HW6: Due on Friday, March 2

1. Explain in at most three sentences why the proof given of Theorem 4 in section 16.2 does not work if the domain has a hole.

2. Show that a star-like domain $D \subseteq \mathbb{R}^n$ is simply connected: given a closed curve $C$ in $D$, find an explicit sequence of closed curves $C_s$, $0 \leq s \leq 1$ s.t. $C_0 = C$, $C_1$ is a single point, each $C_s$ is contained in $D$, and the curves $C_s$ “vary continuously” with $s$.

3. Show that the open punctured ball in $\mathbb{R}^3$ is simply connected by reducing to the fact, proved in class that the closed punctured ball in $\mathbb{R}^3$ is simply connected.

Problems in textbook:
15.5: 3, 4, 7, 14, 21