9.2. **Mapping of z-plane into the s-plane**

Consider the inverse relation given by $z = e^{sT_s}$—that is, how to map the z-plane into the s-plane.

(a) Find an expression for s in terms of z from the relation $z = e^{sT_s}$.

(b) Consider the mapping of the unit circle (i.e., $z = 1e^{j\omega}$, $-\pi \leq \omega < \pi$). Obtain the segment in the s-plane resulting from the mapping.

(c) Consider the mapping of the inside and the outside of the unit circle. Determine the regions in the s-plane resulting from the mappings.