ECE 330 HW 2

In class quiz Fri, Feb 1.
Copies of the textbook are kept at the Grainger Engineering Library Reserve

Textbook problem 2.16 (Partial answer: $I_{line} = 1,255A$, $P_{tot} + jQ_{tot} = 600 + j450MVA$)

Textbook problem 2.17 (Partial answers: -250, -500, 500, 0, 150, 1900, -150)

Textbook problem 2.19

Textbook problem 2.20

Textbook problem 2.25 (Partial answer: 100 Amps)

Special Problem #1
A balanced, 3-phase, 3-wire, $60Hz$, Wye-connected source is serving a combination of balanced loads in various configurations. Measurement of the source line voltage indicates 480 Volts (line to line). Measurement of the source line current indicates 23 Amps. When $8kVAR$ of capacitance (3-phase) is added in parallel to the other loads, the source voltage stays the same and the source line current changes to 18 Amps.
What is the total 3-phase original load in Watts and Vars?(Partial answer: 14,153 Watts)

Special Problem #2
The following three-phase, balanced loads are connected across a three-phase, wye-connected source($60Hz$ and $480V$ - line to line). The nature of the three loads are described below:
Load #1: Wye-connected load with $100kVA$ (3-phase) at 0.9 PF lag;
Load #2: Wye-connected load with $60kW$ (3-phase) at 0.7 PF lead;
Load #3: Delta-connected load, with 75 A phase current and 0.9 PF lag.
Calculate the following:

1. The total complex power (3-phase) consumed by these three loads.

2. The magnitude of the total source line current (answer: 300 Amps).

3. The capacitive reactive power **per phase** needed to be added to the delta connected load to make the overall PF equal to 1.0 (total for all loads).

4. The magnitude of the total source line current after the power factor correction of part c).