Topology, fall 2022

Homework 7, due Friday November 4. (60 points)

I misnamed homework 6 to "Homework 7" in Courseworks, hence this one will be labelled "Homework 7.1" there.
Read Munkres Sections §51, 52 (the material of Thursday's lecture; we've covered only the first half of §52).

I, II, III. (10 points each) Exercises 1, 2b, 3bc on page 330.

IV. (10 points) Exercise 1ab on page 334.

V. (20 points) Which of the following spaces (assume standard topology on each of them) are contractible? It's enough to provide "yes" or "no" answers, but drawing a picture or giving a brief explanation would help us to see your reasoning for the answer.

$\mathbb{R}^n$, $[0,2)$, $\mathbb{R}\setminus\{0\}$, $(-3,6)$, $\mathbb{Q}$,

subspace of $\mathbb{R}^2$ which is the union of the x-axis and the y-axis,

the unit cube in $\mathbb{R}^3$,

$\mathbb{R}_\ell$,

$X=\{a,b\}$ with the topology $\mathcal{T}=\{\emptyset,\{a\},X\}$.