Chapter 11, Solution 87.

$$\mathbf{Z} = R \pm jX$$

$$\mathbf{V}_R = \mathbf{I}R \longrightarrow R = \frac{\mathbf{V}_R}{\mathbf{I}} = \frac{80}{50 \times 10^{-3}} = 1.6\ \text{k}\Omega$$

$$|\mathbf{Z}|^2 = R^2 + X^2 \longrightarrow X^2 = |\mathbf{Z}|^2 - R^2 = (3)^2 - (1.6)^2$$

$$X = 2.5377\ \text{k}\Omega$$

$$\theta = \tan^{-1}\left(\frac{X}{R}\right) = \tan^{-1}\left(\frac{2.5377}{1.6}\right) = 57.77°$$

$$\text{pf} = \cos\theta = \mathbf{0.5333}$$