Ch.15 Prob.22

$C = 25\,\mu F$

$v = (160\,V)\sin(120\pi t)$

a) Find the reactance.

for a capacitor $X_C = \frac{1}{\omega C}$

$= \frac{1}{(120\pi)(25\times10^{-6}\,F)}$

$X_C = 106\,\Omega$

b) write an expression for the current.

In a capacitor $i = \frac{v}{X_C}\sin(\omega t - \phi)$ where $\phi = -\frac{\pi}{2}$

$i = \frac{v}{X_C} = \frac{(160\,V)\sin(120\pi t + \frac{\pi}{2})}{106\,\Omega}$

$i = (1.51\,A)\sin(120\pi t + \frac{\pi}{2})$

amplitude

ϕ - negative phase shift

current peaks before voltage