

$$U = \{x \in \mathbb{R} \mid \sin x = \frac{1}{2}\}$$

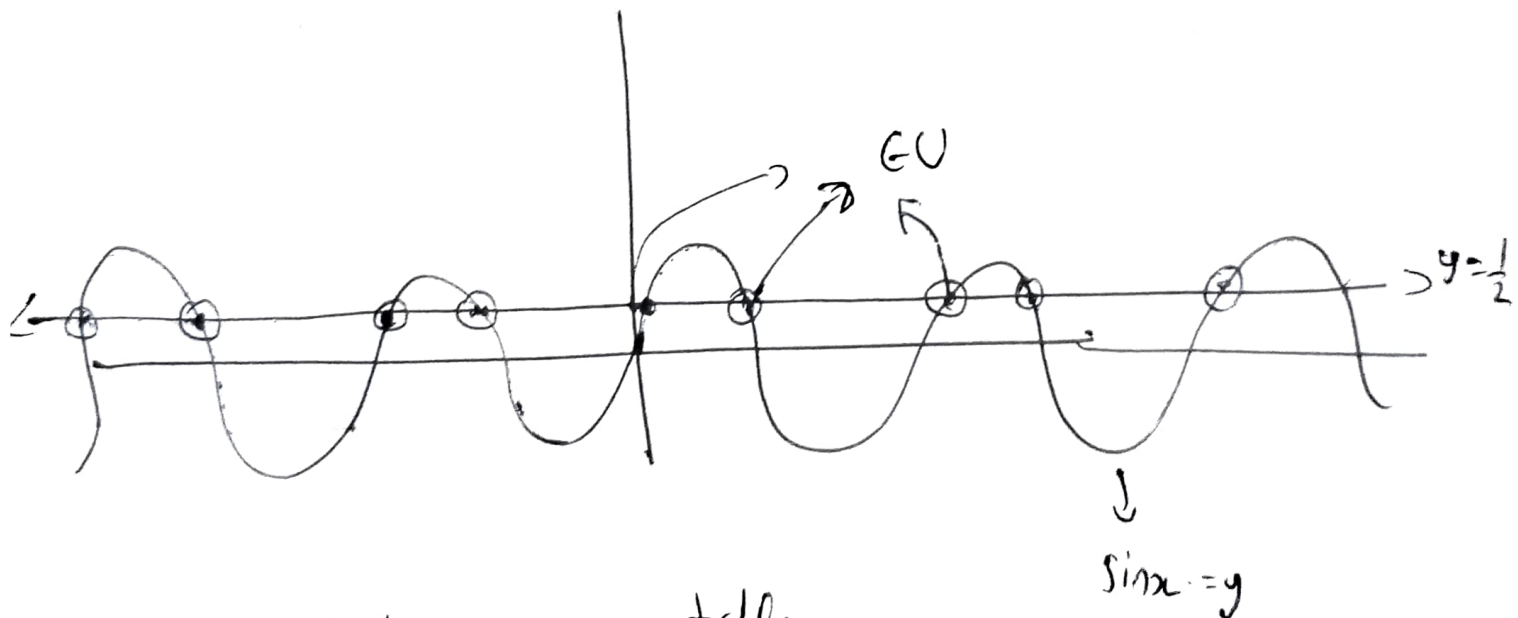
let $f: \mathbb{R} \rightarrow \mathbb{R}$ by $f(x) = \sin x$

where f is continuous.

$$\Rightarrow U = f^{-1}\left(\underbrace{\left\{\frac{1}{2}\right\}}_{\text{closed set}}\right)$$

as under continuous function, inverse image of closed set is closed.

II method



which are countable

$\Rightarrow$ not open and closed