Chapter 11, Solution 52.

$$S_A = 2000 + j\frac{2000}{0.8}0.6 = 2000 + j1500$$
$$S_B = 3000x0.4 - j3000x0.9165 = 1200 - j2749$$
$$S_C = 1000 + j500$$
$$S = S_A + S_B + S_C = 4200 - j749$$

(a) $$pf = \frac{4200}{\sqrt{4200^2 + 749^2}} = \mathbf{0.9845\ leading}$$

(b) $$S = V_{rms}I_{rms}^* \longrightarrow I_{rms}^* = \frac{4200 - j749}{120\angle 45°} = 35.55\angle -55.11°$$

$I_{rms} = \mathbf{35.55\angle 55.11°\ A}$.