Writing Assignment 10

Due Monday, April 26, 11:59 PM

Show that $\mathbb{R}^n \setminus \{0\}$ is homotopy equivalent to S^{n-1}.

As a hint: If $n = 1$, note that $\mathbb{R} \setminus \{0\}$ "retracts" to $S^0 = \{\pm 1\}$. As a start, you should try to construct a retraction of the interval $(0, \infty)$ to the point $1 \in (0, \infty)$. That is, is there a function

$$H : [0, 1] \times (0, \infty) \to (0, \infty)$$

so that $H(0, x) = x$ but $H(1, x) = 1$? (If so, as you fix x and run t from 0 to 1, you will see a movie of x moving from its initial position to the point 1.)