Chapter 11, Solution 46.

(a) $\mathbf{S} = \mathbf{V}\mathbf{I}^* = (220\angle 30°)(0.5\angle -60°) = 110\angle -30°$

$\mathbf{S} = [95.26 - j55]\ VA$

Apparent power = **110 VA**
Real power = **95.26 W**
Reactive power = **55 VAR**
pf is **leading** because current leads voltage

(b) $\mathbf{S} = \mathbf{V}\mathbf{I}^* = (250\angle -10°)(6.2\angle 25°) = 1550\angle 15°$

$\mathbf{S} = [497.2 + j401.2]\ VA$

Apparent power = **1550 VA**
Real power = **1497.2 W**
Reactive power = **401.2 VAR**
pf is **lagging** because current lags voltage

(c) $\mathbf{S} = \mathbf{V}\mathbf{I}^* = (120\angle 0°)(2.4\angle 15°) = 288\angle 15°$

$\mathbf{S} = [278.2 + j74.54]\ VA$

Apparent power = **288 VA**
Real power = **278.2 W**
Reactive power = **74.54 VAR**
pf is **lagging** because current lags voltage

(d) $\mathbf{S} = \mathbf{V}\mathbf{I}^* = (160\angle 45°)(8.5\angle -90°) = 1360\angle -45°$

$\mathbf{S} = [961.7 - j961.7]\ VA$

Apparent power = **1360 VA**
Real power = **961.7 W**
Reactive power = **- 961.7 VAR**
pf is **leading** because current leads voltage