

**Chapter 9, Solution 88.**

(a)  $\mathbf{Z} = -j20 + j30 + 120 - j20$   
 $\mathbf{Z} = \mathbf{(120 - j10) \, \Omega}$

(b) If the frequency were halved,  $\frac{1}{\omega C} = \frac{1}{2\pi f C}$  would cause the capacitive impedance to double, while  $\omega L = 2\pi f L$  would cause the inductive impedance to halve. Thus,  
 $\mathbf{Z} = -j40 + j15 + 120 - j40$   
 $\mathbf{Z} = \mathbf{(120 - j65) \, \Omega}$