H3.1 In each of the following cases, a balanced positive-sequence 3-phase source supplies a balanced 3-phase load. For all phasor calculations, assume that $V_{AN}$ is the "reference." (The angle of $V_{AN}$ is $0^\circ$)

For each case, first draw the power triangle for the load, labeling $P, Q, S,$ and $\Theta$.

a) $V_{RATED} = 34.5$ kV. The load consumes 165 kW at a PF of 0.75 LEAD. Calculate the phasor values of $I_A$ and $I_B$ flowing into the load.

b) $V_{RATED} = 69$ kV. The load consumes 300 MVA at a PF of 0.8 LAG. Calculate the phasor value of $I_A$ flowing into the load. How many amps must the line handle?

c) $V_{RATED} = 480$ V. The load generates 58 kVAR. The PF is known to be 0.6, but it was not noted whether it is LEAD or LAG. Calculate the phasor value of $I_A$ flowing into the load. Is the PF LEAD or LAG? Explain.