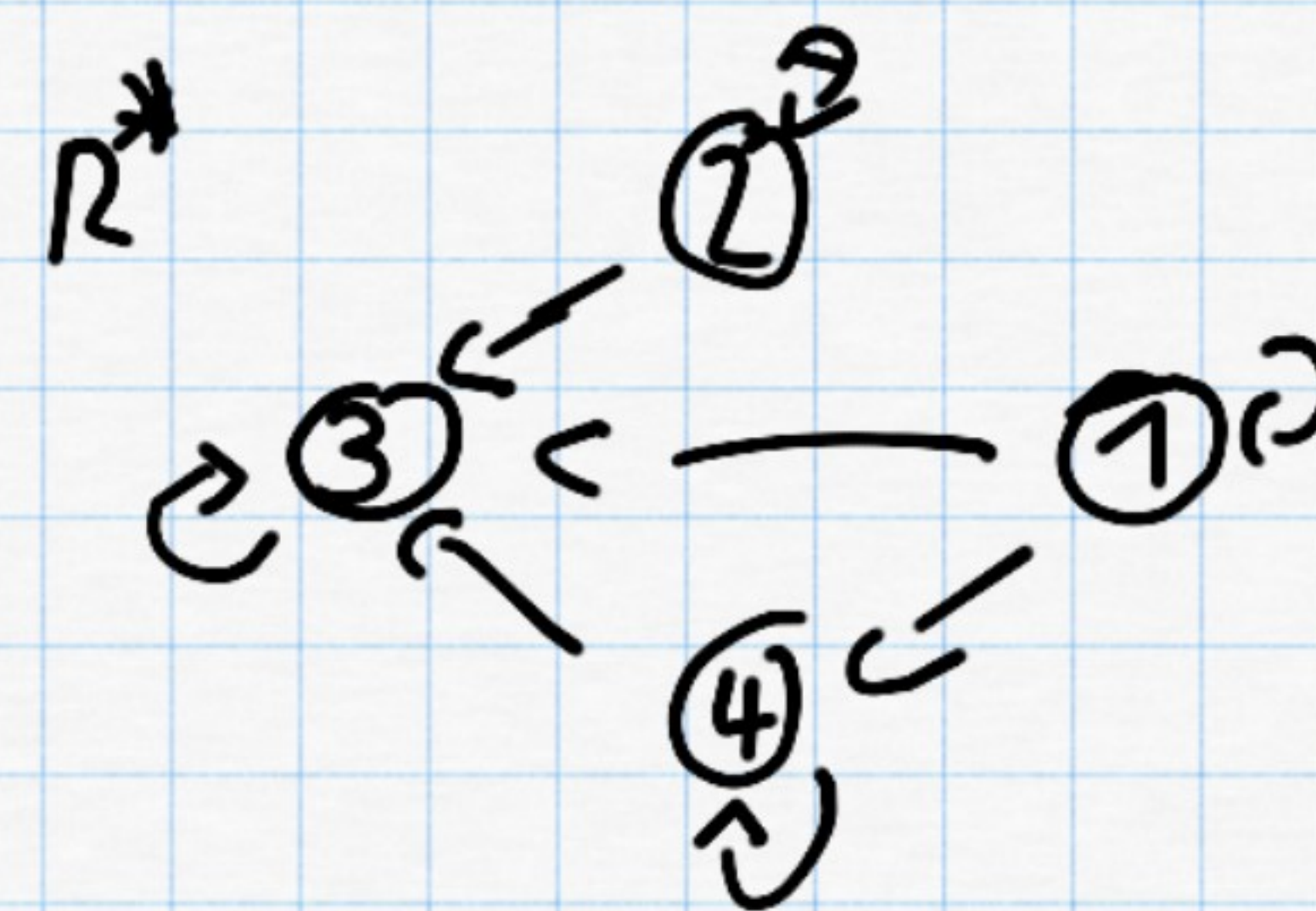
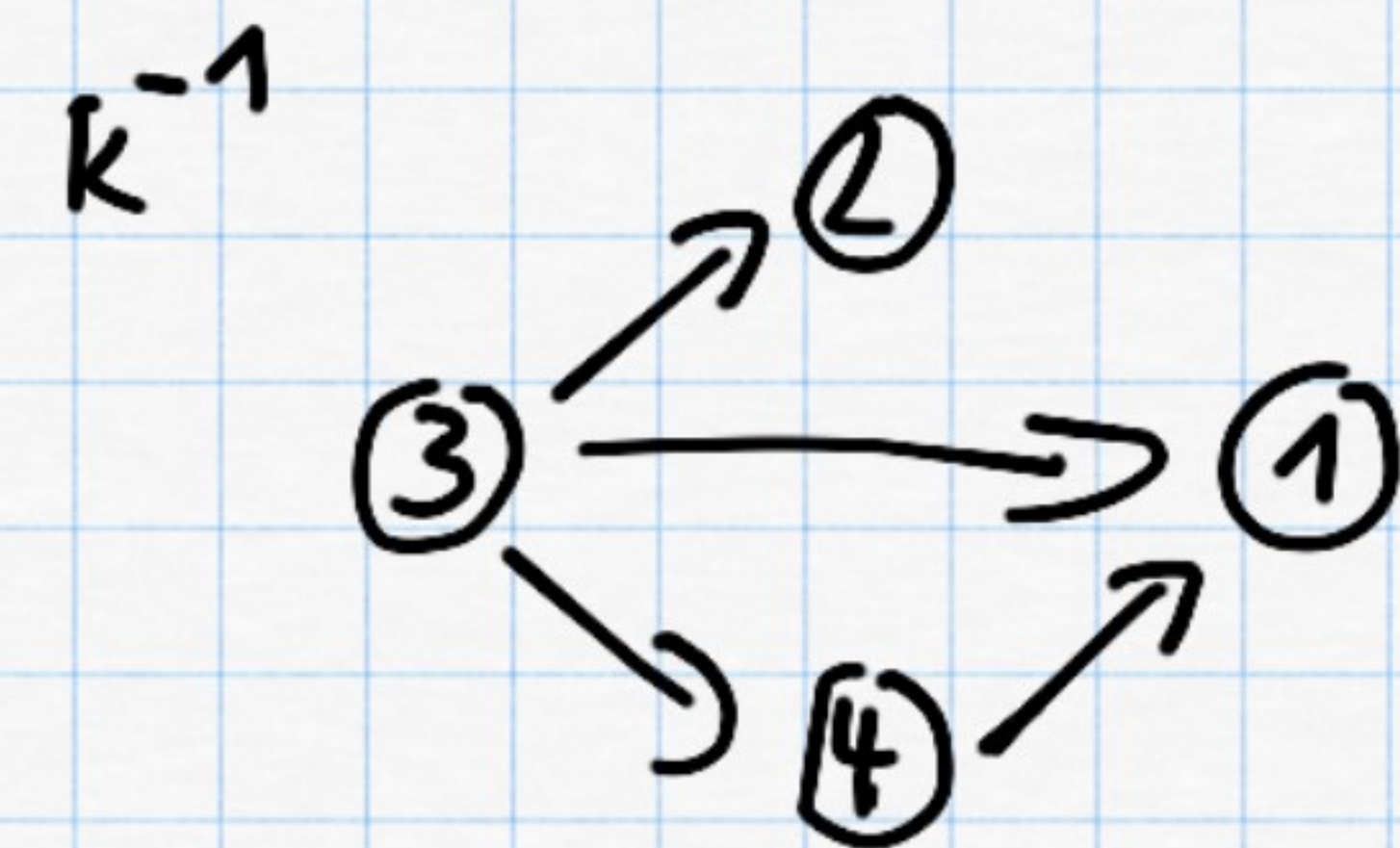
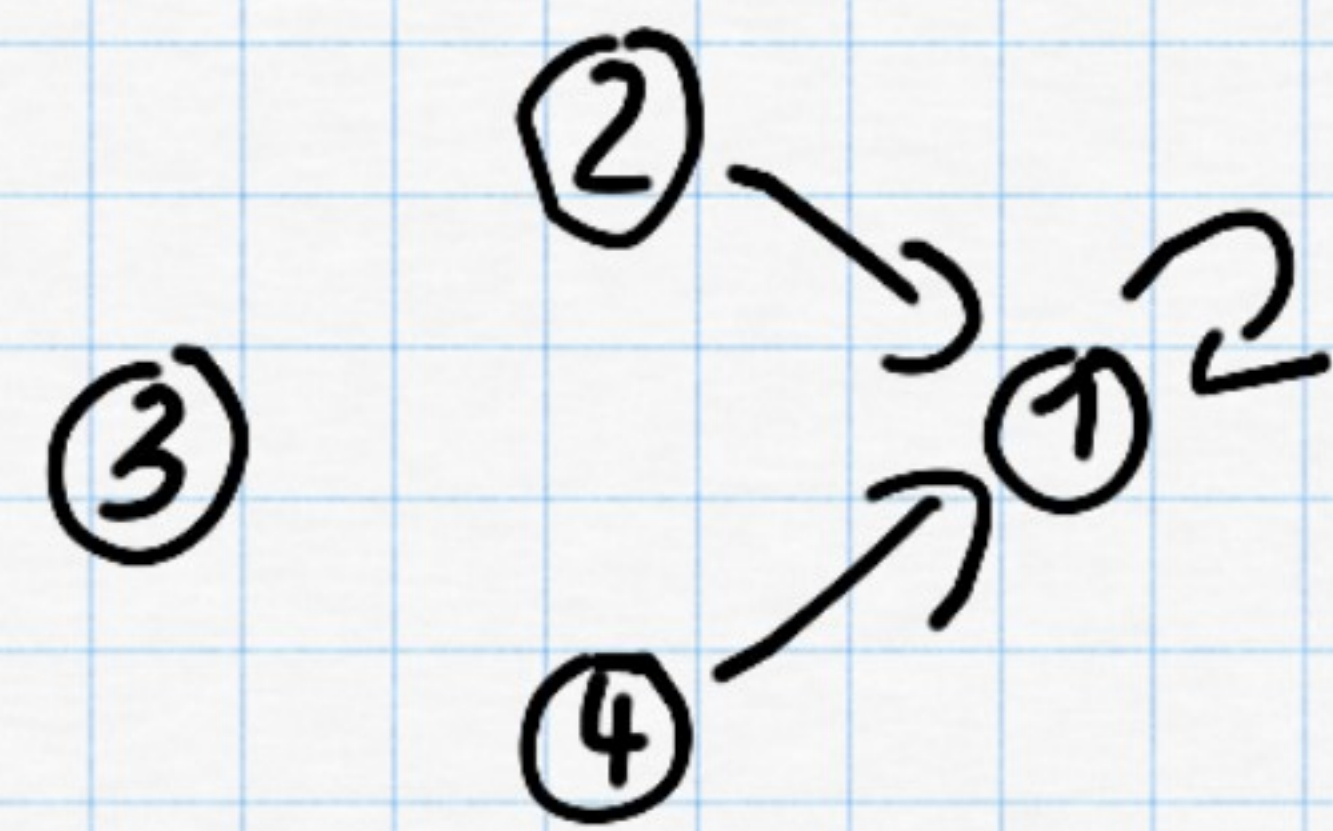
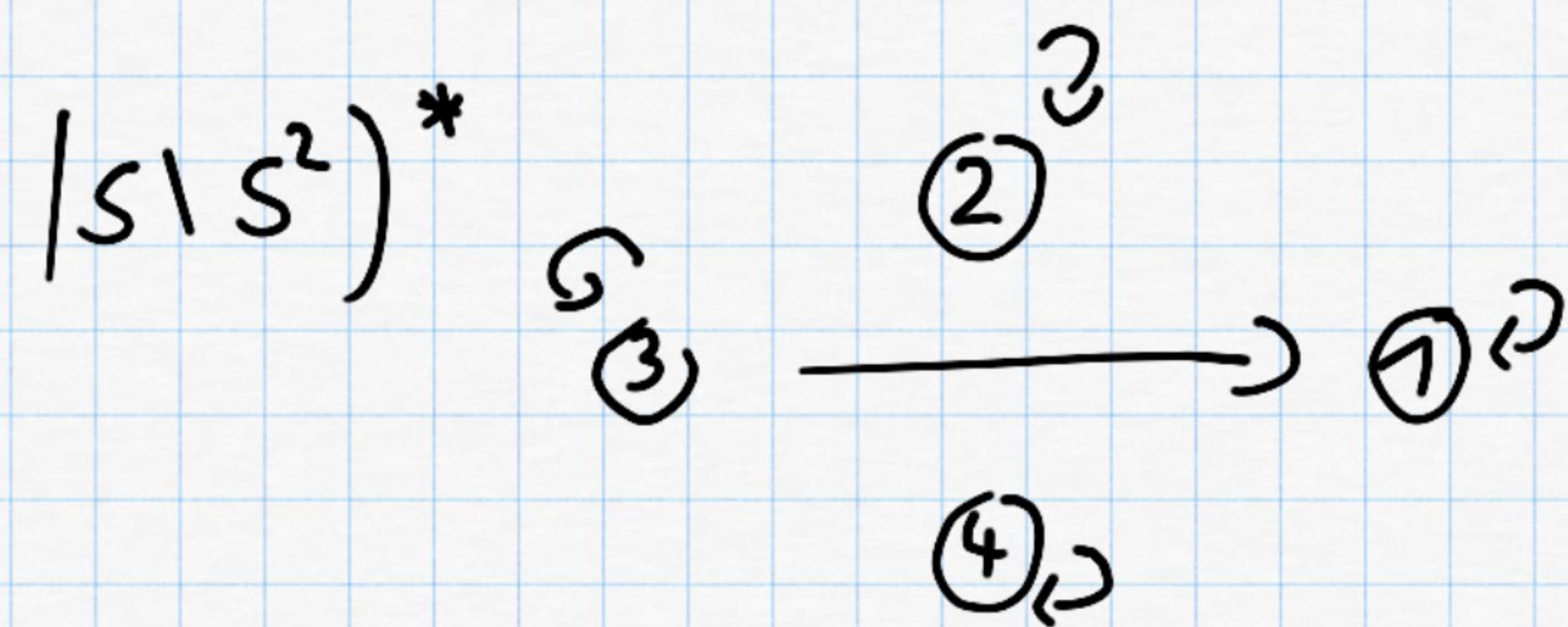
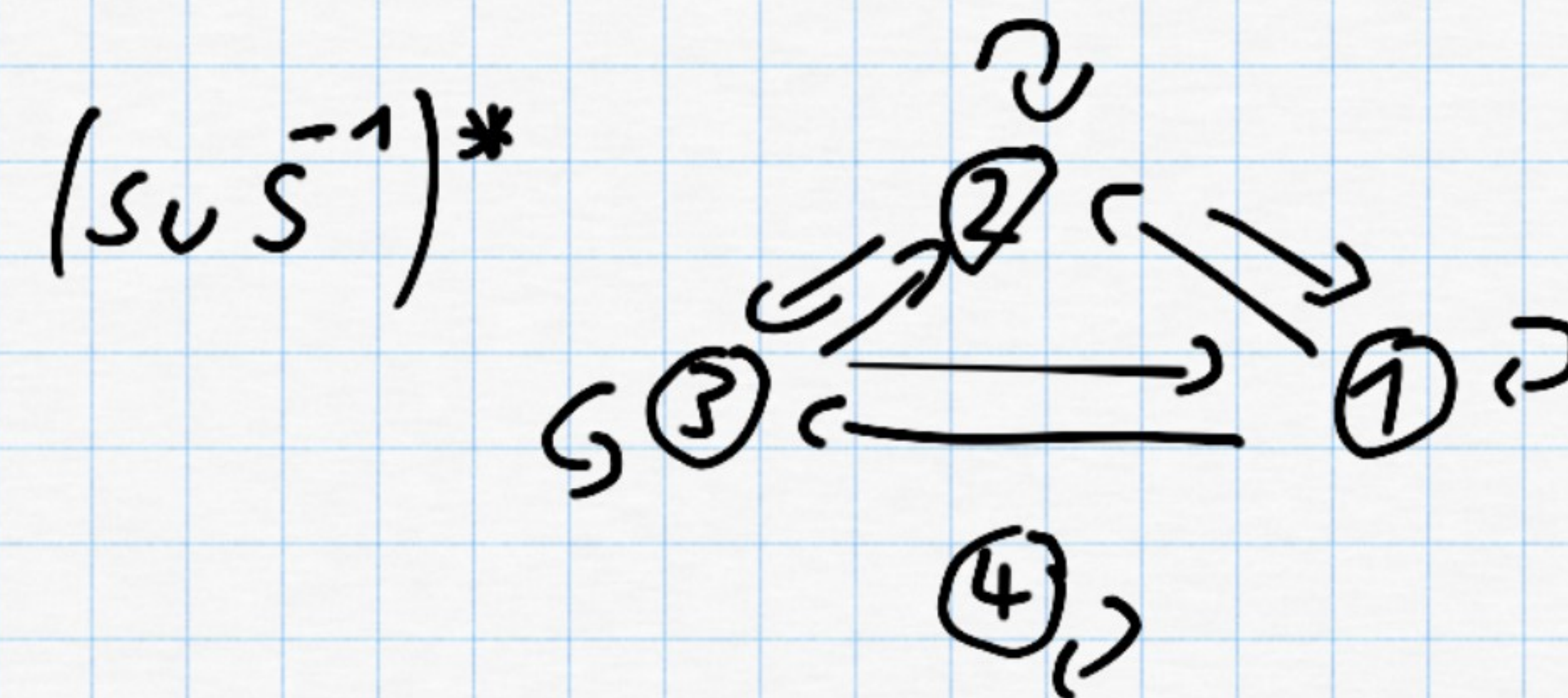
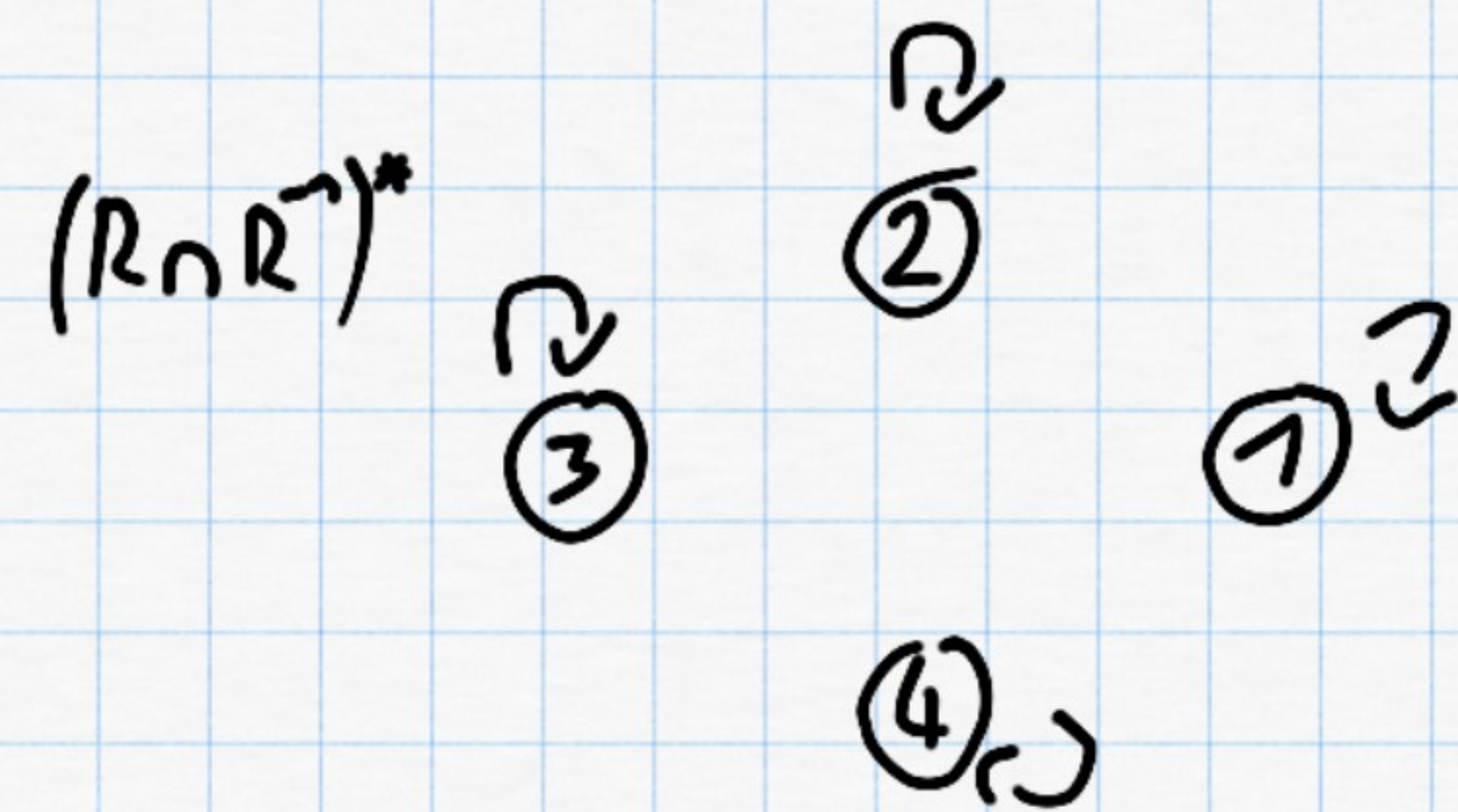
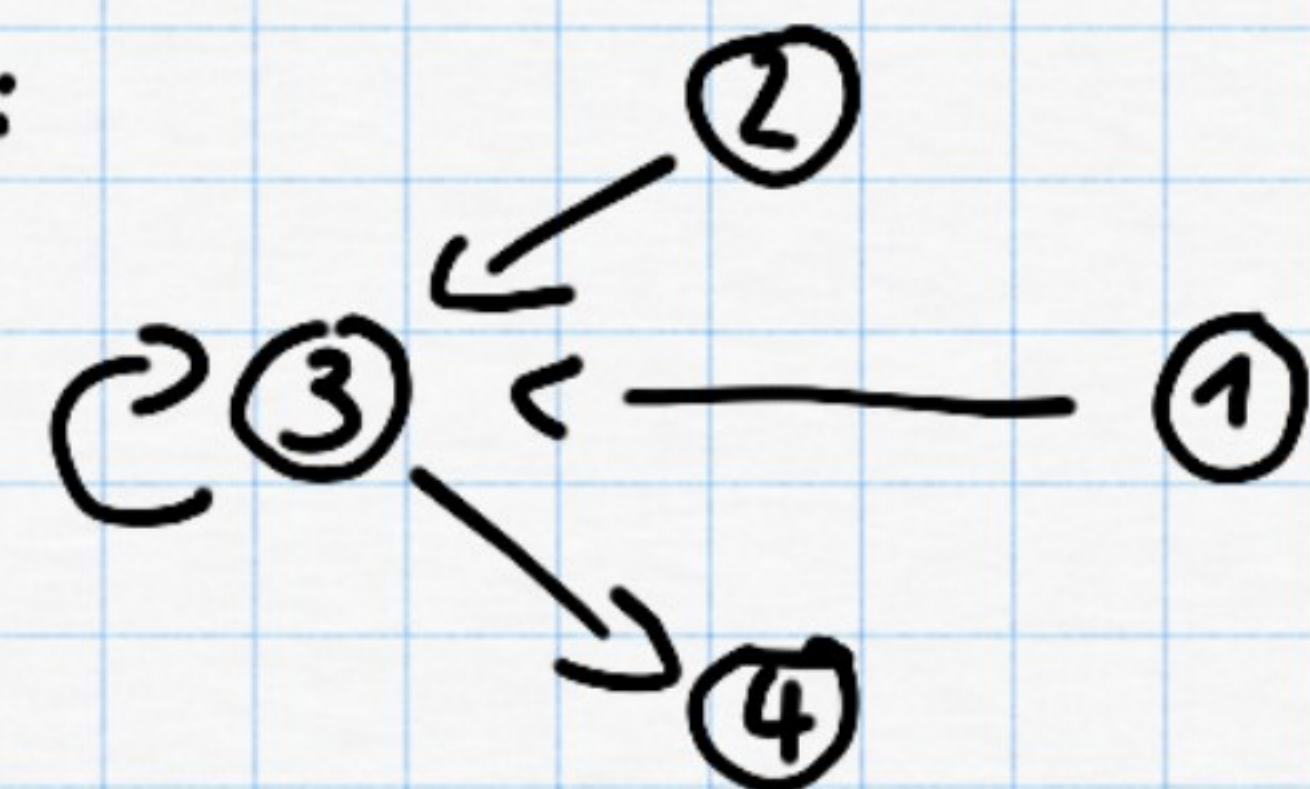


1a) RS:



SR:



b)

	reflexiv	trans.	antisymm.	asymm	symm	
(i)	X	✓	✓	✓	X	
(ii)	X	X	X	X	X	
(iii)	✓	✓	✓	X	X	Ord
(iv)	✓	✓	✓	X	✓	Äquiv. & Ord.
(v)	✓	✓	X	X	✓	Äquiv.
(vi)	✓	✓	✓	X	X	Ord

2 a) reflexiv: $a \equiv_f a$ gdw. $f(a) = f(a)$ $\leftarrow$ immer gültig
 symm.: $a \equiv_f b$ gdw. $f(a) = f(b)$ gdw. $f(b) = f(a)$ gdw. $b \equiv_f a$
 transitiv: $a \equiv_f b$ und $b \equiv_f c \Leftrightarrow f(a) = \underline{f(b)} \quad f(b) = f(c) \rightarrow f(a) = f(c) \Leftrightarrow a \equiv_f c$

b) $f: \mathbb{Z} \rightarrow \mathbb{Z}: x \mapsto x \bmod 7$
 $\{0, 1, 2, 3, 4, 5, 6\}$
 $[7]$

$f: \mathbb{N}_0 \times \mathbb{N}_0 \rightarrow \mathbb{Z}: (x, y)$

$\{(0, a), (a, 0), (0, 0) \mid a \in \mathbb{N}\}$

$\{(1, a), (a, 1), (0, 0) \mid a \in \mathbb{N}_0 \setminus \{1\}\}$

$[(0, 0)]_{\equiv_f} = \{(0, 0), (1, 1), (2, 2), \dots\}$

$f: \mathbb{R} \rightarrow \mathbb{R}: x \mapsto (x^2 - 1)^2 = c$

$x = \pm \sqrt{1 \pm \sqrt{c}}$

$\{-1, 1\}$

$\{-1, -\sqrt{c}, \sqrt{1+\sqrt{c}} \mid$

$\{-\sqrt{c}, \sqrt{c}, 0\}$

$x \in \mathbb{R}^+ \setminus \{1\}\}$

$\{\pm \sqrt{1 \pm \sqrt{c}} \mid x \in (0, 1)\}$

$\{\pm \sqrt{1 \pm \sqrt{c}} \mid x > 1\}$

2.2 b)

4.

$$f: \mathbb{Z} \rightarrow \mathbb{R} : x \mapsto \cos\left(\frac{\pi}{3}x\right)$$

$$\{0, 1, 2, 3\} \quad \{0, 3, 4, 5\}$$

$$\mathbb{Z} / \equiv_f = \{ \underline{6\pi}, \underline{6\pi+3}, \underline{(1+6\pi) \cup (5+6\pi)}, \underline{(2+6\pi) \cup (4+6\pi)} \}$$

