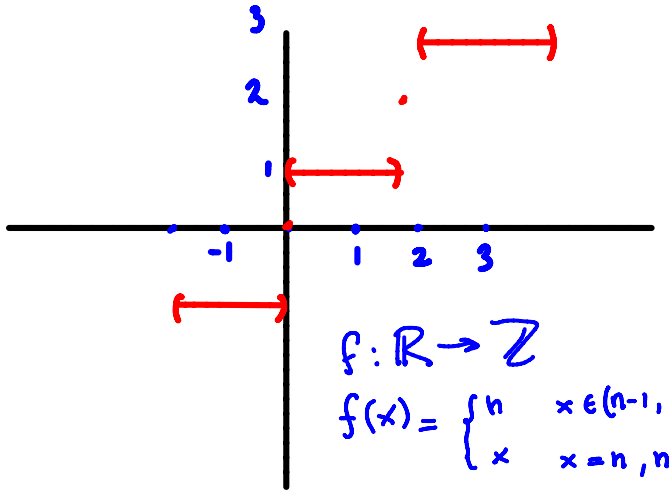
Find the quotient topology.

① $X=\{\alpha,\beta,\gamma\}$

$f:\mathbb{R}\to X$

$$f(x)=\begin{cases}\alpha & x<0\\ \beta & x=0\\ \gamma & x>0\end{cases}$$



$f:\mathbb{R}\to\mathbb{Z}$

$$f(x)=\begin{cases}n & x\in(n-1,n+1),\ n \text{ odd}\\ x & x=n,\ n \text{ even.}\end{cases}$$

$f:[0,4]\to\{0,1,2,3,4\}$

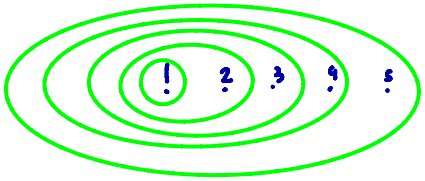
$$f(x)=\begin{cases}\lfloor x\rfloor, & x\in[0,2)\\ \lceil x\rceil, & x\in(2,4]\\ 2 & x=2\end{cases}$$

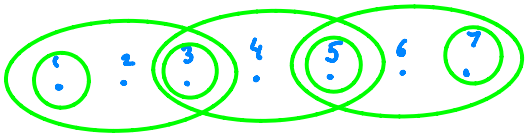
where $\lfloor x\rfloor$ is the largest integer smaller than x

$\lceil x\rceil$ is the smallest integer larger than x

$f:\{1,2,3,4,5\}\to\{a,b\}$

$$f(x)=\begin{cases}a & x\le 2\\ b & x\ge 3\end{cases}$$





$f:\{1,2,3,4,5,6,7\}\to\{1,2,3,4,5,6\}$

$$f(x)=\begin{cases}x & x\le 6\\ 1 & x=7\end{cases}$$

$f : [0,1] \longrightarrow A$

$A = (0,1) \cup \{p\}$

$$f(x) = \begin{cases} x & x \in (0,1) \\ p & x = 0 \text{ or } x = 1 \end{cases}$$

$f : [0,1] \times [0,1] \longrightarrow A$

$A = (0,1) \times [0,1] \cup \{p\} \times [0,1]$

$$f(x) = \begin{cases} x & x \in (0,1) \times [0,1] \\ (p,\pi) & x = (0,\pi) \text{ or } (1,\pi) \end{cases}$$

A is the following partition of $[0,1] \times [0,1]$

$$A = \{(x,y)\}_{(x,y) \in \mathbb{R}^2} \cup \{(0,y),(1,y)\}_{y \in (0,1)} \cup \{(x,0),(x,1)\}_{x \in (0,1)} \cup \{(0,0),(0,1),(1,0),(1,1)\}$$

$f : [0,1] \times [0,1] \longrightarrow A$

$(x,y) \longrightarrow$ Subset of $A / (x,y) \in C$

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$$f(x) = \begin{cases} x & x \in (0,1) \times [0,1] \\ (p,\pi) & x = (0,\pi) \text{ or } (1,1-\pi) \end{cases}$$

A is the following partition of $[0,1] \times [0,1]$

$$A = \{(x,y)\}_{(x,y) \in \mathbb{R}^2} \cup \{(0,y),(1,1-y)\}_{y \in (0,1)} \cup \{(x,0),(x,1-x)\}_{x \in (0,1)} \cup \{(0,0),(0,1),(1,0),(1,1)\}$$

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$f : [0,1] \times [0,1] \longrightarrow A$

$(x,y) \longrightarrow$ Subset of $A / (x,y) \in C$

$A = \{0,1,2,3\} \cup \{x\}_{x \text{ in } (0,1) \cup (2,3)}$

$[0,1] \cup [2,3] \longrightarrow A$

$x \longrightarrow$ subbset of A containing x

$A = \{0,1,2,3,4\} \cup \{x\}_{x \text{ in } (0,1) \cup (2,3)}$

$[0,1] \cup [2,3] \cup [4,5] \longrightarrow A$

$x \longrightarrow$ subbset of A containing x