$Y = [-1, 1]$ as a subspace of $\mathbb{R}$

Which of the following sets are open in Y which in $\mathbb{R}$?

$A = \{x \mid \frac{1}{2} < |x| < 1\}$

$B = \{x \mid \frac{1}{2} < |x| \leq 1\}$

$C = \{x \mid \frac{1}{2} \leq |x| < 1\}$

$D = \{x \mid \frac{1}{2} \leq |x| \leq 1\}$

$E = \{x \mid 0 < |x| < 1, \ \frac{1}{x} \notin \mathbb{Z}_+\}$

We see that the basis of Y consists of sets of the form:

$(a, b), \ -1 \leq a < b \leq 1$

$[-1, a), \ -1 < a < 0$

$(a, 1], \ -1 < a < 0$

$\emptyset$ or $[-1, 1]$

$A = (-1, -\frac{1}{2}) \cup (\frac{1}{2}, 1)$ open in $\mathbb{R}$ and thus in Y

$B = [-1, -\frac{1}{2}) \cup (\frac{1}{2}, 1]$, not open in $\mathbb{R}$ but open in Y

$C = (-1, -\frac{1}{2}] \cup [\frac{1}{2}, 1)$ not open in Y

$D \to$ not open in Y

$$E = (-1,0) \cup \left((0,1) \setminus \left(\bigcup (\tfrac{1}{n})\right)\right)$$

$(-1,0)$ is open

$(0,1) \setminus \left(\bigcup_{n \in \mathbb{N}} \{\tfrac{1}{n}\} \right) = A$

if $x \in A$ let $a = \sup\{\tfrac{1}{n} < x\}$

$b = \inf\{\tfrac{1}{n} > x\}$

then a^* s.t $a < a^* < x$

b^* s.t $x < b^* < b$

thus $x \in (a^*, b^*) \to$ open

so E is open in X