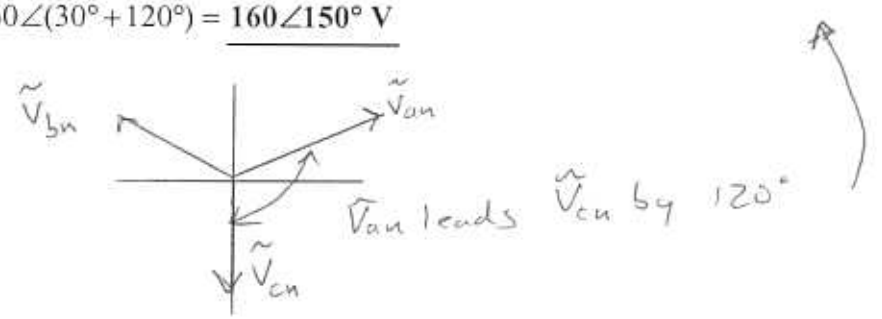
PROBLEM SET #27

Chapter 12, Solution 2.

Since phase c lags phase a by 120°, this is an **acb sequence**.

$$\mathbf{V}_{bn} = 160\angle(30° + 120°) = \mathbf{160\angle 150°\ V}$$



Chapter 12, Solution 7.

This is a balanced Y-Y system.

Using the per-phase circuit shown above,

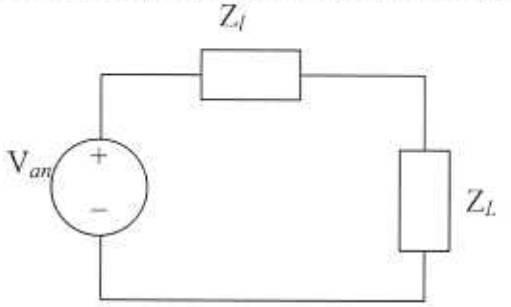
$$\mathbf{I}_a = \frac{440\angle 0°}{6 - j8} = \mathbf{44\angle 53.13°\ A}$$

$$\mathbf{I}_b = \mathbf{I}_a\angle -120° = \mathbf{44\angle -66.87°\ A}$$

$$\mathbf{I}_c = \mathbf{I}_a\angle 120° = \mathbf{44\angle 173.13°\ A}$$

Chapter 12, Solution 8.

Consider the per phase equivalent circuit shown below.



$$I_a = \frac{V_{an}}{Z_L + Z_l} = \frac{100 < 20^o}{10.6 + j15.2} = \underline{\mathbf{5.396\angle -35.1^\circ\ A}}$$

$$I_b = I_a < -120^o = \underline{\mathbf{5.396\angle -155.1^\circ\ A}}$$

$$I_c = I_a < +120^o = \underline{\mathbf{5.396\angle 84.9^\circ\ A}}$$

$$V_{La} = I_a Z_L = (4.4141 - j3.1033)(10 + j14) = \underline{\mathbf{92.83\angle 19.35^\circ\ A}}$$

$$V_{Lb} = V_{La} < -120^o = \underline{\mathbf{92.83\angle -100.65^\circ\ A}}$$

$$V_{Lc} = V_{La} < +120^o = \underline{\mathbf{92.83\angle 139.35^\circ\ A}}$$