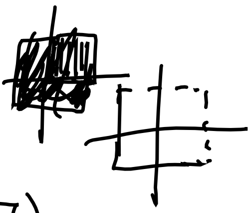
1.1.

$A = [-1,1] \times [-1,1]$

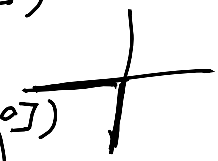
$g : \mathbb{R}^2 \to \mathbb{R}^2/A$ hoc



a) $g_*((-\infty,0] \times (-\infty,0])$

~~zapta~~ nie odp nits ~~nie otw~~ zap

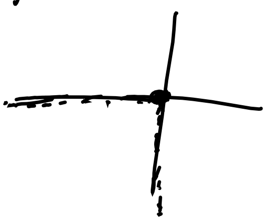
$g^*(g_*((-\infty,0] \times (-\infty,0]))$



b) $g_*(\mathbb{R}^2 - (-\infty,0] \times (-\infty,0])$

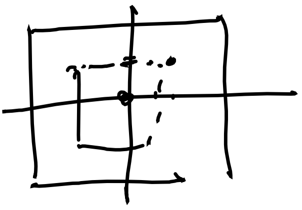
nie otwarte

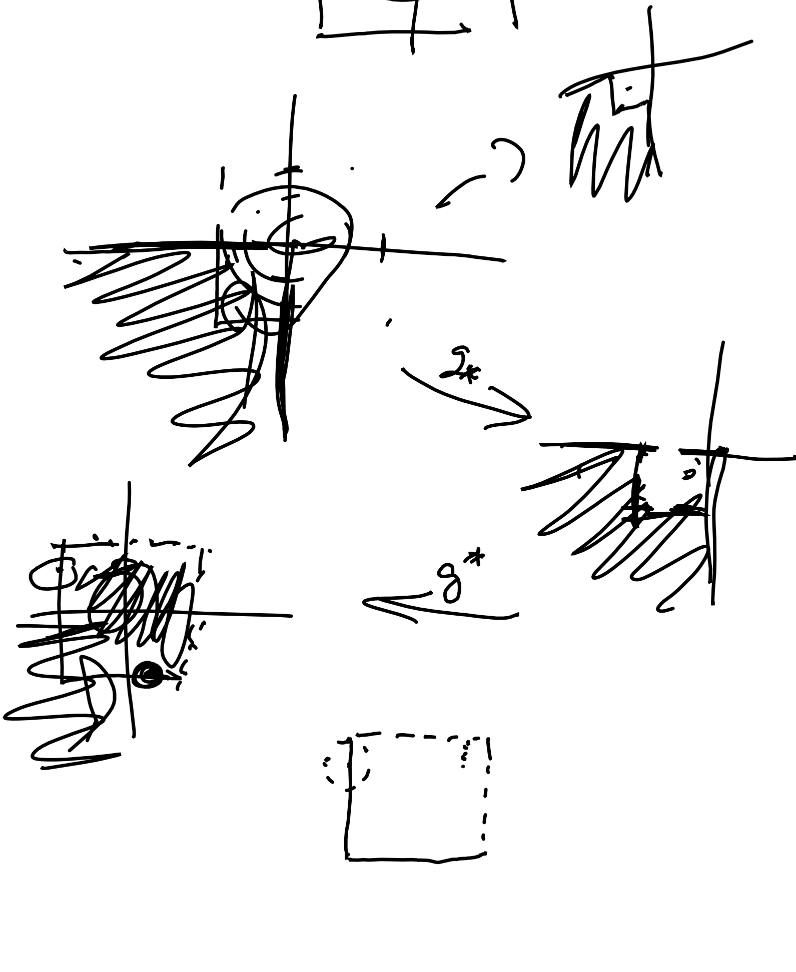
nie zamknięte



c) $g_*([-2,2] \times [-2,2])$

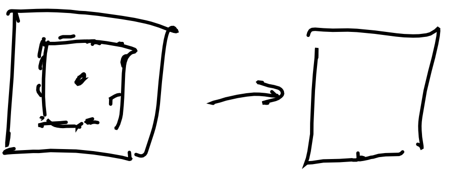
otwarte





5)

$g^*(g([-2,2] \times [-2,2])$



zapta

ni odp

d) niedy jest

7.4

a) $[-2,2] / [-1,1]$ 

$\cong [-1,1]$

b) $[-1,1] / \{-1,0,1\}$ 

$\cong$ 

$\mathbb{R}^2$ 

c) /

$$\mathbb{R}^n / K(0,1) \xrightarrow{\;\cong\;} \mathbb{R}^n$$

$$\begin{tikzcd}
\mathbb{R}^n \arrow[rr, "f"] \arrow[d] & & \mathbb{R}^n \\
\mathbb{R}^n / K(0,1) & &
\end{tikzcd}$$

$$f(\vec{a}) := \begin{cases} 0 \ ; & \text{če je } |\vec{a}| \leq 1 \\ \vec{a} - \dfrac{\vec{a}}{\|\vec{a}\|} \ ; & a \in \mathbb{R}^n - \{\overline{K}(0,1)\} \end{cases}$$

d) $\mathbb{R}^n/_\sim \qquad x \sim y \Leftrightarrow \|x\| = \|y\|$

$\mathbb{R}^n/_\sim \;\tilde{\to}\; [0,\infty)$

$f: \mathbb{R}^n \longrightarrow [0,\infty)$

$f(\vec{x}) = \|\vec{x}\|$ je surj

$a \in [0,\infty) \qquad (a,0,0\ldots) \mapsto a$

$[x]=[y] \Leftrightarrow \|x\|=\|y\| \Leftrightarrow f(x)=f(y)$

je zvezna

iščemo preslikavo s, da velja $\quad f\circ s = id_{[0,\infty)}$

$s: a \longmapsto (a,0\ldots\ldots)$

Dokažimo da če $r\circ s = id_Y$

$\Rightarrow$ r kvocientna, sublažilo

$S \subseteq Y$ taka da $r^*(S)$ odp v X

$S = s^*(r^*(S)) =$

$= (s^* \circ r^*)(S) = (r\circ s)^*(S) =$

$id_Y^*(S) = S \quad \blacksquare$

$\Longrightarrow$ S je odprta

f)

$$S^n \times [-1,1] \big/ \{S^n \times \{-1\}, S^n \times \{1\}\} \approx S^{n+1}$$

$$f: X \to S^{n+1}$$

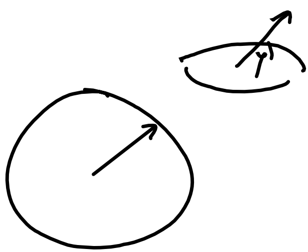
$$(x,t) \longmapsto (xb, t) = (\sqrt{1-t^2}\,x, t$$

ansatz vektor

$$\|xb\|^2 + \|t\|^2 = 1$$

$$\|b\|^2 + \|t\|^2 = 1$$

$$b = \sqrt{1-\|t\|^2} = \sqrt{1-t^2}$$



$$G/H = \{ g \cdot H \; ; g \in G\} =$$

$$= \{\{g \cdot h ; h \in H\} ; g \in G\}$$