

Math 364 Homework #3

Solutions

1 a) $A = (-2, 1]$ is not open in $X = (-2, 2)$

Proof: Note that if $\varepsilon < 1$, then the open balls in X around 1 are of the form

$$\begin{aligned} U_\varepsilon(1) \cap X &= (1-\varepsilon, 1+\varepsilon) \cap (-2, 2) \\ &= (1-\varepsilon, 1+\varepsilon) \end{aligned}$$

So, all of these contain points that are > 1 and hence not in A .

$\therefore 1$ is not an interior point of A in X

b) The interval $A = (-1, 2)$ is open in $(-2, 2)$.

Proof: Let $x \in A = (-1, 2)$ and set

$$r = \min \{ |x+1|, |2-x| \}.$$

Then $U_r(x) \subset A$ and x is an interior point of A in X .