Name:

Problem 1: *Pat claims that the subspace* $Y = [-1, 0) \cup (0, 1] \subset \mathbb{R}$*, where* $\mathbb{R}$ *has the usual topology, is not connected, because* $U = [-1, 0)$ *and* $V = (0, 1]$ *form a separation of* Y*. Sam disagrees, and says that this argument doesn't work, because* $[-1, 0)$ *and* $(0, 1]$ *are not open.*

Who is correct? Justify your answer with ***one*** *sentence.*

Solution: Pat is correct here. It is true that $[-1, 0)$ and $(0, 1]$ are not open in $\mathbb{R}$, but they are open in Y with the subspace topology, so all is good and U and V do form a separation of Y.