Math589 Homework 6

Note: To submit the k-th homework, simply put your files in the folder `HWk` on CoCalc, and it will be collected on the due day.

1. Let $(X, \mathcal{O})$ be a topological space with $X = \{1, 2, 3, 4\}$ and $\mathcal{O} = \{\emptyset, X, \{1\}, \{2\}, \{1, 2\}\}$. Let $Y = \{3\}$. Find the closure $\text{cl}(Y)$, the boundary ∂Y, and the interior $\text{int}(Y)$ of Y.

2. Suppose X and Y are deformation retracts of Z. Show that X and Y are homotopy equivalent by Definition 1.2.2.