2.36 A lossless transmission line is terminated in a short circuit. How long (in wavelengths) should the line be for it to appear as an open circuit at its input terminals?

Solution: From Eq. (2.84), $Z_{\text{in}}^{\text{sc}} = jZ_0 \tan \beta l$. If $\beta l = (\pi/2 + n\pi)$, then $Z_{\text{in}}^{\text{sc}} = j\infty\ (\Omega)$. Hence,

$$l = \frac{\lambda}{2\pi}\left(\frac{\pi}{2} + n\pi\right) = \frac{\lambda}{4} + \frac{n\lambda}{2}.$$

This is evident from Figure 2.19(d).