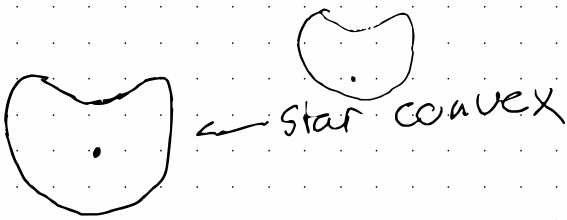
A subset $A$ of $\mathbb{R}^n$ is said to be star convex if for some some point $a_0$ of $A$ all the line segments joining $a_0$ to other points of $A$ lie in $A$

a) find a star convex set that is not convex




b) show that if $A$ is star convex, $A$ is simply connected

Let $x_0$ be the point giving $A$ the star connected property. for $x_1, x_2 \in A$ let $f_1$ be the path from $x_1 \to x_0$, $f_2$ from $x_0 \to x_2$ then $f_1 * f_2$ is a path from $x_1$ to $x_2$ so $A$ is path connected now let $f$ be a loop of $x_0$

$F(x,t) = tf(x) + (1-t)x_0$ is a continuous function, thus $f(x)$ and $x_0$ are homotopic so $A$ is simply connected ∎