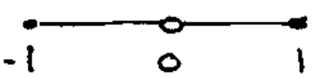
⑥ (a) $A = \{x \in \mathbb{R} \mid 0 < x^2 \leq 1\}$.

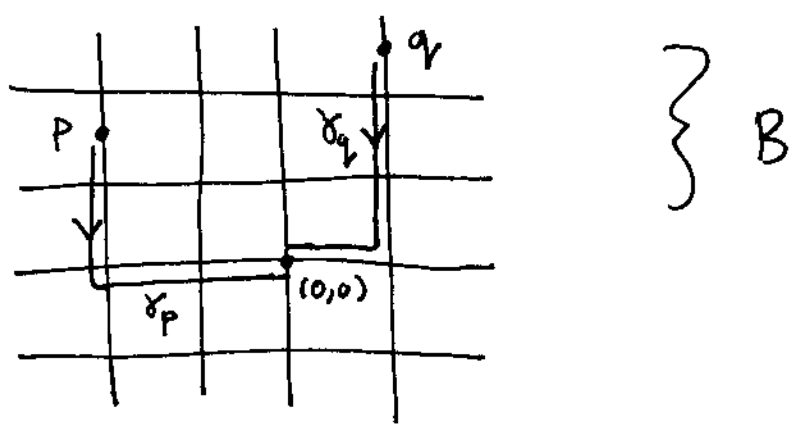
i.e.



- every path from -1 to 1 in $\mathbb{R}$ must pass through 0 by the Intermediate Value Thm.
- thus, there is no path in A from -1 to 1 and so A is not path connected.

(b) $B = \{(x,y) \in \mathbb{R}^2 \mid$ either x or y is an integer$\}$

i.e.



- to show that B is path connected it is enough to find a path $\gamma_p : [0,1] \to B$ from p to $(0,0)$, i.e. $\gamma_p(0) = p$ $\gamma_p(1) = (0,0)$.

Then to connect p and q in B by a path in B. we could use. $\gamma_p \# \gamma_q^{-1}$. (See picture above)

~~To connect $p=(x,y)$ to $(0,0)$~~ we